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10th International Congress on Peritoneal Surface Malignancies

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ABSTRACT BOOK

Journal of PERITONEUM
(and other serosal surfaces)

pagepress

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(and other serosal surfaces)

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Journal of Peritoneum
(and other serosal surfaces)

The **Journal of Peritoneum (*and other serosal surfaces*)** (JoPER) is an open access, peer-reviewed online journal that covers all aspects of clinical and basic research related to either healthy, either diseased peritoneum (and other serosal surfaces, like pericardium and pleura) and its allied subjects. Peritoneum is a word derived from Greek (peritonaion) via Latin (peritonaeum), that results from the merging of peri- "around" (lat. peri-) + teinein "to stretch" (lat. tenet), meaning thus "stretched around" or "stretched over". Although peritoneum is present in some invertebrates, such as annelids, typically is the serous membrane that forms the internal covering of the abdominal cavity or coelom in amniotes, wrapping most of the intra-abdominal (or coelomic) organs. Although the peritoneum is composed only of a layer of mesothelium supported by a thin stratum of connective tissue, it is involved in many intrabdominal disorders and is an important way of treatment (like, for example, intraperitoneal chemotherapy and peritoneal dialysis). Thus peritoneum spans a wide range of disciplines and interests, including either surgical and medical specialties, but even anatomy, embryology, histology, physiology and basic sciences. The same can be told for other serosal surfaces of human body, like pericardium and pleura. As such JoPER aims to provide a platform for surgeons and physicians to publish their researches and rapidly exchange ideas and findings with the common topic of the peritoneum (and the other serosal surfaces). Areas of interest include, but are not limited to: oncology, inflammatory diseases and adhesions, septic diseases, gynecological diseases and endometriosis. The online presence of JoPER, as well as it's open access policy ensures that the articles published in the journal are highly visible and reach a wide audience, whilst immediate publication on acceptance ensures all findings are disseminated as quickly as possible.

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10th International Congress on Peritoneal Surface Malignancies
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TOP ABSTRACTS

Pseudomyxoma Peritonei and Appendiceal Adenocarcinoma

P100

THE MUCIN-LYSING EFFECT OF MYRTOL STANDARDIZED FOR ENHANCED TREATMENT OF PSEUDOMYXOMA PERITONEI: A PROOF-OF-PRINCIPLE STUDY

Yan Li, Department of Peritoneal Cancer Surgery, Beijing Shijitan Hospital affiliated to the Capital Medical University; Kai-Wen Peng, Department of Peritoneal Cancer Surgery, Beijing Shijitan Hospital affiliated to the Capital Medical University; Zhong-He Ji, Department of Peritoneal Cancer Surgery, Beijing Shijitan Hospital affiliated to the Capital Medical University*

BACKGROUND: Pseudomyxoma Peritonei (PMP) is characterized by formation of very thick mucin in the abdominal and pelvic cavity, and the accumulation and thickening of mucin ultimately lead to jelly belly and abdominal obstruction. Mucin is also resposible for tumor resistance to chemotherapy. Reducing the formation and the viscosity of mucin is an urgent task in PMP treatment.
METHODS: Since myrtol standardized is an established mucin-lysing drug for mucin-related respiratory diseases, we tested the *in vitro* and *in vivo* efficacy of this drug in PMP treatment. For *in vitro* study, 20 ml of thick mucin from 3 PMP pts was added with 300 mg of the drug. For *in vivo* study, 3 pts take the drug 600 mg bid for 3 wk before CRS+HIPEC. For chemotherapy study, 3 pts take the drug 600 mg bid with capecitabine or tegafur, gimeracil and oteracil portassium for up to 6 mo.
RESULTS: For the *in vitro* study, the viscosity of the mucin could reduced by half 1 h after contacting with the drug at room temperature. For the *in vivo* study, the mucin viscosity and the hardness of the tumor mass were significantly reduced, and spleen preserving operation could be performed in 1 pt. For the chemotherapy study, partial tumor remission confirmed by CT scan was observed in all 3 pts studied, along with significantly improved performance status, and tumor markers CEA and CA199 leves reduced by over 6 folds (from 2900 u/ml to 400 u/ml for CA199). No clinically significant adverse events were observed.
CONCLUSIONS: This proof-of-principle study has provided evidence to support myrtol standardized as an effective mucin-lysing drug to enhance the efficacy of PMP treatment either before or after CRS+HIPEC.

Colorectal Cancer

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REPEAT CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY IN COLORECTAL CANCER IN 189 PATIENTS (PSOGI COLLABORATION)

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) for peritoneal dissemination of colorectal cancer (CRC) is commonly complicated by recurrence. The survival and recurrence benefits of iterative surgery in the context of CRC PC is also uncertain. The aim of this multi-centre study was to report safety and long-term survival of patients with PC of colorectal origin who underwent repeat CRS.
METHODS: 1. Determine the treatment benefits in terms of recurrence and survival following initial and repeat CRS/HIPEC in CRC. 2. Determine prognostic factors for survival and recurrence following the initial CRS/HIPEC and the iterative procedure. 3. Report on the feasibility of repeat CRS/HIPEC in patients with CRC. 4. Develop criteria with the PSOGI community for improved selection of patients that are suitable for a repeat CRS/HIPEC procedure.
RESULTS: A total of one-hundred and eighty-nine patients formed the cohort of this study. Mean peritoneal cancer index (PCI) at the repeat CRS was 6.9 (Median=6.0, Standard Deviation (SD)=6.5, Range= 0-39). Complete cytoreduction (*i.e.* completeness of cytoreduction (CC) score 0 or 1) was achieved in 81% (n=153) after the 2nd CRS. 63.0% patients received hyperthermic intraperitoneal chemotherapy (HIEPC) at he 2nd CRS. The mean total hospital stay following the 2nd CRS was 19.1 days (median=14.0, SD=29.2, range=0-208). Hospital mortality and major morbidity rate after the 2nd CRS was 2.1% (n=4) and 25.9% (n=49) respectively. The median follow up was 45.8 months (SD=43.2, range=5.5-309.0). The median overall survival (OS) was 46.2 months (95% confidence interval=37.0-55.4) with a 1-year, 3-year and 5-year OS rate of 96.5%, 66.3% and 41.6%. Use of HIPEC was identified as a significant prognostic factor for major morbidity after the

repeat CRS independent of sex, age, PCI of the 2nd CRSand CC score (p=0.015). Multivariate analysis identified PCI of the second CRS (p=0.005), use of HIPEC after the 2nd CRS (p=0.032) and CC score as independent prognostic factors of long-term survival.
CONCLUSIONS: Repeat CRS is able to provide further disease control for selected patients with recurrent PC of colorectal origin with acceptable mortality and morbidity.

Peritoneal Mesothelioma

P300

IMMUNOHISTOCHEMICAL EVALUATION OF TWO ANTIBODIES AGAINST PD-L1 AND PROGNOSTIC SIGNIFICANCE OF PD-L1 EXPRESSION ON A SERIES OF EPITHELIOID PERITONEAL MALIGNANT MESOTHELIOMA: A RENAPE STUDY

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BACKGROUND: Peritoneal malignant mesotheliomas (PMM) are uncommon tumours with poor outcomes. Cytoreductive surgery (CS) and hyperthermic intraperitoneal chemoperfusion (HIPEC) were proposed to increase overall survival. Three distinctive variants are described in the 2015 WHO classification: epithelioid, sarcomatoid and biphasic mesothelioma. Epithelioid type (EPMM) is the most common variant. PD-L1 is a recent theranostic biomarker evaluated in most cancers but it has not been reported in EPMM.
METHODS: The aim of this study were (1) to compare the immunostaining with two antibodies anti-PD-L1 and (2) to evaluate the prognostic value of PD-L1 expression of mesothelial cells and lymphocytic reaction, in EPMM.
RESULTS: (1) For E1L3N clone, inter-observer agreement of immunostaining is moderate on mesothelial cells (k=0.57) and lymphocytic cells (k=0.55). For anti-PDL1 antibody SP142 clone, inter-observer agreement of the immunostaining is fair (k=0.38) on mesothelial cells and poor (k=0) on lymphocytic cells. (2) After consensus reviewing by three pathologists, PD-L1 expression is 31.1% (14/45 cases) and 15.6% (7/45 cases) for the E1L3N clone and 22.2% (10/45 cases) and 26.7% (12/45 cases) for the SP142 clone, on mesothelial cells and lymphocytic cells respectively. (3) Finally, the inter-antibodies agreement is moderate for immunostaining on mesothelial cells (k=0.55) and lymphocytic cells (k=0.54). The clone E1L3N gives a membrane staining while the SP142 antibody gives a granular cytoplasmic and/or membrane staining. Both are of weak or moderate intensity. The percentage of positive mesothelial cells is=5% for 12/14 and 6/10 cases with E1L3N and SP142 clone respectively.
(4) By univariate survival analysis, CS+HIPEC treatment was correlated to better PFS (p=0.03), solid histological subtype was correlated to worse OS (p=0.02), PD-L1 expression by lymphocytic cells was correlated to better PFS and OS (p=0.03 and p=0.02). By multivariate analysis CS+HIPEC was correlated to better PFS (p=0.04) and solid histological subtype to worse OS (p=0.03).
CONCLUSIONS: The E1L3N clone gives a clear membrane staining and seems to be easier to use than SP142 clone for evaluation of PD-L1 expression. A minority of EPMM express PD-L1 and the percentage of positive cells is low in a majority of positive cases. There isn't prognostic significance of PD-L1 expression in EPMM.

Ovarian Cancer

P400

NORMOTHERMIC OR HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY WITH PACLITAXEL OR DOCETAXEL? EVALUATION OF THE CYTOTOXICITY OF VARIOUS DRUG CONCENTRATIONS, WITH OR WITHOUT HYPERTHERMIA, IN OVARIAN CANCER CELL LINES

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BACKGROUND: Intraperitoneal chemotherapy with taxanes, an effective treatment of ovarian cancer, provides high locoregional drug concentrations (μM rather than nM as in intravenous chemotherapy). Regarding their synergy with hyperthermia, results have been inconclusive.
METHODS: In this study, the effect of different concentrations paclitaxel and docetaxel on ovarian cancer cells under normothermic and hyperthermic conditions, resembling also intraoperative hyperthermic intraperitoneal chemotherapy, is evaluated. Cisplatin resistant SK-OV-3 and OVCAR-3 ovarian cancer cells were exposed for 2 hours to 0.1, 1 and 3 μM concentrations of paclitaxel and docetaxel at 37 (normothermia) and 41.5 OC (hyperthermia). Cell proliferation and cell cycle kinetics were evaluated after 24 hours, 3 days and 7 days.
RESULTS: A concentration-dependent effect on cell proliferation was observed under all conditions, with docetaxel being more effective than paclitaxel. In most circumstances a cytostatic effect was observed. After 7 days, a cytotoxic effect was observed in both cell lines with 3 μM concentrations of either drug and with 1 μM concentrations of docetaxel. Moderate thermal enhancement was observed for 0.1 μM and 1 μM concentrations of both drugs after 24 hours, but after 7 days only for 1 μM paclitaxel in OVCAR-3 cells. Concurrent hyperthermia caused a prolonged arrest of cells in the G2-M phase under all circumstances, but this phenomenon was most distinct for 1 μM docetaxel and 3 μM paclitaxel in OVCAR-3 cells.
CONCLUSIONS: This *in vitro* study demonstrates a concentration-dependent effect of both paclitaxel and docetaxel on ovarian cancer cell proliferation, supporting their intraperitoneal use. Docetaxel seems to be more effective than paclitaxel. Since their thermal enhancement appears to be limited, intraoperative intraperitoneal chemotherapy with taxanes may be performed under normothermic conditions without significant impairment of its effectiveness to be expected.

Gastric Cancer

P500

INTRAOPERATIVE ADJUVANT HIPEC PREVENTS HEPATIC RECURRENCE AS WELL AS PERITONEAL RECURRENCE AFTER CURATIVE GASTRECTOMY FOR AN ADVANCED GASTRIC CANCER

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BACKGROUND: Prevention of recurrence after curative (R0) surgery is one of the most important subjects to be resolved for gastrointestinal (GI) cancers. We have previously shown that hyperthermic intraperitoneal chemotherapy (HIPEC) following R0 gastrectomy is effective for preventing peritoneal recurrence. However, little is known about the preventive effect of HIPEC for GI cancers on hepatic recurrence.
METHODS: The aim of this study was to compare hepatic or peritoneal recurrence-free survival between patients with or without adjuvant HIPEC after R0 gastrectomy for an advanced gastric cancer (GC). Patients with advanced GC who underwent gastrectomy with a curative intent in the Shiga University of Medical Science hospital between 1998 and 2012 were included in this single center, retrospective, propensity score-matched cohort study. Cox proportional hazards regression models were used to evaluate the association between adjuvant HIPEC and hepatic or peritoneal recurrence-free survival. The Kaplan-Meier method was used to calculate the survival rate. P values <0.05 were considered statistically significant. HIPEC was performed using CDDP and MMC, or combined with 5-FU in 5 L of perfusate of saline maintained at 42-43°C for 30 min. Patients received a standard adjuvant chemotherapy after surgery.
RESULTS: A total of 180 patients with an advanced GC, in which the pathological depth of invasion was beyond the muscularis propria, were included in the study. There was no significant difference in clinicopathological factors between the matched cohorts (with or without HIPEC). There were significant differences in the hepatic recurrence-free survival (hazard ratio [HR] for without HIPEC *versus* with HIPEC: 19.99, 95%CI: 2.62 to 152.37, P: 0.0039) and peritoneal recurrence-free survival (HR: 5.75, 95%CI: 2.31 to 14.3, P: 0.00018). The 3- and 5-year overall survival rate was 92.1% and 87.1% in patients with HIPEC and 53.3% and 45.6% in patients without HIPEC (log-rank: P <0.0001).
CONCLUSIONS: Adjuvant HIPEC performed with R0 gastric surgery showed a preventive effect on hepatic recurrence, as well as peritoneal recurrence and survival benefits for patients with advanced GC compared with R0 surgery alone without HIPEC.

Unusual Applications of Cytoreductive Surgery and Hyperthermic Intraperitoneal Chemotherapy

P600

CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR PERITONEAL METASTASES FROM SMALL BOWEL ADENOCARCINOMA: MULTI-INSTITUTIONAL EXPERIENCE

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BACKGROUND: Peritoneal metastases (PM) and hepatic metastases are the most common failure pattern for small bowel adenocarcinoma (SBA). Current standard treatment for patients with advanced SBA is systemic chemotherapy.However, a consensus on the treatment for SBA patient with PC has not been reached. Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) is a newer modality which has been developed to treat PM. Several retrospective single institution studies evaluating CRS and HIPEC treating PM from SBA have been reported. A multi-institutional data registry including 177 patients with PM from SBA was established. The primary end point was overall survival (OS) after CRS and HIPEC. The secondary end points were evaluation of prognostic variables for OS.
METHODS: This multi-institutional registry evaluated the outcome after cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) for patients with peritoneal metastases (PM) from small bowel adenocarcinoma (SBA).
RESULTS: Follow-up was completed in 174 (98.3%) patients. The median follow-up period was 30 months (range, 1 to 115 months). There were 80 (46.0%) female patients, and median age was 55 years (range, 29 to 78). One hundred and twelve (64.4%) patients presented with synchronous PM. The mean peritoneal cancer index (PCI) was 13 before CRS. Completeness of cytoreduction (CCR) 0/1 was achieved in 140 (80.5%) patients, and 152 (87.4%) patients received HIPEC. Twenty (11.5%) patients underwent a repeat CRS and HIPEC. The median OS of all 174 patients was 32.0 months. The median OS of 152 patients who received CRS and HIPEC was 36.0 months (range, 1 to 115 months), and the 1-, 3-, and 5-year survival rates were 86.0%, 52.6%, and 37.5%, respectively. Treatment-related mortality was 1.1%, and Grade 3 to 4 operative complications occurred in 32 (18.3%) patients. Three prognostic factors were independently associated with improved survival in multivariate analysis: well differentiated tumor (P=.010), CCR0 (P=.015), and performance of HIPEC (P=.027).
CONCLUSIONS: CRS is valuable for patients with PM from SBA. The combined treatment strategy of CRS and HIPEC achieved better survival in selected patients with PC from SBA with acceptable morbidity and mortality.

Basic and Pharmacological Research

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UNDERSTANDING THE ORIGINS OF SYNCHRONOUS PERITONEAL METASTASES AND ITS INFLUENCE ON SURVIVAL

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BACKGROUND: Peritoneal metastases (PM) may arise from virtually every primary tumor. However, the distribution of primary tumors in patients suffering from PM is currently unknown. Furthermore, it is not known whether the origin and the histology of the primary tumor correlates with survival. The aim of the current study was to investigate the distribution pattern of the primary tumor in patients suffering from PM and to determine the correlation with survival in a nationwide population.
METHODS: All patients diagnosed with synchronous PM in the Netherlands between 01-01-2007 and 31-12-2013 were retrospectively analysed. Data were extracted from the Dutch National Cancer Registry(IKNL). Origin of primary tumor and histology were registered according to the International Classification of Diseases for Oncology (ICD-0) and then analysed. Survival of different primary tumor locations was compared by using Kaplan-Meier.
RESULTS: Of all 88555 patients diagnosed with colorectal cancer in the Netherland between 2007 and 2013, 3933 (4%) were diagnosed with synchronous peritoneal metastases. Ovarian cancer was diagnosed in 9466 patients, PM was present in 4284 (45%). In patients diagnosed with stomach cancer, 13% had PM. In duodenal cancer 10% of the total population had PM. In patients with appendicular cancer, PM was found in 19%. PM was seen in 14% of the total population diagnosed with small intestinal cancer, 10% of the patients with pancreatic cancer as a primary tumor had PM. In total, 16094 patients with PM were included, of whom 5755 (36%) were male. In male patients, the most frequently encountered primary tumor was colorectal cancer (n=2009, 35%) followed by stomach cancer (n=974, 17%), tumors with an unknown primary location (n=901, 16%), pancreatic cancer (n=745, 13%), and bronchus- and lung cancer (n=358, 6%). In female patients, the most frequently encountered primary tumor was ovarian cancer (n=4284, 41%) followed by colorectal cancer (n=1924, 19%), tumors with an unknown primary location (n=1246, 12%), stomach cancer (n=758, 7%) and pancreatic cancer (n=717, 7%). In total, 3933 (24.44%) patients with colorectal cancer were included, of whom 67% had adenocarcinoma (AC), 19% mucinous adenocarcinoma (MC), and 7% signet ring cell carcinoma(SRCC). Of 1732 (11%) patients with stomach cancer, 52% had AC, 3% MC, and 26% SRCC. Survival differed significantly between the different sites of origin varying from 44.5 months PM from appendicular cancer to 3.5 months in pancreatic cancer patients with PM.
CONCLUSIONS: In patients with PM, the primary tumor location is most frequently the ovary in women and colorectal cancer in male patients. Survival varies widely between primary tumor location which probably has great impact on treatment possibilities.

Organization and Structure of Regional/National Peritoneal Surface Oncology Programs

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PROGNOSTIC VALUE OF 18 F FDG PET/CT IMAGING IN THE EVALUATION OF METASTATIC CANCERS OF UNKNOWN PRIMARY ORIGIN

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BACKGROUND: Intraabdominal metastatic cancers of unknown primary origin (CUP) are a heterojen groups of cancers. The presence of metastatic disease with no identified primary tumor at presentation. Identifying patients with prognostically favorable disease is important. Therefore, it is necessary an important imaging tool for detecting primary origin in the patients with CUP.
METHODS: F-18 FDG PET/CT scans of 35 patients (25 female, 10 male, mean age 56±13) with intraabdominal metastatic cancers of unknown primary origin referred to our clinic between May 2014 and June 2016 were evaluated retrospectively. Whole body images were obtained 60 minutes after the injection of approximately 370 MBq (10 mCi) F-18 FDG by PET/CT (Siemens Biograph Duo PET/CT). Emission scans were obtained for 3 min per bed position and transmission scans were obtained with low dose CT using 80 mA and 120 kvp.
RESULTS: The tumor was identified histopathologically in 25 of 35 patients. In 25 patients, the primary was identified as 4 lung, 3 colorectal, 3 breast, 2 stomach, 3 pancreas, 2 endometrial, 2 lymphoma, 3 peritoneum, 2 ovary cancerand 1 renal. If reports are considered, F-18 FDG PET/CT helped to detect primary origin in 65% of these 25 patients.
CONCLUSIONS: F-18 FDG PET/CT is an important imaging tool for detecting primary origin in the patients with intraabdominal metastatic cancers of unknown primary origin. Aswell as, F-18 FDG PET/CT can help to determine the extent of the disease and help to evaluate the therapy response.

PHYSICIAN ABSTRACTS

Pseudomyxoma Peritonei and Appendiceal Adenocarcinoma

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A POTENT CYTOTOXIC MUCOLYTIC FOR THE TREATMENT OF PSEUDOMYXOMA PERITONEI THROUGH PERITONEAL CATHETER

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BACKGROUND: Treatment for pseudomyxoma peritonei involves laparotomy,cytoreduction and hyperthermic intra-peritoneal chemotherapy. A potent cytotoxic mucolytic may enable the treatment through a peritoneal catheter. Hence, in the current study we show the development of a new and potent cytotoxic mucolytic comprising of cysteamine and bromelain, with subsequent comparison of it mucolytic efficacy to a previous formula made up of N-acetylcysteine and bromelain.
METHODS: *In situ* solubilisation of all mucin types secreted by Pseudomyxoma peritonei.
RESULTS: A combination of 200 µg/ml bromelain+200 mM cysteamine solubilised all soft mucin within 90 minutes compared to 180 minutes with previous formulation. It also disintegrated 86 -94% of the other grades of mucin as compared to 40 -60% by the previous formulation. A mild formulation with 50 µg/ml bromelain+50 mM cysteamine disintegrated only the soft mucin, however in a peritoneal wash, almost all the mucins disintegrated within 40 minutes, with considerable cytotoxicity (100% cell death) on mucin producing tumour cells.
CONCLUSIONS: The novel mucolytic consisting of 50 µg/ml bromelain+50 mM cysteamine is capable of solubilising all mucin types within 40 minutes in a peritoneal wash, with substantial cytotoxicity on mucin producing cells. Hence, the mucolytic may pave the way to a less invasive treatment for pseudomyxoma peritonei.

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EARLY POSTOPERATIVE INTRAPERITONEAL CHEMOTHERAPY FOR LOW-GRADE APPENDICEAL MUCINOUS NEOPLASMS WITH PSEUDOMYOMA PERITONEI- IS IT BENEFICIAL?

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BACKGROUND: There is little evidence for whether to use EPIC in patients with low-grade mucinous neoplasms (LAMN) with pseudomyxoma peritonei (PMP). This study aims to assess the short-term and long-term outcomes of use of EPIC in a large cohort of patients with LAMNs with PMP uniformly treated by CRS and PIC, all of whom received HIPEC and most of whom also received EPIC.
METHODS: To determine: 1. the short- and long- term outcomes of patients with LAMN PMP that have EPIC *vs* patients that do not. 2. Compare the difference in survival, morbidity, mortality and length of stay between the two groups. 3. Report on the feasibility of EPIC from a high-volume centre in LAMN PMP.
RESULTS: A total of 250 patients formed the cohort of this study. However there was no significant difference in terms of hospital mortality (p=0.153), major morbidity rate (*i.e.* Grade III/IV) (p=0.593), intensive unit care stay (p=0.764) and total hospital stay (p=0.927). However, patients who received HIPEC and EPIC had a significant longer stay in high dependency unit. Multivariate analysis showed combined HIPEC with EPIC is an independent prognostic factor for better survival outcomes (HR=0.30, 95%CI=0.12-0.74, P=0.009), adjusted for age, PCI and histopathological subtypes.
CONCLUSIONS: In summary, the combination of HIPEC and EPIC can provide additional survival benefits for patients with LAMNs with PMP as compared to HIPEC alone without increasing postoperative morbidity and mortality. EPIC should be considered following CRS and HIPEC for patients with LAMNs with PMP.

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PROGNOSTIC SIGNIFICANCE OF HISTOPATHOLOGICAL DIAGNOSIS OF PERITONEAL CARCINOMATOSIS OF APPENDICEAL ORIGIN ON SURVIVAL OUTCOMES

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BACKGROUND: It has been increasingly recognised that appendiceal mucinous neoplasms with peritoneal dissemination is not a homogenous disease. This study aims to examine the impact of different histological subtypes on survival of a large cohort of appendiceal mucinous neoplasms uniformly treated by cytoreductive surgery and intraperitoneal chemotherapy.
METHODS: 1. To determine the prognostic differences between histological diagnoses of low-grade appendiceal mucinous neoplasms with neoplastic epithelium absent, low-grade appendiceal mucinous neoplasms with neoplastic epithelium present, peritoneal mucinous neoplasms without signet ring cells and peritoneal mucinous carcinomatosis with signet cells.
RESULTS: A total of 444 patients formed the cohort of this study. Patients with low-grade appendiceal mucinous neoplasms with neoplastic epithelium absent tend to have a lower CEA, CA19-9 and CA125 levels preoperatively (p=0.109, 0.008 and 0.034 respectively). Factor analysis showed histological diagnosis is an independent prognostic factor for survival outcomes (HR=3.07, 95%CI=2.21-4.27, P<0.001), adjusted for PCI, CC score=2, use of EPIC, transfusion units, CEA>7.0mg/L, CA19-9 >24.0 U/mL and CA125>24 U/mL.
CONCLUSIONS: In summary, histological subtype remains a significant prognostic factor for survival outcomes in patients with appendiceal mucinous neoplasms. It should be taken into account when selecting patients for cytoreductive surgery and intraperitoneal chemotherapy and used to guide the long-term follow up of patients with peritoneal carcinomatosis of appendiceal origin.for patients with LAMNs with PMP.

P104

HAEMODYNAMIC CHANGES DURING HEATED INTRA-THORACIC CHEMOTHERAPY

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BACKGROUND: Heated intra-thoracic chemotherapy (HITOC) combined with cytoreductive surgery is a novel approach in the management of PMP tumours with thoracic extension. The effects of surgical manipulation of thoracic organs and application of high dose hyperthermic chemotherapy agents presents an anaesthetic challenge. In addition, surgical access commonly requires one lung ventilation. Cardiac output monitoring is likely to be of use in the management of this subset of patients. Here we describe the haemodynamic changes seen during HITOC with the use of a LIDCOrapid™ cardiac output monitor.
METHODS: Patients who underwent cytoreductive thoracic surgery with HITOC between February 2009 and February 2016 were included. All patients had thoracic spread of a primary appendix tumour with

pseudomyxoma peritoneii. Data were collected on oesophageal temperature, heart rate (HR), mean arterial pressure (MAP), central venous pressure (CVP), cardiac output (CO), systemic vascular resistance (SVR), stroke volume variation (SVV), urine output (UO), arterial pH, base excess (BE) and arterial lactate concentration. Intravenous fluids administered and dose of phenylephrine administered were also recorded. Haemodynamic parameters were recorded every 10 minutes.

RESULTS: Oesophageal temperature increased from a mean of 36.95°C to 38°C at 60 minutes. Mean heart rate (HR) peaked at 20 minutes following commencement of HITOC. The difference between HR at time 0 and at peak was minimal. There was minimal change in cardiac output and SVV remained stable. Phenylephrine or noradrenaline dose was almost unchanged throughout surgery. Average urine output during HITOC was 110.8±78.4 mls at 30 minutes and 142.5±109.6mls at 60 minutes. Mean fluid requirements during HITOC was 586.2±441.2 mls. Average blood loss during surgery was 1087.5±1742 mls. Two patients each received 2 units of blood, and one of these received 2 units of cryoprecipitate. No significant change occurred in pH or base excess.

CONCLUSIONS: Haemodynamic instability has been reported with HIPEC. The severity of the haemodynamic instability can be reduced by optimising patients' fluid status prior to HIPEC. HITOC should create a similar physiological challenge to HIPEC. Kerscher *et al.* reported their experience in a series of HITOC procedures. They reported considerable haemodynamic instability with hypotension, tachycardia increased vasopressor requirements and one episode of asystole. We used experience gained in abdominal cytoreductive surgery and HIPEC to guide our management. The use of goal directed fluid administration using a LIDCOrapidTM cardiac output monitoring allowed haemodynamic parameters to remain stable. This has not been described elsewhere. The peri-operative management of this patient group is complex. Ensuring an adequate preload must be balanced against the risks of lung injury resulting from excessive fluid. Thoracic complications following cytoreductive surgery and HIPEC are common. There are risks of both inadequate and excessive fluid administration. Cardiac output monitoring with goal directed fluid administration may reduce intraoperative and post operative complications in patients having HITOC procedures.

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INTRAVENOUS FLUID REQUIREMENTS DURING CYTOREDUCTIVE SURGERY AND HEATED INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Cytoreductive surgery with heated intraperitoneal chemotherapy (HIPEC) is associated with a high intravenous fluid requirement during surgery. Large fluid shifts resulting from drainage of ascites and extensive open surgery combined with the cardiovascular effects of HIPEC make assessment of fluid requirements challenging for the anaesthetist. There is significant morbidity associated with both inadequate and excessive fluid therapy. The literature quotes a fluid requirement in the range of 11 to 21mL/kg per hour for patient with peritoneal carcinomatosis undergoing cytoreductive surgery with HIPEC.

METHODS: - Describe fluid requirements for patients undergoing cytoreductive surgery with HIPEC. - Primary tumour histology, surgical procedure, age, sex and American Society of Anesthesiologists (ASA) classification were recorded. - A LIDCOrapid™ cardiac output monitor was connected and fluid boluses titrated to maintain stroke volume variation (SVV) <10%. - Millilitres of crystalloid, colloid and blood products administered were recorded as well as blood loss and urine output. Data were analysed using Microsoft Excel. Mean and standard deviation values were calculated.

RESULTS: 99 patients undergoing cytoreductive surgery with HIPEC were assessed. 50 patients had primary pseudomyxoma peritoneii (PMP), 49 patients had peritoneal carcinomatosis from a colorectal primary tumour. Participants were aged 23 to 86 years. 43 were male and 56 female. All patients were ASA grade 2 or 3. Mean total intravenous fluid requirement was 105.07 mls/kg (range 39.21 to 246.03 mls/kg, standard deviation (SD) 42.92 mls/kg) for the duration of surgery. For patients with primary PMP, fluid requirements were greater, with a mean of 115.05 mls/kg (range 42.99 to 246.03 mls/kg, SD 42.78 mls/kg). Those with other colorectal primary tumours required a mean of 94.89 mls/kg (range 39.21 to 210.41 mls/kg, SD 41.04 mls/kg). 14 patients had blood loss of more than 1.5L during the procedure. Excluding patients with blood loss of greater than 1.5L a mean of 105.81 mls/kg (SD 34.48 mls/kg, n=40) was required in the PMP group and 90.94 mls/kg (SD 39.67 mls/kg, n=45) for those with another primary tumour.

CONCLUSIONS: Open cytoreductive surgery with HIPEC carries unique challenges for fluid management. Under transfusion of fluid risks haemodynamic instability during HIPEC and may increase the risk of renal injury. Over transfusion can result in gastrointestinal and respiratory dysfunction. Goal-directed fluid therapy (GDFT) has been shown to reduce hospital length of stay and post-operative complications in cytoreductive surgery and HIPEC for non-PMP patients. With the use of GDFT, we found patients undergoing surgery and HIPEC for PMP required a larger volume of fluid than those undergoing surgery for other gastrointestinal primary malignancies. This is likely to be due to the increased incidence of ascites, resection of large volume of mucinous material and the propensity to a longer operative time.

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5-YEAR PROGRESSION-FREE AND OVERALL SURVIVAL FROM CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR ADENOCARCINOMAS OF THE APPENDIX

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BACKGROUND: Adenocarcinomas of the appendix are rare tumours with a propensity for peritoneal metastasis. Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS/HIPEC) can be curative with some published literature on overall survival (OS), but the impact of this intervention on disease progression where complete clearance is not achieved is less well known.

METHODS: This study aims to evaluate the progression-free survival (PFS) and overall survival (OS) of patients with adenocarcinomas of the appendix selected for CRS/HIPEC at a national peritoneal tumour centre. It also aims to evaluate the impact of tumour markers and blood test prognostic indicators on 5-year PFS and 5-year OS. A prospective database was used to collect information on patients undergoing CRS/HIPEC for adenocarcinomas of the appendix. All patients went through a multi-disciplinary team process where a decision to operate with curative intent was made based on review of CT scans, histology specimens, operation notes, comorbidities, and performance status. Outcomes of interest included pre-operative blood tests, previous surgery, prior systemic chemotherapy, tumour subtype, grade, stage, peritoneal cancer index (PCI), and completeness of cytoreduction score (CCS). Pre-operative (pre-CRS/HIPEC) blood tests included tumour markers (CEA, CA19-9, CA125) and derived neutrophil/lymphocyte ratio (NLR), and platelet/lymphocyte ratio (PLR). 5-year PFS and 5-year OS from date of CRS/HIPEC were evaluated using Kaplan Meier curves and univariate Cox proportional hazards regression analysis. Statistical analysis was performed using Stata version 13.

RESULTS: Between 2005 and 2015, 65 patients underwent CRS/HIPEC for adenocarcinomas of the appendix at this institution with curative intent. The median PCI score was 6 (IQR 0-34), with CCS=0 tumour clearance achieved in 45 cases (69.2%), CCS=1 tumour clearance achieved in 13 cases (20%), CCS=2 tumour clearance achieved in 3 cases (4.6%), and CCS=3 tumour clearance achieved in 4 cases (6.2%). 5-year PFS was 36.1% and OS was 55.5%. Patients with CCS=0 following CRS/HIPEC had a significantly higher 5-year PFS of 45.3% (HR=2.2, CI=1.1-4.3, p=0.03) and OS of 70% (HR=6.6 CI=2.6-16.6, p=<0.005). Prognostic indicators associated with significantly higher PFS were PCI<7 (HR=1.07, CI=1.0-1.1, p=<0.005) and pre-operative CEA<4 (HR=2.42, CI=1.4-4.3, p=0.002). Prognostic indicators associated with significantly higher OS were PCI<7 (HR=1.1, CI=1.1-1.2, p=<0.005), pre-operative CEA<4 (HR=2.7, CI=1.3-5.5), pre-operative CA 19-9 (HR=3.2, CI=1.3-7.9, p=0.01), and pre-operative CA125 (HR=3.3, CI=1.1-10.1, p=0.039). Tumour grade, sub-type, NLR, and PLR were not associated with changes in PFS and OS.
CONCLUSIONS: This study highlights the importance of determining PFS as well as OS when evaluating long-term outcomes from CRS/HIPEC for peritoneal tumours. It also clearly demonstrates that complete tumour clearance (CCS=0) from CRS/HIPEC in appendiceal adenocarcinomas is achievable in the majority of cases selected for this intervention, and results in significantly improved PFS and OS. Finally it identifies pre-operative tumour markers, PCI score, and CCS as the poor prognostic indicators of PFS and OS, suggesting that these patients may benefit from additional systemic treatments following CRS/HIPEC.

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VALIDATION OF THE RECENT PSOGI PATHOLOGICAL CLASSIFICATION OF PSEUDOMYXOMA PERITONEI IN A SINGLE CENTER SERIES OF 244 PATIENTS TREATED BY CRS/HIPEC

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BACKGROUND: Controversies still persist regarding the terminology and pathologic classification of appendiceal mucinous neoplasms and the associated clinical entity of pseudomyxoma peritonei (PMP). To address these inconsistencies, a consensus process based on the Delphi methodology was started during the 2012 World Congress of the Peritoneal Surface Oncology Group International (PSOGI) in Berlin. The final results were presented during the 2014 World Congress in Amsterdam. To date, the PSOGI classification has never been clinically validated.
METHODS: The objective of the present study was to assess the prognostic significance of the recently proposed PSOGI classification in our large institutional case-series.
RESULTS: A prospective database of 244 PMP patients uniformly treated by cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS/HIPEC) form 1996 to 2016 in a single center was reviewed. Closed-abdomen HIPEC was performed with cisplatin and mitomycin-C. According to the PSOGI classification, peritoneal disease was retrospectively classified into three categories: low-grade (LG-PMP), high-grade (HG-PMP), and high-grade with signet ring cells (SRC). Acellular mucin was classified separately. Potential clinical and pathological prognostic factors were assessed as control variables, including the 2010 World Health Organization (WHO) pathological classification. One hundred-one patients were males, and 143 patients were females. Mean patient age was 54.2 years (range 24-81). Mean PCI was 21.2 (range 1-39). Surgical cytoreduction was macroscopically complete 132 patients (54.1%), nearly complete (residual disease=2.5 mm) in 107 (43.8%), and grossly incomplete in 5 (2.1%). In the overall series, median follow-up was 65.5 months (95% confidence interval [CI] 53.7-78.8), and 10-year overall survival 64.1%. Major complications occurred in 79 patients (32.4%), and operative death in 9 (3.7%). Twenty-five patients (10.2%) were diagnosed with acellular mucin, 175 with LG-PMP (71.7%), 41 with HG-PMP (16.8%), and 3 with SRC (1.2%). Ten-year survival was 96.0%, 68.9%, 33.9%, and 0 for patients with acellular mucin, LG-PMP, HG-PMP, and SRC, respectively. Survival rate for LG-PMP was statistically higher than those of HG-PMP (P<0.001), and SRC (P=0.025), but there was only a border line difference with acellular mucin group (P=0.095). At multivariate analysis, PSOGI classification reached only a border line significant correlation with survival (hazard rate [HR] 0.67; 95% CI 0.43-1.05; P=0.082). The completeness of cytoreduction (HR 1.71; 95%CI 1.33- 2.19; P<0.001), and WHO classification (HR 2.22; 95% CI 1.20-4.10; P=0.011) were independently and significantly associated with prognosis.
CONCLUSIONS: Our findings suggest that two pathological categories proposed by the new PSOGI classification, namely acellular mucin and HG-PMP with SRC, may identify two subsets of patients with favorable and exceedingly dismal prognosis, respectively. Nevertheless, it remains unclear if the PSOGI classification might provide a better prognostic stratification, as compared to the current WHO classification. Further studies in larger prospective series are needed.

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HUGE PSEUDOMYXOMA PERITONEI: AN EXTENSIVE DISEASE WITH SPECIFIC OUTCOMES AFTER COMPLETE CYTOREDUCTIVE SURGERY AND HIPEC

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BACKGROUND: The gold standard treatment for pseudomyxoma peritonei (PMP) is a complete cytoreductive surgery (CCRS) followed by hyperthermic intraperitoneal chemotherapy (HIPEC). There is not peritoneal carcinomatosis index (PCI) cut-off to contraindicate the surgical resection although the completeness of cytoreductive becomes technically challenging in the case of extensive abdominal invasion.
METHODS: The aim of this study was to analyze the specific short and long terms outcomes of patients with "huge" PMP (PCI=28) when compared to the rest of the PMP population ("not-huge" PMP).
RESULTS: The surgical procedures and outcomes of the 313 patients operated on for PMP between 1992 and 2014 were retrospectively reviewed from a prospective database in a single institution. Among them 120 (39%) patients presented "huge" PMP (PCI=28). During this period, 254 (81%) patients underwent CCRS+HIPEC including 61 patients with "huge" PMP.The post-operative mortality was similar between the "huge" and "not-huge" populations. The 5-year overall survival (OS) was 70% in the "huge" group and 90% in the "not-huge" group (p<0.001). At 5-year, the disease free survival (DFS) reached 45% in the "huge" group and 78% in the "not-huge" group (p<0.0001). The surgery performed were more extensive in the "huge" group with an increased rate of partial gastrectomy (63% *vs* 8% p<0.001), total colectomy (43% *vs* 2%) and splenectomy (97% *vs* 49% p<0.001). Patients in the "huge" group experienced an increased rate of grade 3-4 complications (46% *vs* 23%, p<0.001) and longer hospital stay (mean 38 [4-99] *vs* 23 [7-127] p<0.001).
CONCLUSIONS: Although the PCI remains a strong prognostic factor, prolonged OS and DFS are observed after CCRS plus HIPEC even in the case of "huge" PMP involvement. Although the morbidity rate remains similar between the 2 groups, patients with huge experienced a higher grade of severe complications. This complex surgery should be proposed and performed for selected patients in specialized center only.

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OUTCOMES OF CYTOREDUCTIVE SURGERY AND HIPEC FOR PSEUDOMYXOMA PERITONEI OF APPENDICEAL ORIGIN FROM TWO INDIAN CENTERS: A PRELIMINARY FIVE YEAR EXPERIENCE

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BACKGROUND: With the implementation of cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) for treating pseudomyxoma peritonei (PMP) of appendiceal origin, experienced centers have reported a median survival of 196 months (16.3 years) and a median progression-free survival rate of 98 months (8.2 years).
METHODS: To evaluate the short term outcomes of patients of PMP of appendiceal origin treated with CRS and HIPEC at two tertiary Indian centers.
RESULTS: From Jan 2011 to Jan 2016 data was prospectively collected. Palliative procedures were excluded. HIPEC was performed by the coliseum technique using either a mitomycin or oxaliplatin based regimen. 77 procedures were performed on 71 patients. The average time interval between diagnosis and CRS was 15.3 months. 22.1% of the tumors were high grade, 77.9% were low grade of which 24.6 were intermediate grade. The median PCI was 26 (>25 in 70.1% and >30 in 38.9%). A CC0/1 score was achieved in 75.3% (CC-0 in 42.9%). The average number of bowel anastomoses was 1.1 and mean number of organs resected per patient was 3.3. 71% of the patients had resection of 3 or more organs and 50.6% had resection of 4 or more organs. Four patients underwent a staged second resection due to either CC-2/3 resection or intraoperative hemodynamic instability following a CC-0/1. Grade 3-4 complications occurred in 42.9% of the patients; the perioperative mortality was 5.2%. The incidence of complications increased with the increase in PCI (p=0.05). There were three patients who had reiterative CRS and HIPEC. The median follow-up was 13 months and the mean was 15.4 months (range 3-58 months). The median DFS and OS had not been reached. The mean DFS was 33.29 months and the mean OS was 43.56 months. The projected 5 year OS was 62.3%. The cumulative 3 year DFS was 71%. The age, the sex, prior chemotherapy, prior surgery or the prior surgical score had no impact on the DFS and OS. Patients with low grade tumors (p=<0.01), a low PCI (p=<0.01), a CC-0/1 score (p=<0.01) and those without obstructive symptoms (p=<0.01) experienced a better DFS, but the only independent predictor was the CC score of 0/1 (p=0.03). The absence of grade 3-4 complications (p=<0.01), a low PCI (P=0.05) and CC score of 0/1 (p=0.04) were the factors favorably affecting OS, the only independent predictor being an absence of grade 3-4 complications (p=<0.01). The intermediate grade tumors had a similar DFS as the high grade tumors, but there was no difference in the OS between the 3 groups.
CONCLUSIONS: PMP of appendiceal origin can be treated with an acceptable morbidity and mortality in Indian patients with CRS and HIPEC. A lack of early referral leads to a large portion of patients presenting with extensive disease. Half the procedures were performed in the last one year of our experience leading to a short median follow up. One fourth of the patients also had intermediate grade tumors that behaved more like the high grade tumors. An increase in awareness about the treatment and timely referrals combined with an increase in our experience could improve these results in the future.

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IMPACT OF THE LEARNING CURVE ON OUTCOMES OF CYTOREDUCTIVE SURGERY AND HIPEC IN PATIENTS OF PMP: QUANTITATIVE ASSESSMENT USING THE LC-CUSUM

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BACKGROUND: The learning curve for CRS and HIPEC for PMP is known to peak at 90 procedures for the surgeon and 100 procedures for the institution. The CUSUM test for learning curve (LC-CUSUM), a quantitative and individualized statistical tool for analyzing the learning curve. LC-CUSUM was used to analyze the performance of 2 centers treating PMP with CRS and HIPEC.
METHODS: • To compare the outcomes between the first and second halves of our patients. • To assess the safety of the procedure in terms of morbidity, mortality and completeness of cytoreduction before the peak of the learning curve had been reached. • To assess the safety in terms of early oncological failure defined as recurrence within two years of CRS and HIPEC.
RESULTS: From Jan 2011 to Jan 2016, 77 patients with PMP arising from an appendiceal primary tumor underwent CRS and HIPEC. The first half that is 38 cases were treated from Jan 2011 to Oct 2014 (46 months) and the second half that is 39 cases from Nov 2014 to Jan 2016 (17 months). The mean PCI was 30 and 26 in the two groups respectively. The PCI and the rate of complete cytoreduction in the two groups were not significantly different. (p=0.09 for PCI and p=0.07 for CC score of 0/1) though there seemed to be an improvement. There was a reduction in the 3-4 grade complications from 52.7% to 30.7% in group 2 compared to group 1 (p=0.06). The 30-day mortality in the 2 groups was similar. There hazard ratio for DFS was 0.635 (95%CI-0.25 to 1.6) for second group compared to the first, but was not statistically significant (p=0.34). We employed the LC-CUSUM to assess the safety of the procedure. For grade 3-4 morbidity, 25% was an acceptable upper limit, anything more than that was unacceptable, the target being 15% (h0=25%, h1=15%); for the 30-day in hospital mortality, a lower limit of 2% and an upper limit of 4% was set (h0=4%, h1=2%). For CC-2/3 resections, h1=15% and h0=25%. For early oncological failure, 5% was considered acceptable (h1) and 15% or more, unacceptable. (h0) The acceptable limits were calculated using an a error of 5% and a ß error of 20%. For in-hospital mortality, the graph reached acceptable limits after the 57th case. For the grade 3-5 morbidity and proportion of CC-2/3 resections, it took 38 cases for the graph to be in the acceptable limits. For early oncological failure we considered patients with a two year follow up only. The graph was above the higher limit for early failures indicating that the process was not in control. For all the above parameters, the graph had not plateaued indicating that the peak of the learning curve had not been reached.
CONCLUSIONS: Optimal results for CRS and HIPEC are attained after completing a prolonged learning curve. The LC- CUSUM is a useful tool to determine the number of cases after which CRS and HIPEC can be performed safely by surgeons on the learning curve.

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PATHOLOGIC ANALYSIS OF LOW GRADE PMP ARISING FROM PERFORATED APPENDICEAL PRIMARY TUMORS

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BACKGROUND: The current classification used to report PMP divides tumors into two groups -low grade PMP (low grade mucinous carcinoma peritonei or disseminated peritoneal adenomuicnosis-DPAM) and high grade PMP (high grade mucinous carcinoma peritonei or peritoneal mucinious carcinomatosis-PMCA). Low grade PMP is a heterogenous group comprising of tumors that have predominantly acellular mucin, tumors with bland cells as well as those which are termed low grade adenocarcinomas.
METHODS: To study the architectural, cytological and nuclear features in patients with low grade PMP and further stratify them as invasive and non-invasive tumors. To study the characteristics of mucinous deposits in patients with low grade PMP.
RESULTS: From Jan 2011 to Jan 2016, 90 patients with PMP of appendiceal origin were taken up for surgery at two Indian centers. (12 palliative procedures, 78 CRS and HIPEC). The average time between diagnosis and surgery was 15.3 months. The mean PCI was 27 (median=30). A CC-0/1 was obtained in 77% (60/78). 73 (81%) had low grade PMP, 18 (19%) had high grade PMP (signet ring cells in 9 patients). Of the 73 patients with low grade PMP, 15 (16%) had intermediate features and on excluding these 58 (64.4%) patients remained. In these 58 patients, the

predominant type of mucin in the peritoneal deposits was acellular mucin (0 patients), mucin with epithelial cells in 31, organizing mucin in 7, dissecting mucin in 5 and organizing and dissecting mucin in 15 patients. We looked at the mucinous deposits in the peritonectomy specimens, omentum and omental bursa and resected organs separately. Only 9 patients had few areas of acellular mucin, 49 patients had no areas of acellular mucin. Based on the architectural features (papillae, solid areas, cribriform areas) and cytological and nuclear features (type of cells-tall columnar/cuboidal, presence or absence of karyomegaly, focal stratification and rounding, nucleoli, mitosis and necrosis) 6 patients (6.6%) had peritoneal deposits with no features of invasion (true DPAMs), 52 had mucinous deposits with invasive epithelium. The type of invasion was of the 'pushing type' in all these patients. The median follow up was 15 months. Mean DFS in intermediate tumors was 16.6 months which was significantly than that in lower grade tumors (44.2 months, $p<0.05$) and similar to the high grade tumors. The OS was not different between the 2 groups. Early recurrence developed in 7 patients who had a CC-0/1 resection. In the 6 patients with non-invasive peritoneal deposits, the mean PCI was 24.5 (median 28). At a mean follow up of 38.3 months, none of these patients had developed recurrence, indicating that they had a better outcome.

CONCLUSIONS: Low grade PMP is a heterogenous subgroup. 20% of the patients classified as low grade PMP had intermediate tumors, 72% had mucinous deposits with invasive epithelium and only 8% had non-invasive epithelium (true DPAMs). Patients with true DPAMs had a better survival. The intermediate tumors behaved like high grade tumors. The time lag between the diagnosis and definitive treatment could be one of the factors responsible for this presentation.

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CRS AND HIPEC FOR PMP WITH HIGH TUMOR BURDEN: SURGICAL OUTCOMES AND SURVIVAL

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BACKGROUND: One third of the patients of PMP presenting for CRS and HIPEC will have a high tumor burden. There is no standard cut off for what constitutes high volume disease. Some have defined a PCI of 28 or more as a 'huge PMP', others have considered a PCI of 30 or more as high tumor burden. It has also been defined by the number of organ resected and the number bowel anastomoses performed. We chose a PCI of 25 or more as a cut off as these patients require at least 1-2 bowel anastomoses to attain a complete CRS.

METHODS: • To study the surgical outcomes, perioperative morbidity, mortality in patients of PMP with PCI>25. • To study the survival outcomes in these patients.

RESULTS: From Jan 2011 to April 2016, 56 patients (comprising of two thirds of all our patients) with a PCI of >25 underwent CRS and HIPEC at 2 Indian centers. 13 (23.2%) patients had high grade tumors (4 with signet ring cells), 43(76.8%) had low grade tumors of which 10 (17.8%) were of intermediate grade. The mean PCI was 31 (median 30, range 26-39). A CC-0/1 was achieved in 64.2% (36/56). The average number of bowel anastomosis was 1.5 per patient (>2 in 20 patients) and the mean number of organs resected was 3.7 (>3 in 45 patients and >5 in 25). A subtotal colectomy was performed in 25 patients, total colectomy in 3, partial gastrectomy in 6 and total gastrectomy in 3, total gastrectomy with total colectomy in 0 patients. 88% of the patients with PCI <30 had a complete cytoreduction compared to 45% of the patients with PCI >30($p=<0.05$). The grade 3-4 morbidity was 35.7% and the 30 day mortality was 3.57%. There was in increase in morbidity when 2 or more bowel anastomoses were performed ($p=0.04$). The morbidity was higher in patients with PCI >30 but it did not reach statistical significance ($p=0.09$). *Hospital* The median follow up was 13 months and the mean was 20 months. The median DFS was 28 months. The median OS had not been reached, the mean was 47 months. Patients with a complete cytoreduction (CC-0/1)($p=0.005$) and low grade tumors ($p=0.01$) had a better DFS, the only independent predictor was complete cytoreduction. A lower PCI was a predictor of a better OS ($p=0.02$). Other factors affecting OS like CC score ($p=0.08$) tumor grade ($p=0.06$) and grade 3-4 morbidity ($p=0.08$) did reach statistical significance.

CONCLUSIONS: Morbidity and mortality of CRS and HIPEC in patients of PMP with a high tumor burden is similar to that in patients with less extensive disease. Patients with 2 or more bowel anastomoses had a higher morbidity. The rate of complete cytoreduction was significantly lower in patients with a PCI of >30 which could be attributed to our limited experience as well as inappropriate patient selection. The percentage of patients with high and intermediate grade tumors was high (41%) and the DFS in these patients was inferior..

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PSYCHO-ONCOLOGIC SCREENING IN PATIENTS WITH PERITONEAL SURFACE MALIGNANCIES TREATED WITH CYTOREDUCTIVE SURGERY AND INTRAPERITONEAL HYPERTHERMIC CHEMOTHERAPY

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BACKGROUND: Psycho-oncologic screening is known to be a useful tool to identify oncologic patients who benefit from early postoperative psycho-oncological therapy.

METHODS: This retrospective analysis included all patients who were treated for peritoneal surface malignancies with cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) at our department between 01/2013 and 02/2016. A psycho-oncologic screening form was preoperatively handed to the patient at the outpatient clinic and was filled out by the patient himself. The aim of this study was to raise demographic data and to examine correlations between high risk of psychological distress and clinical outcome of the patients.

RESULTS: A total of 150 patients were included in this analysis, while 76 (50.7%) patients participated in the psycho-oncologic screening reaching a score of 5.5 (±2.7) on average. 49 patients were identified at high risk for anxiety and depression (Score=5). Patients with Cancer of unknown Primary (7.7±0.6; n=5) and low-grade appendiceal mucinous neoplasm (6.8±1.6; n=22) scored higher compared to patients with colorectal cancer (5.5±2.5; n=33), mesothelioma (4.8±2.9; n=18) or gastric cancer (4.4±3.4; n=35). Female patients had a higher score (6.0±2.6) compared to male patients (4.8±2.8; $p=0.09$). Patients age ($p=0.78$), comorbidities ($p=0.30$) and Peritoneal Cancer Index ($p=0.25$) had no significant influence on psycho-oncologic score. The postoperative rate for surgical 15/49 (30.6%) or non-surgical complications 16/49 (32.7%) in patients at high risk was comparable with patients with low risk (4/16 (25.0%), 5/16 (31.3%); $p=0.46$, $p=0.59$). Linear regression analysis revealed psychological problems in Sadness (HR 2.15; $p=0.04$) and Sleep (HR 2.94; $p=0.06$) with the strongest impact on psycho-oncologic screening score.

CONCLUSIONS: The average psycho-oncologic screening score is not related to the medical prognosis of the patients due to their underlying disease and showed no correlation to the complication rate. Sadness and problems with sleep are of major influence in this score.

Further studies including larger numbers of patients are necessary to establish more information about the psycho-oncologic screening and its clinical impact.

P114

CYTOREDUCTIVE SURGERY PLUS HIPEC AS TREATMENT FOR APPENDICEAL MUCINOUS NEOPLASMS: EXPERIENCE OF A SINGLE CENTER

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BACKGROUND: Mucinous tumor is a rare subtype of appendiceal epithelial neoplasm. 20% of the cases are associated with accumulation of mucus in the peritoneal cavity, giving the so called peritoneal pseudomyxoma (PMP), which is classified in adenomucinosis (DPAM, low grade) and mucinous carcinomatosis (PMCA, high grade). Several studies have shown that cytoreductive surgery (CRS) plus hyperthermic intraperitoneal chemotherapy (HIPEC) are the current standard of care.
METHODS: Analyze our experience treating this rare condition. This is a prospective study of patients diagnosed with appendiceal mucinous neoplasm treated with CRS+HIPEC in a single center with an experience of more than 200 cases of other causesof peritoneal carcinomatosis treated. Parameters related to the patient, tumor, surgery and survival, dividing into subgroups according peritonealcarcinomatosis index (PCI) and CRS were analyzed.
RESULTS: From March 2001 to March 2016, 13 patients (6 males/7 females witha mean age of 56, 5 years-old) were operated with the diagnosis of appendiceal mucinous neoplasm and PMP. 15 CRS+HIPEC were carried out (2 patients received a re-HIPEC procedure). All cases received a peroperative intraperitoneal perfusion with Oxaliplatin (200 mgr. /L) at a mean temperature of 42ºC during 30 minutes. Histologically, 12 were PMCA (92%) and 1 DPAM (8%). Mean PCI was 19.2 (range 0-39) and CRS was completed in 9 patients (69%). The complication rate grade III/IV was 36% (5 pts.), reoperation rate of 13% (2 pts.) and 6% mortality (1 pt.). Median follow-up of 71 months with a disease free survival (DFS) of 65 m. and overall survival (OS) of 82 m. There were 6 recurrences (46%, 2 patients treated with a re-HIPEC) and 6 patients free of disease (46%). When PCI <20, the OS at 60 m. rate is 70%, being 40% if PCI>20. With a complete CRS, the OS at 60 m. rate is 80% while incomplete CRS 25%.
CONCLUSIONS: - The morbidity and mortality of CRS+HIPEC is comparable to other oncological major surgeries. - CRS+HIPEC offers good results in terms of DFS and OS (65 months and 82 months respectively), although in our series evidently dominates the PMCA (high grade, 92%). - PCI and CRS achieved are main factors that influence survival.

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OUTCOME DATA OF 405 PATIENTS WITH PMP IN AEROSPACE CENTRAL HOSPITAL IN CHINA

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BACKGROUND: Pseudomyxoma peritonei (PMP) characterized by mucin accumulation in the peritoneal cavity usually arises from perforation of an adenoma in the appendix. Cytoreductive surgery (CRS) combined with hyperthermic intraperitoneal chemotherapy (HIPEC) is regarded as standardized therapy for PMP.
METHODS: 1.The purpose of this note was to accumulate and analyze the data of 405 PMP patients from 2008 to 2015 in the department of PMP, Aerospace Central Hospital, Beijing, China.
RESULTS: Mean follow-up time was 47 months (range, 2-93) from the date of cytoreduction surgery. Median age at diagnosis was 58 years (range, 35-81). Prior surgical score (PSS) >1 was 85.4% (346/405). The median Peritoneal Cancer Index (PCI) score was 28 (range, 3-39). Only 25.4% (103/405) of patient achieved CCR-0/CCR-1, while the remaining 74.6% (302/405) of patients underwent debulking surgery (CCR-2/CCR-3). The mean duration of surgery was 8 h (range, 4-16). 73.6% (298/405) of patients were treated with a protocol based on administration of 5-Fu 650 mg/m2 plus mitomycin C 16 mg/m2. Within the follow-up time, 83 (20.4%) patients accepted secondary surgery in our department for recurrence. The postoperative mortality rate was 1.98%(8/405). Median overall survival (OS) at the end of follow-up was 35 months (range, 0 - 82); the overall 2-year, 3-year and 5-year survival rates were 74.12%, 47.34%, 25.15%, 9.93%, respectively.
CONCLUSIONS: As in other similar studies, the overall survival seems more acceptable than us (*e.g.* 196 months *vs* 35 month for the median OS). The reason for this difference may include the higher PSS that caused by less known about PMP and the severe PCI score contributing to higher rate (74.6%) of debulking surgery (CCR-2/CCR-3). Therefore, we will strive to get more patients and doctors to know about PMP, as better understanding of PMP is of great importance for early diagnosis, timely and standard treatment, which could improve the survival rate and life quality of the PMP patients.

P116

CYTOREDUCTIVE SURGERY AND MULTIVISCERAL SMALL BOWEL TRANSPLANTATION. A TECHNICALLY FEASIBLE OPTION FOR PATIENTS WITH END-STAGE PSEUDOMYXOMA PERITONEI

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BACKGROUND: Pseudomyxoma peritoneii (PMP) arising from a low grade appendix tumour can be cured by cytoreductive surgery and hyperthermic intraperitoneal chemotherapy. In those with extensive small bowel involvement or recurrence, major tumour debulking can still prolong survival with a good quality of life. The inevitable disease progression however eventually results in nutritional failure from small bowel obstruction and often abdominal wall failure with fistulation of disease through surgical scars and stoma sites. This leads to poor quality of life and is eventually fatal. Total Parenteral Nutrition can improve nutritional status but does little to palliate symptoms from massive abdominal distention and abdominal wall failure. Multi visceral small bowel transplantation could offer a life prolonging opportunity in endstage disease.
METHODS: Between 2013-2015, 4 pmp patients, following discussion at the Specialist T at the Peritoneal Malignancy Institute in Basingstoke and the National Transplant T were referred for consideration of small bowel transplantation with end stage disease and intestinal failure. The procedures were performed jointly by the peritoneal malignancy and transplant teams. Outcomes include time on PN, mortality, rejection, nutritional status, tumour markers, radiological evidence of recurrence or progression.
RESULTS: 3 patients underwent radical debulking (all had prior major tumour debulking) and 1 complete cytoreduction (prior mini laparotomy and gastrostomy only); followed by small bowel transplantation. Average time on waiting list was 40 days (range 2-112). Organs transplanted: all were modified multivisceral transplants including stomach, duodenum-pancreatic complex, small bowel and abdominal wall; 3 received colon and 1 case a kidney. Post-op stay on ITU average 14.5 days (range 2-45). Time on PN postoperatively: median 31 (range 19-51) Mortality risk: 2 survived at time of review, 17 months and 13 months; 2 died (Day 26 and day 64) the first from anastomotic

leak, GVHD with associated fungal and bacterial chest sepsis, the other died of GI bleed and anastomotic leak. No episodes of acute rejection of intestinal graft seen but a single episode of grade 1 skin rejection of abdominal wall graft at day 68 treated with methylprednisolone. Both the surviving patients are independent of TPN and well at home. One has radiological evidence of some asymptomatic disease progression and one has an area of suspected radiological recurrence being monitored.

CONCLUSIONS: From this preliminary series, cytoreductive surgery followed by multi-visceral small bowel transplantation is technically feasible for endstage PMP. Furthermore, in those who survived, it is has been life transforming giving so far an extra 13-17 months independent of TPN and excellent quality of life. The long term outcomes will determine the effectiveness of this procedure. Selecting physiologically fit patients and earlier referral for surgery may improve early outcomes. This major surgical intervention requires close collaboration and the joint expertise of peritoneal malignancy and transplant teams.

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THE ROLE OF SURGICAL DEBULKING FOR PATIENTS AFFECTED WITH UNRESECTABLE PSEUDOMYXOMA PERITONEI

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BACKGROUND: Complete cytoreductive surgery (CCRS) for curative treatment of pseudomyxoma peritonei (PMP) is not always possible when the surgeon is faced with a massive tumor burden and the prospect of having to resect organs whose removal is likely to impair patients' quality of life and to increase postoperative morbidity. In this context, the role of incomplete cytoreductive surgery (debulking) is still under debate. This study evaluated the role of surgical debulking in improving PMP-related symptoms if CCRS of huge PMP was unachievable.

PATIENTS AND METHODS: This was a retrospective analysis of a prospective database of 338 patients treated for PMP between 1992 and 2014 in our tertiary care center. All cases of surgical debulking in patients scheduled for CCRS that proved unachievable during the operation were selected for the present study. Debulking principle was the removal of at least 80% of the disease burden with acceptable morbidity and satisfying post-operative quality of life.

RESULTS: Thirty-nine patients had undergone surgical debulking because CCRS was unachievable. All of these patients were symptomatic before surgery, and the median PCI was 32 (5-39). More than 80% of the disease burden was resected in 23 patients (59%). Mortality and major morbidity rates were 2.5 and 23%, respectively. After debulking surgery, symptoms gradually subsided over a median time of 23 months and 50% of the patients no longer experienced PMP-related symptoms after a median follow-up of 24.5 months. After a median follow-up of 46.4 months (range 3-120), median overall (OS) and progression-free (PFS) survival times were 55.5 and 20 months, respectively. Five-year OS and PFS rates were 46 and 11%, respectively.

CONCLUSIONS: Aggressive debulking surgery in case of unachievable CCRS for huge PMP can offer prolonged relief of PMP-related symptoms and long-term survival. The surgeon should be able to be sufficiently aggressive to resect the major part of the disease and conservative enough to achieve low morbidity/mortality and good quality of life.

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LONG-TERM SURVIVAL AFTER AGGRESSIVE TREATMENT OF RELAPSED SEROSAL OR DISTANT PSEUDOMYXOMA PERITONEI

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BACKGROUND: Complete cytoreductive surgery (CCRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) have dramatically changed the prognosis of patients with pseudomyxoma peritonei (PMP). However, recurrences can still occur and no consensus has been reached regarding the optimal treatments for these patients. The aim of this study was to analyze the patterns of recurrence after CCRS plus HIPEC for PMP and potential subsequent treatments of these lesions.

PATIENTS AND METHODS: Between 1992 and 2014, patients who had relapsed after treatment of PMP were selected from a prospective database of 251 patients who had undergone CCRS plus HIPEC with a curative intent.

RESULTS: After a median follow-up of 85 months [range 15-227], 66 patients (26%), had relapsed with a median free interval of 25 months (range 5-138). Compared to the patients without recurrence, the patients who recurred had significantly higher PCI at initial surgery, a higher rate of high grade PMP and received more frequently preoperative chemotherapy. Recurrences were exclusively located in the peritoneum in 50 patients (76%), and were extraperitoneal in 16 (associated with a peritoneal relapse in 6). Curatively intent treatment, mainly consisting in redo-surgery, was performed in 42 patients including 35 with peritoneal recurrence and 7 with extraperitoneal. After curative-intent treatment, 5-year overall and progression-free survivals were respectively 83% (CI 95%: 69-96) and 39% (IC 95%: 22-56), significantly better than survivals of patients palliatively treated, respectively, 27% (CI 95%: 14-53) ($p<0.001$) and 28% (IC 95%: 0-60) ($p=0.049$).

CONCLUSIONS: After primary CCRS plus HIPEC, most of the relapses occur in the peritoneum and are amenable to curative treatment in more than 70% of the patients, allowing prolonged survival. Likewise, due to long-term survivals after CCRS plus HIPEC, distant relapses' can be observed, for which curatively intended therapy may also be considered, which allows obtaining prolonged survival too.

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LOCALLY INVASIVE MODERATELY DIFFERENTIATED APPENDICEAL CANCER CAN BE EFFECTIVELY TREATED WITH MULTIMODALITY THERAPY

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BACKGROUND: Appendiceal neoplasms represent about 1% of GI malignancies. Tumor grade and extent of disease are known to affect the natural history of appendiceal adenocarcinoma. Patients with metastatic disease to the peritoneum are frequently treated with cytoreductive surgery and heated intraperitoneal chemotherapy (CRS/HIPEC). Patients with disease localized to the appendix are treated with less radical operations, including appendectomy and right hemicolectomy. However, the treatment for patients presenting with locally advanced, non-metastatic disease is less well characterized. We present a series of patients treated

with multi-modality therapy including radiation, chemotherapy and radical local resection, without HIPEC.
METHODS: Describe presentation of locally advanced, non-metastatic moderately differentiated appendix cancer. Describe treatment algorithm consisting of chemotherapy, radiation, radical resection and intraoperative radiation. Describe outcomes associated with this treatment approach.
RESULTS: We identified 10 patients with relatively similar presentation of moderately differentiated appendix cancer with local invasion into the right lower quadrant and retroperitoneum. The spectrum of invasion ranges from subtle invasion of the right psoas muscle to a large mass in the right lower quadrant. All patients demonstrated some evidence of perforation of appendix prior to treatment. Intraoperative radiation therapy (IORT) was used in 9 of the cases. Complex abdominal closure was required 70% of the time. At a median follow up of 13 months, there have been no local recurrences. One patient developed a distant (lung) metastases.
CONCLUSIONS: Our results demonstrate an effective treatment approach for patients with locally advanced appendiceal cancer, without peritoneal dissemination. The approach of preoperative chemotherapy, radiation and radical resection have demonstrated favorable results. The fact that these patients have predominately moderately differentiated disease suggests a distinct tumor biology in this group of patients.

P120

PSEUDOMYXOMA PERITONEI: A NEW SCANNOGRAPHIC SCORE PREDICTING ITS RESECTABILITY

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BACKGROUND: Pseudomyxoma peritonei (PMP) is a rare disease, characterized by the presence of mucinous ascites within the peritoneal cavity and can be treated with complete surgical removal of disease and hyperthermic intraperitoneal chemotherapy (HIPEC). Suitability for surgery is based on preoperative imaging. The aim of the study was to compare preoperative imaging based on new scannographic items and surgical resectability.
METHODS: All cases of patients with PMP undergoing laparotomy with purpose of cytoreductive surgery and HIPEC between 2007 and 2014 were included. For each patient, thickness of tumor burden has been measured as the sum of 5 mucin measurements on preoperative CT scan (left liver-stomach, left hepatic lobe-right hepatic lobe, segment I-left liver, segment I-right crus of the diaphragm, hepatic portal vein-inferior vena cava). Two staff radiologists blinded to surgical results retrospectively reviewed imaging studies to calculate the CT score for each patient. Association between CT score and complete (CC0-1) or incomplete (CC2-3) cytoreductive surgery (CRS) has been studied. The bi-centric population has been randomized in two cohorts (training and validation).
RESULTS: One hundred and twenty six patients had a mean surgical PCI of 17 (8-30) and mean CT score of 9.3mm (0-28). Surgical resectability with compete CRS was 72.2% (n=91). The most common tumor histologies were low tumor grade (53%). After randomization, the cohorts of 63 patients were comparable in terms of age, sex, CT score, surgical PCI, resectability rate and pathological grade. CT score was higher in unresectable disease with 46.2mm [27.9-74.6) *vs* 0.0 [0.0-14.0] for CC2-3 and CC0-1 surgeries respectively ($p<0.001$). The best CT score threshold was 28mm, achieving an AUC of 0.86 [0.727-0.968] and 0.80 [0.676-0.914] for training and validating cohorts, respectively. CT score had a sensitivity of 81% and 68%, a specificity of 94% and 80%, positive predictive value of 94% 85%, and a negative predictive value of 81% and 85% for training and validation cohorts when compared with the surgical resectability.
CONCLUSIONS: Total thickness of tumor burden measured in the peri-hepatic region on preoperative CT scan is a new and reproducible item to predict resectability of PMP.

P121

CHANGING PATTERNS OF REFERRAL AND TREATMENT IN PSEUDOMYXOMA PERITONEI

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BACKGROUND: In pseudomyxoma peritonei (PMP), achieving complete cytoreduction (CC) using cytoreductive surgery (CRS) with heated intraperitoneal chemotherapy (HIPEC) determines long term survival. Low grade appendiceal mucinous neoplasm (LAMN) is a precursor lesion for (PMP). Two subtypes of LAMN (I and II) have been described based on clinico-pathological features allowing stratification of risk of developing PMP. From early 2000 in the UK treatment for PMP has been commissioned nationally via specialised centres in Manchester and Basingstoke. We evaluated referrals and management pathways over time at the Colorectal and Peritoneal Oncology Centre, Manchester.
METHODS: To evaluate referrals and management pathways over time at the Colorectal and Peritoneal Oncology Centre, Manchester.
RESULTS: A total of 1047 referrals were received, increasing from 7 in 2002 to 139 in 2015. Of patients undergoing major laparotomy, rates of complete cytoreduction (CC0/1) increased from 66% in P1 to 76% in P4; debulking surgery (CC2/3) decreased from 34% to 24%. Median PCI was 24, 15, 19 and 17 in P1-4 respectively. A spline regression model has demonstrated PCI followed a reducing trajectory through P1 but a flat trajectory through P2-4. This pivot was statistically significant ($p=0.002$). The proportion of patients referred with precursor disease increased from 9% in P1 to 19% in P4. These patients are managed either with risk reducing CRS & HIPEC (LAMN II) or on a programme of active surveillance (LAMN I or II). The proportion of patients with precursor disease under active surveillance has increased from 6% in P1 to 16% in P4.
CONCLUSIONS: Two clear patterns are demonstrated. 1. In patients with PMP, improved rates of complete cytoreduction are demonstrated over time despite no substantial change in median PCI since 2007. This reflects progression along the learning curve both technically and for patient selection. 2. Earlier referral of patients with precursor lesions allows an increasing number of patients to be managed either by risk reducing surgery or active surveillance. The impact on long term survival is being monitored over time.

P122

MORBIDITY, MORTALITY AND OUTCOMES OF 120 CONSECUTIVE CYTOREDUCTIVE SURGERIES WITH HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY PERFORMED AT A COMMUNITY HOSPITAL

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BACKGROUND: Cytoreductive surgery (CRS) with hyperthermic intraperitoneal chemotherapy (HIPEC) can be used for peritoneal dissemination from various primary malignancies. Historically CRS with HIPEC experienced high morbidity and mortality: reported Clavien-Dindo grade III complication rates of 26-33% and grade IV 12-26%. Our study evaluated morbidity, mortality and outcomes after 110 consecutive CRS with HIPEC performed at a 770 bed community hospital by a single surgeon (RB).
METHODS: From October 2011 to May 2016, 215 patients were evaluated by a multidisciplinary team and taken to OR with curative intent: 152 patients successfully underwent complete CRS with HIPEC. Using an institutional review board approved study a comprehensive database of all surgeries, pathologies and outcomes was developed. To allow for adequate duration of follow up, the first one hundred twenty patients who met inclusion criteria were chosen for analysis. Survival analysis was performed using Kaplan-Meier outcomes.
RESULTS: The average age was 54.8 years; 62% were female and 38% male. The most common diagnosis was mucinous appendiceal adenocarcinoma (64%), colorectal (25%), mesothelioma (7%) and other (ovarian, gastric, hepatocellular carcinoma, sarcoma and small bowel-9%). Multivisceral resections were performed in 63% of cases. Average intra-operative estimated blood loss was 240mL and 7.3% of patients required intra-operative blood transfusions. Average length of stay was 9.8 days, 30 day readmission rate was 9.1%. Rate of grade I Clavien-Dindo complications was 24.5%, grade II, 41%. Grade III 11.4% and grade IV complications was 1.6%. There was no inpatient, 30 day, 60 day or 90-day postoperative mortality. Average length of follow up was 537 days. For patients without complete CRS, OS at 1 year was 95%, 2 years 75% and 3 years 67%. For patients with CRS+HIPEC, OS at 1 year was 71%, 2 years 45% and 3 years 31%. This was statistically significant p<0.0001.
CONCLUSIONS: Our study demonstrates that this procedure can be safely performed in the community setting with low morbidity and no mortality. This can occur if a surgeon led multidisciplinary team is assembled that can provide protocol driven, outcome based high quality care.

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SAFETY AND EFFICACY OF NEOADJUVANT CHEMOTHERAPY FOR MODERATELY AND POORLY DIFFERENTIATED APPENDICEAL ADENOCARCINOMA

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BACKGROUND: Moderately and poorly-differentiated adenocarcinoma of the appendix have a high risk of recurrence and death following cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemoperfusion (HIPEC) alone. Eighty patients with moderately and poorly-differentiated appendiceal adenocarcinoma who underwent CRS and HIPEC from 2004-2014 were identified from a prospective single-institutional database. Operative parameters, morbidity and survival were analyzed.
METHODS: We aimed to assess the impact of neoadjuvant chemotherapy on the following -post-operative morbidity - disease-free survival -overall survival.
RESULTS: Forty four (54.4%) patients had moderately differentiated tumors and 37 (45.6%) had poorly differentiated tumors. Sixty four (79%) were mucinous and 30 (37%) had signet ring cells. Lymphovascular invasion was present in 30 (37%) patients and lymph node involvement in 24 (29.6%) patients. Fifty three (65%) patients received neoadjuvant chemotherapy; 40 (75.5%) received FOLFOX or FOLFIRI +bevacizumab and 13 (24.5%) patients received FOLFOX or FOLFIRI without bevacizumab. Twenty two (41.5%) patients had stable disease while on systemic therapy, 20 (37.7%) had a partial response and 10 (18.0%) had progressive disease on restaging CT scan. The median OS was 49 months for responsive disease, 43 months for stable disease and 19 months for progressive disease (p=0.001). Addition of bevacizumab to chemotherapy was associated with a higher likelihood of achieving a radiographic response (p=0.05). Neoadjuvant chemotherapy including bevacizumab was not detrimental to operative time, length of stay, blood loss, 30- day morbidity or 90-day morbidity. The median DFS was 14 months for those who had radiographic progression *vs* 26 months for those with stable disease and 27 months for those with radiographic disease regression (p=0.03). In multivariate analysis mucinous histology (p=0.05), lymph node involvement (p=0.03), PCI (p=0.004), completeness of cytoreduction (p=0.02) and radiographic response on systemic therapy (p=0.05) were the only independent factors associated with overall survival. Receipt of neoadjuvant therapy was not associated with improved DFS or OS. However, receipt of neoadjuvant chemotherapy was associated with poor characteristics such as poorly differentiated histology (p<0.001), non-mucinous histology (p=0.001), lymphovascular invasion (p <0.001), lymph node involvement (p=0.01) and signet ring cells (p=0.001). Adjuvant chemotherapy was not associated with improved DFS nor OS.
CONCLUSIONS: Neoadjuvant chemotherapy±bevacizumab has marked clinical activity in patients with high-grade appendiceal adenocarcinoma without negatively impacting morbidity or operative outcomes. These data support the use of neoadjuvant chemotherapy±bevacizumab for high grade appendiceal adenocarcinoma.

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THREE TIER HISTOLOGICAL GRADING FOR APPENDICEAL ADENOCARCINOMA: IMPORTANCE OF PATHOLOGY ON OUTCOMES

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BACKGROUND: The unique histology and biology of appendiceal adenocarcinoma has led to considerable controversy in regards to the classification and terminology used. Only recently has the Peritoneal Surface Oncology Group International (PSOGI) come to a consensus of three categories of appendiceal adenocarcinoma: low grade, high grade and high grade with signet rings cells. Despite this consensus, controversy continues.
METHODS: Single institution review of a prospectively maintained database of 288 consecutive patients undergoing cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) with the diagnosis of an appendiceal adenocarcinoma from 2004 through 2014. -We review disease-free survival and overall survival based on pathologic grade.
RESULTS: At the time of cytoreduction 39 (13.5%) pts. had acellular mucin only. 139 (48.3%) had well differentiated tumor, 29 (10.1%) had well-to-moderate differentiated tumor, 44 (15.3%) had moderately differentiated tumor, 14 (4.9%) had moderately-to-poorly differentiated tumor and 19 (6.6%) had poorly differentiated tumor. There were 4 (1.4%) of patients who had a well with focal areas of poorly differentiated tumor. Kaplan Meier analysis demonstrated that acellular mucin, well differentiated and well to moderately differentiated all did similarly well. Moderately-to-poor and poorly differentiated tumors all did similarly poorly and the moderately differentiat-

ed and the well with focal areas of poor all had an intermediate outcome. Therefore the histologies were reclassified into a three-tier system; resulting in 207 patients in the low grade group, 44 patients in the intermediate group and 33 patients in the high grade group. The 5-year OS is 92%, 65% and 15% respectively (p <0.001). Similarly, the 5 year DFS is 70%, 26% and 0%, respectively. If only acellular mucin was found outside the appendix at the time of CRS and HIPEC for a well-differentiated appendiceal adenocarcinoma this was associated with a 100% survival at a median follow up of 54 months compared to 90% OS for those with invasive well-differentiated tumor outside the appendix (p=0.016). Other important prognostic variables for DFS on multivariate analysis include: tumor grade (HR 1.78, 95%CI, 1.21-2.63, p=0.004), PCI (HR1.05, 95%CI 1.02-1.08, p=0.001), lymph node involvement (HR 0.33, 95%CI 0.11-0.98, p=0.046) and previous surgical score (PSS) (HR 1.31, 95%CI 1.05-1.65, p=0.02). Important prognostic factors for OS on multivariate analysis include: mucinous (HR7.23, 95% CI 2.28-22.89, p=0.001), signet ring cell (HR3.41, 95% CI 1.32-8.5, p=0.1), PCI (HR1.08 95%CI 1.03-1.14, p=0.001), pre-operative albumin HR0.35, 95%CI 0.13-0.89, p=0.3), complete cytoreduction (HR 0.25, 95%CI 0.09-0.70, p=0.008) and tumor grade (HR 3.43, 95%CI 1.74-6.75, p<0.001).

CONCLUSIONS: Our data strongly supports a three tier staging system and demonstrates the importance of pathologic grade and prognostic features such as mucinous tumors, signet ring cells, lymph node involvement, PSS, PCI, completeness of cytoreduction, pre-operative albumin and the presence of acellular mucin only.

P125

CLINICAL MANAGEMENT OF LOW-GRADE APPENDICEAL MUCINOUS NEOPLASMS (LAMN): THE "WATCH AND WAIT" POLICY EXPERIENCE

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BACKGROUND: Low-grade appendiceal mucinous neoplasm (LAMN) is a precursor lesion for pseudomyxoma peritonei (PMP), that is able to spread throughout the abdominal cavity. The role of cytoreductive surgery and HIPEC for these relatively early lesions is not still well defined.

METHODS: - To assess the clinical results of the policy of active surveillance in patients affected by LAMN and previously treated by macroscopically complete tumor resection.

RESULTS: Between 2003 and 2016, 43 patients affected by LAMN were prospectively evaluated. Inclusion criteria were disease limited to the appendix or immediate periappendiceal tissues and microscopically complete tumor resection. Patients underwent thoracic, abdomino-pelvic CT scan and serum tumor markers (CEA, CA19.9, CA15.3, CA125) every six months for the first five years, and every twelve months afterward. All the histological specimens were revised by a dedicated institutional pathologist before the inclusion. Of 43 patients with a diagnosis of LAMN, 39 were included in the study. Among the 4 patients excluded, 2 were not eligible because of incomplete resection (R2) and 2 for unavailability of histological specimen. Median age was 45 years, and all of them had disease exclusively localized to the appendix and/or peri-appendiceal tissue. Twenty-two patients onset with symptoms of acute appendicitis or right iliac fossa pain, three with occlusion or abdominal mass and fourteen were symptomless. Twenty-nine patients underwent appendectomy (open or VLS) and pelvic toilette; in four additional cases hysterectomy or oophorectomy was associated, and one lady was resected during caesarian section. Finally, 5 patient underwent right colectomy (open or VLS). Appendiceal rupture was found in 20/36 patients (51.3% *vs* 41%), while in 3 cases specimens were not evaluable. Mucine and/or cells outside the appendix were reported in 10/39 patients (25.6% *vs* 74.4%). Median follow-up time was 43 months (4-142 months), and 14 patients (35%) had a follow-up extended for more than 60 months. Only one recurrence was observed (2.6%), 18 months after appendectomy. The appendiceal lesion was a type I LAMN, according to McDonald *et al.* classification, without rupture or extra-appendiceal mucinous diffusion. Patient underwent CRS-HIPEC, and is actually alive with no evidence of disease.

CONCLUSIONS: The findings of the present study, strongly suggest that "Watch and wait" policy is associated with a very low risk of metacronous peritoneal dissemination. Also traditional empiric criteria, such as appendix wall perforation and/or presence of mucin and cells nearby the appendix, that may represent a more advanced stage of disease progression, were not associated with a higer risk of peritoneal dissemination. Accordingly, we do not support upfront CRS-HIPEC as a treatment option for these patients.

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INCIDENCE OF LEUKOPENIA AFTER INTRAPERITONEAL *VERSUS* COMBINED INTRAVENOUS/INTRAPERITONEAL CHEMOTHERAPY IN PSEUDOMYXOMA PERITONEI

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BACKGROUND: To investigate the clinical impact of post-HIPEC (hyperthermic intraperitoneal chemotherapy) leukopenia, intraperitoneal and combined intravenous/intraperitoneal drug administrations were compared.

METHODS: Two patient cohorts were retrospectively analyzed regarding the incidence of postoperative leukopenia. The first cohort (n=32) received Mitomycin C (MMC)-based HIPEC intraperitoneally (35mg/m² for 90 minutes) and the second cohort (n=10) received a bi-directional therapy consisting of oxaliplatin (OX) (300mg/m² for 30 minutes) intraperitoneally and 5-fluorouracil (5-FU) 400mg/m² plus folinic acid 20mg/m² intravenously. The following data were collected retrospectively: age, sex, length of operation, length of hospital stay, amount of resection including extent of peritonectomy, peritoneal cancer index (PCI), CC (completeness of cytoreduction)-status and leukocyte-count before CRS and HIPEC, on days 3, 7 and 14 after CRS and HIPEC. HIPEC leukopenia was defined as <4000cells/m³.

RESULTS: Leukopenia occurred statistically more often in the MMC- than in the OX/5-FU-group (10/32 *vs* 0/10; p=0.042). Leukopenia set-on was on day 7 after CRS and MMC-HIPEC and lasted for two to three days. Three patients (33%) required medical treatment. Patients affected by leukopenia were predominantly female (7/10 patients) and older than 50 years (8/10 patients). The length of hospital stay tended to be higher in the MMC-group without reaching statistical significance (22,5±11 *vs* 16,5±3,5 days). Length of operation (08:54±01:44 *vs* 09:48±02:28 hours) were comparable between patients with and without postoperative leukopenia. Prior history of systemic chemotherapy did not trigger post-HIPEC leukopenia. Occurrence of leucopenia did not trigger surgical site infections, intraabdominal abscess formations, hospital-acquired pneumonia or anastomotic insufficiencies.

CONCLUSIONS: Surgeons must be aware that there is a higher incidence of postoperative leukopenia in MMC-based HIPEC protocols primarily affecting females and older patients.

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GOBLET CELL CARCINOIDS AND PERITONEAL CARCINOMATOSIS: TREATMENT WITH CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY AT A NATIONAL CENTRE

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BACKGROUND: Goblet cell carcinoids (GCC) are mixtures of adeno- and neuroendocrine carcinomas in the appendix. Many patients present with metastatic disease where 5-year survival is less than 20% once treated systemically. The abdominal cavity is a common site of metastases for GCC. GCC behave in general more like an adenocarcinoma than like a neuroendocrine tumor. Therefore, synchronous and metachronous peritoneal metastasis (PM) arising from GCC has been an inclusion criteria for cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) in Denmark since 2009.
METHODS: To describe long-term outcome in patients with GCC and PM with focus on CRS and HIPEC. Consecutive patients with GCC and PM referred from the entire Denmark to a single, national centre were prospectively registered. CRS and HIPEC were offered if all of were fulfilled: physiologic age <75 yrs., ASA <3, no evidence of distant metastases, PC extent in <6 regions according to the Dutch 7 Region Count score, and complete cytoreduction should be achievable. Patients who had been operated within 3 months by open technique or had a complicated postoperative course after appendectomy received neoadjuvant chemotherapy. Mitomycin C, 35 mg/m2, was used during HIPEC for 90 minutes. Adjuvant chemotherapy was offered all patients after CRS and HIPEC. Follow-up included a (PET)CT scan at 3, 6, 12, 18, 24, 26, 48, and 60 months after surgery. Patients with too extensive peritoneal spread received palliative chemotherapy, and in case of intestinal obstruction they also had palliative surgery. Survival was calculated from time of diagnosis of primary GCC or recurrent GCC.
RESULTS: From March 2009 through May 2016, 34 patients with GCC and PM were evaluated. Median age was 58 years (range 37-75). At multidisciplinary team conference (T) 27 (79%) patients were deemed to be eligible to CRS and HIPEC based on history and (PET)CT scan. Fourteen (52%) of these patients were afterwards excluded from CRS and HIPEC because of massive extent of disease as detected at preoperative laparoscopy or at explorative laparotomy. Thus, 13 (48%) patients underwent complete CRS and HIPEC. Their PC extent was by median 3 regions (range 0-5). Major postoperative complications, *i.e.*, Clavien-Dindo score >2, were seen in one patient (anastomotic leak, CD score 4a). Median follow-up time was 23 months (range 1-90). Median overall survival, calculated according to the intention-to-treat-principle, of 27 patients deemed eligible to CRS and HIPEC at T was 38 months (95% CI: 29-48). In 13 patients in whom a complete CRS was achieved and HIPEC was performed, the median survival was 67.4 months. Their 2-year, 3-year and 5 year survival rates were: 91.7%, 74.1%, and 74.1%, respectively. Twenty-one patients received palliation only because of too extensive disease and thus incomparable to CRS and HIPEC patients. Their median survival was 20.7 months (95% CI: 12-30) and 2-year and 3-year survival rates were 32.2% and 19.3%.
CONCLUSIONS: CRS and HIPEC seems to be an effective and safe treatment of selected patients with GCC and PM. The prognosis of GCC patients with massive PM extent excluding CRS and HIPEC is poor.

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HIGH-TEMPERATURE HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY AND CYTOREDUCTIVE SURGERY FOR PATIENTS WITH APPENDICEAL PSEUDOMYXOMA

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BACKGROUND: Systemic chemotherapy offers almost no benefit to patients with pseudomyxoma peritonei (PMP), and after repeated tumor excisions over years, the patients die in distress. Cytoreduction surgery (CRS) followed effective HIPEC seemed to be the most effective approach. But because of the high morbidity and mortality with this procedures, HIPEC with a relatively low temperature around 41-42°C has been performed in most institutions for safety.
METHODS: In this study, we performed HIPEC with relatively high temperature around 43-44°C (H-HIPEC) after resection of primary foci and CRS for peritoneal metastases greater than 5 mm (non-peritonectomy), for appendiceal PMP. Method of H-HIPEC: Four liters of saline containing 100 mg/body CDDP, 20 mg/body of MMC, and 200 mg/body of etoposide were heated to 56°C in the reservoir and two liters were poured into the abdomen. An additional two liters were pumped into the circulation between the abdominal cavity and a reservoir at ~500 ml per minute. The newly developed disposable circulating circuit was used. Thermometers that can measure inflow and outflow temperatures were included in the tubes. To heat the whole abdomen evenly and continually for safety and efficacy, it is important to stir by hand during H-HIPEC. Temperatures in the abdomen were measured using 22-gauge thermocouple at the serosal surface in the subphrenic space and the pouch of Douglas and was maintained at approximately 43°C. The thermal dose (TD) was calculated and expressed in terms of equivalent time at 43°C. HIPEC was continued until the TD reached 25 minutes, which was actually obtained in around 40 to 45 minutes. Post operative management: It is very important to manage the water balance of the patient after H-HIPEC to avoid renal failure. Because heating with a high temperature injures the whole peritoneum, intensive circulation care similar to the care after a severe burn is required. The volume of the infusion depends on the size of the patient's body and the TD obtained. Total volume of infusion on the 1st day is around 12,000 ml in case of a 50-kg patient. H-HIPEC was performed for 13 cases of appendiceal PMP. Nine female and four male, ranging from 40 to 73 years of age. Pathological diagnosis showed six had DPAM, two PMCA-I, and the other eight PMCA. In three recurrence cases, tumor re-resection and HIPEC were repeated.
RESULTS: The complications among the 54 procedures for 51 patients with peritoneal metastases from colorectal and appendiceal malignancy who underwent H-HIPEC, there were 5 renal disorders, and 3 developed anastomotic leakage. Only one developed acute renal failure that dialysis but recovered. Treatment was not associated with any mortality. The 5-year survival was 82.5%. That of PMCA was 66.7%.
CONCLUSIONS: Concerning the treatment of PMP, we considered that good quality of life and improved prognosis may be obtained by performing H-HIPEC over 43°C without massive resection of the peritoneum or alimentary tract, although it requires a high-level postoperative general management technique.

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INDICATIONS FOR CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY IN ELDERLY PATIENTS WITH PERITONEAL MALIGNANCY

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BACKGROUND: A combination of CRS and HIPEC is effective for some peritoneal malignancies. However, the indications for elderly patients remain unclear, with substantial postoperative morbidity and mortality being problematic.
METHODS: This study was performed to investigate the indications for CRS+HIPEC in elderly patients by analyzing our postoperative data.
RESULTS: Clinical data were analyzed in 42 patients undergoing CRS+HIPEC for peritoneal malignancy. The primary tumor was located in the appendix in 32 cases and elsewhere in 10 cases. Operative results and survival data were compared between patients aged >70 and <70 years. Fourteen patients were older than 70 years. Elderly patients had a higher peritoneal cancer index (32.0 *vs* 21.5), higher CA19-9 level (189.0 *vs* 28.1), and higher frequency of grade 4-5 complications (5/9 *vs* 2/26) than the younger patients. Grade 4-5 respiratory failure occurred in three elderly patients. There was a significant difference of postoperative survival between the elderly patients and younger patients, with 5-year survival rates being 41.3% and 74.2%, respectively (p=0.0166). The poor prognosis of elderly patients was related to the higher frequency of grade 4-5 complications.
CONCLUSIONS: Elderly patients were referred for treatment with more advanced disease than younger patients. An age >70 years was associated with more frequent grade 4-5 complications and worse sur-

vival. Performing CRS+HIPEC in elderly patients should be considered carefully due to the risk of severe complications, especially respiratory failure.

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IN-DEPTH MUTATION ANALYSIS OF PSEUDOMYXOMA PERITONEI PATIENT SAMPLES WITH LOW TUMOR CONTENT

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BACKGROUND: Pseudomyxoma peritonei (PMP) is a very rare cancer that originates from mucinous tumors of the appendix and is characterized by tumor spread to the surfaces of the peritoneal cavity. Surgery followed by hyperthermic intraperitoneal chemotherapy (HIPEC) may cure up to 50% of the patients, but new therapeutic options are needed for patients who cannot be cured by surgery alone. An important limitation for improving PMP treatment is the lack of accurate molecular diagnosis, which prevents us from understanding disease mechanisms and identifying therapeutic targets. Therefore, knowledge of the molecular composition of PMP by analysis of a large number of patient samples is required. A challenge, in addition to the rarity of the disease, is that the tumor tissue often has extremely low cellularity (tumor content <<10%). The methods used for analysis must therefore be highly sensitive to be able to detect molecular abnormalities in these samples. In this pilot study we have evaluated the ability of ultra-deep targeted sequencing and denaturant capillary electrophoresis to detect mutations in patient samples with low tumor content and in patient-derived xenograft (PDX).
METHODS: a. Evaluate ultra-deep targeted sequencing (average depth of 7500x) covering hotspots in 50 cancer-related genes in patient samples with low tumor content. b. Validation of gene mutations in KRAS and GNAS using denaturant capillary electrophoresis (DCE). c. Mutation analysis of five PMP PDX mice models with the same methods as described in objective a. and b.
RESULTS: A range of mutations was detected in PMP patient samples with low tumor content using ultra-deep targeted sequencing. However, some mutations were called with low confidence and these should be verified by additional methods. We found that KRAS and GNAS were the most frequently mutated genes, and were confirmed by DCE. Similar results were found when analyzing the PMP xenograft models, although with higher confidence because of higher tumor content in the tissue samples.
CONCLUSIONS: In this study we show that it is, in fact, possible to identify mutations in PMP patient samples with extremely low tumor content by using ultra-deep targeted sequencing and DCE. Using these techniques, it may be possible to identify clinically useful molecular biomarkers as well as actionable therapeutic targets for this rare cancer.

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CYTOREDUCTIVE SURGERY AND HEATED INTRA-PERITONEAL CHEMOTHERAPY FOR APPENDICEAL MUCINOUS NEOPLASMS: EARLY EXPERIENCE OF A PUBLIC HEALTHCARE INSTITUTION IN SINGAPORE

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BACKGROUND: Appendiceal mucinous neoplasms have been known to spread to the peritoneum as pseudomyxoma peritonei which can be progressive and fatal. With the introduction of CRS and HIPEC in the early 2000s, the prognosis of such patients have been transformed. A 15-year survival rate of 59% for patients with pseudomyxoma peritonei who successfully underwent CRS/HIPEC has been reported.
METHODS: To review patients with a final histological diagnosis of appendiceal mucinous neoplasms at our institution who subsequently underwent CRS/HIPEC and compare their outcomes to those who only received adjuvant chemotherapy and surveillance. This is a retrospective review of all the patients with an appendiceal mucinous neoplasm over a 3-year period from 1st January 2012 to 31st December 2015 in a public tertiary healthcare institution in Singapore.
RESULTS: Over the study period, 15 patients were diagnosed with an appendiceal mucinous neoplasm. The patients were predominantly male (53.3%) with a mean age of 64.5 years old (51-84.4 years old). The most common presentation was abdominal pain with a computed tomography scan suggestive of acute appendicitis (60%). Seven patients (46.6%) had upfront right hemicolectomy, six patients (40%) had an appendicectomy at first presentation and subsequently underwent a right hemicolectomy at a later date. Two patients (13.3%) had extensive peritoneal metastasis not amenable to curative surgery; one received an ileocolic bypass, whilst the other had biopsy of his peritoneal nodules. Both patients passed away within 3 months after initial diagnosis. On analysis of the final histology, six patients (40%) had low grade appendiceal mucinous neoplasm, six patients (40%) had moderate to high grade appendiceal mucinous neoplasms, one patient had an appendiceal ex goblet cell carcinoid, two patients had advanced disease noted intra-operatively with biopsy of peritoneal nodules confirming mucinous carcinoma. Post-operatively, six patients (40%) received adjuvant chemotherapy. Chemotherapy had to be prematurely terminated in two cases as they experienced significant side effects. Four patients (26.7%) eventually underwent CRS/HIPEC and three patients (21.4%) were put on surveillance without any further treatment. Amongst the patients who did not receive CRS/HIPEC, pseudomyxoma peritonei subsequently developed in three patients. Their disease free interval ranged from 4.5 months to 1.5 years. There was no disease recurrence amongst the group who received CRS/HIPEC.
CONCLUSIONS: Appendiceal mucinous carcinoma is a rare condition. It has a poor prognosis if diagnosed late. With systemic adjuvant chemotherapy alone, there is a need for regular close monitoring. Some side effects of systemic chemotherapy may not be well tolerated by patients and may cause significant morbidity. In comparison, CRS/HIPEC is a safe and effective treatment for patients with appendiceal neoplasms and pseudomyxoma peritonei. A successful CRS/HIPEC may extend the disease free interval and improve a patient's long term survival outcomes.

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LONG TERM SURVIVAL ANALYSIS FOR HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY WITH OXALIPLATIN AS A TREATMENT FOR PERITONEAL CARCINOMATOSIS ARISING FROM THE APPENDIX

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BACKGROUND: Appendiceal peritoneal carcinomatosis (PC) is a rare disease, historically having a poor prognosis. Complete cytoreduction surgery (CRS) followed by hyperthermic intraperitoneal chemotherapy (HIPEC) have been proven to improve survival in patients with this disease and have therefore become a standard of care.
METHODS: The aim of this study was to analyze long term survival results of this therapy in our institution in the last 10 years. Data from patients with PC arising from the appendix was retrospectively reviewed and analyzed from our institution's database. Treatment consisted of CRS and HIPEC with oxaliplatin (460 mg/m2) at 43°C administered over 30 minutes. Ronnett's histologic classification was used for tumor grading (peritoneal mucinous carcinomatosis (PMCA), PMCA with intermediate features (PMCA-I) and disseminated peritoneal adenomucinosis (DPAM)). Overall survival (OS) and disease-free survival (DFS) estimates were calculated and demonstrated using Kaplan-Meier survival curves. Univariate and multivariate Cox regression analyses were used to assess the association between different patient, disease and treatment related factors and recurrence.
RESULTS: From July 2004 to December 2015, 109 patients underwent laparotomy with curative intent, 92 of which underwent CRS and HIPEC. Fifteen patients were found to have unresectable disease and two other patients had no evidence of disease, and therefore did not undergo CRS or HIPEC. Median follow-up was 42 months (range 1-143). The 5- and 10-year OS estimates for the entire cohort were 74.2% and 64.6%, respectively. The 5- and 10-year OS rates for the HIPEC group were 82.2% and 76.5%, respectively. Among the HIPEC group, the 5- and 10-year OS estimates for DPAM and PMCA-I subgroups were 100% and 100%, 78.1% and 72.9%, respectively. For the PMCA subgroup, the 3- and 5-year OS were 61.4% and 40.1%, respectively. At median follow-up of 10 months, the OS for the unresectable group was 50.9%. Overall recurrence rate was 36.9%. The 5- and 10-year DFS estimates for patients undergoing HIPEC were 71.9% and 42.7%, respectively. The multivariate Cox regression analysis demonstrated that PMCA histology, increased number of hollow organs resected as well as use of systemic chemotherapy were significant poor prognostic factors. Peritoneal carcinomatosis index and completeness of cytoreduction score were not significant. Regarding postoperative morbidity and mortality in the HIPEC group, there was 1 postoperative death and a 26% rate of overall major complications. With regards to the trend of complications over time, there was a significant lower rate of re-intervention between the years 2010-2015 compared to 2004-2009 (9.1% *vs* 30.1%, p=0.017). Overall side effects of intra-peritoneal chemotherapy were experienced in 6 patients (6.5%), with two patients (2.2%) experiencing grade III-IV hematologic toxicity and 6 patients (6.5%) suffering from grade III-IV neuropathy.
CONCLUSIONS: CRS and HIPEC with oxaliplatin represent an effective therapeutic approach for appendiceal PC. Despite a high recurrence rate, the long term OS estimates for patients treated at our institution are encouraging. This aggressive therapy is known for high morbidity, however, results from our series show that this improves with increasing center's experience, supporting the need for referral of these patients to designated centers.

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KRUKENBERG OVARIAN TUMOURS ARE COMMON IN WOMEN WITH PERITONEAL SPREAD FROM ADVANCED LOWER GASTRO-INTESTINAL TRACT MALIGNANCY AND MACROSCOPIC APPEARANCES UNDERESTIMATE TRUE INCIDENCE

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BACKGROUND: Transcoelomic spread to the ovaries is a frequent occurrence in peritoneal malignancy from advanced gastrointestinal tract tumours. These Krukenberg tumours are common in women with peritoneal malignancy, particularly in pseudomyxoma peritonei (PMP) and colorectal peritoneal metastases (CPM). Cytoreductive surgery (CRS) with hyperthermic intraperitoneal chemotherapy (HIPEC) for peritoneal malignancy routinely involves bilateral salpingo-oophorectomy (BSO). The true incidence of unilateral or bilateral ovarian tumour involvement in these patients is unknown and can make pre-operative counselling challenging.
METHODS: • Investigate incidence of macroscopic and microscopic ovarian metastases in patients undergoing complete cytoreductive surgery and HIPEC for pseudomyxoma peritonei or colorectal peritoneal metastases between January 2010 and July 2015. • Demonstrate the risk of occult ovarian involvement in macroscopically normal ovaries. • Report data on risk of ovarian involvement to facilitate pre-operative counselling and intra-operative decision making.
RESULTS: During the study period, 504 female patients underwent complete CRS and HIPEC for PMP or CPM. Of these, 278 had at least one remaining ovary and complete information was available in 269 with a median age of 56 years (range 19-83). Of these 269 patients, 225 (83.6%) had PMP and 44 (16.4%) had CPM. In 11 patients, histological examination of the ovaries revealed a primary ovarian tumour. Of the remaining 258 patients, macroscopic ovarian tumour involvement was documented at surgery in 117 patients (45.3%) of whom 75 (64.1%) had bilateral macroscopically abnormal ovaries. Of the remaining 42 patients, 2 had undergone a previous unilateral salpingo-oophorectomy. Therefore, in 40 patients one ovary looked macroscopically normal, but histology confirmed microscopic involvement in 18 of these 40 patients (45.0%). In 141 patients (54.7%) macroscopic appearances of both ovaries were normal but 24 (17.0%) of these had microscopic tumour involvement. In total, 152 women (58.9%) had ovarian tumour involvement; 79% of women with at least one grossly abnormal ovary had bilateral ovarian tumour involvement.
CONCLUSIONS: Ovarian metastases are common in peritoneal malignancy, occurring in 59% of women undergoing CRS and HIPEC. Macroscopically normal ovaries harbour microscopic malignancy in approximately 15% if both ovaries look normal and in nearly 50% in a normal looking ovary where the contralateral ovary is macroscopically involved. These high rates help inform pre-operative consent and intra-operative decision making.

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IMPACT OF OVARIAN KRUKENBERG TUMOURS ON SURVIVAL IN PATIENTS TREATED WITH CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR PERITONEAL MALIGNANCY OF APPENDICEAL AND COLORECTAL CANCER ORIGIN

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BACKGROUND: Ovarian metastases from gastrointestinal tract malignancy (Krukenberg tumours) have been considered an ominous finding with poor prognosis. It has been hypothesised that Krukenberg secondaries might indicate incurable disease. With this background, there is little information on the impact on survival, and potential cure, of the relatively recent strategy of cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) for peritoneal malignancy in women with Krukenberg tumours.
METHODS: • Retrospective analysis of prospective data in the Peritoneal Malignancy Institute database between January 2010 and July 2015. • Identification of female patients undergoing complete CRS and HIPEC for pseudomyxoma peritonei (PMP) or colorectal peritoneal metastases (CPM), with at least one remaining ovary at time

of surgery. • Estimation and comparison of survival rates between patients with and without ovarian metastases.

RESULTS: Overall 889 patients underwent surgery for peritoneal malignancy, of whom 551 were female. Of these, 504 (91%) female patients underwent complete CRS and HIPEC. Of these 504, 278 (55%) had at least one remaining ovary. Complete data was available in 269 patients (median age 57 years, range 19-83), 225 (84%) of whom had appendiceal tumours and 44 (16%) had CPM. In 11 patients, an incidental primary ovarian tumour was found. Of the remaining 258 patients, ovarian metastasis was confirmed histologically in 141 (55%). At a median follow up of 20 months, overall (OS) and disease-free survival (DFS) did not differ significantly between the 141 patients with and the 117 without ovarian metastases. Mean OS for patients with and without ovarian metastases was 56.3 (95% CI: 50.9-61.7) and 60.2 (95% CI: 55.0-65.3) months, respectively (P=0.267). Mean DFS was 48.7 (95% CI: 42.7-55.0) and 50.3 (95% CI: 45.6-55.0) months, respectively (P=0.057). For patients with low grade PMP, OS and DFS did not differ significantly between those with and without ovarian metastases. For patients with high grade PMP, mean OS for patients with and without ovarian metastases was 34.0 (95% CI: 27.0-40.9) and 58.7 (49.2-68.2) months, respectively (P=0.013); mean DFS was 29.9 (95% CI: 22.9-37.0) and 46.4 (40.6-52.1) months, respectively (P=0.001). Looking specifically at patients with colorectal peritoneal metastases, OS and DFS did not differ significantly between patients with and without ovarian metastases: mean OS was 30.2 (95% CI 20.8-39.5) and 23.9 (18.4-29.5) months, respectively (P=0.617); mean DFS was 27.5 (18.8-36.2) and 22.7 (17.2-28.2) months, respectively (P=0.586).

CONCLUSIONS: Patients with Krukenberg tumours treated by a combination of CRS and HIPEC have similar survival rates to patients without ovarian metastases. By regarding ovarian metastases as a manifestation of peritoneal dissemination, long-term survival and cure is feasible in patients with peritoneal malignancy amenable to complete tumour removal.

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PREDICTING WOUND COMPLICATIONS FOLLOWING CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR PERITONEAL MALIGNANCY AT A UK NATIONAL REFERRAL CENTRE

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BACKGROUND: Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy is increasingly used to treat and potentially cure selected patients with peritoneal malignancy. This extensive surgery can be performed with a low mortality but morbidity remains substantial with wound complication rates of 20 - 30%. Prolonged surgery and the use of HIPEC may play a role. Managing these infections is challenging and frequently delays discharge from hospital. Recently the prophylactic use of negative pressure dressings to manage these wounds has shown promise. We reviewed wound infection rates at a UK National Referral Centre to identify factors that may predict wound complications.

METHODS: • Inclusion of patients undergoing CRS and HIPEC for peritoneal malignancy of appendiceal or colorectal tumours between April and June 2016. • Analysis of data from a prospectively maintained database. • Collection of patient demographics and clinical outcomes, in particular body mass index (BMI) and length of stay (LOS). • Statistical analysis using student t-test or Fisher's exact test as appropriate.

RESULTS: During the 3 month study period 51 patients underwent surgery and, of these, 18 patients had a superficial wound dehiscence (34%). 8 patients needed simple packing whilst the remaining 10 (20% of all patients) required a negative pressure dressing to aid wound closure. All these patients were discharged with this *in situ*. The mean LOS increased by 9 days in these patients compared to those in whom there was no superficial wound dehiscence (28.6 *vs* 19.9 days, p=0.04). The mean BMI was significantly elevated in these patients at 31.6 compared to 26.1 (p=0.008) and the risk of requiring a negative pressure dressing was correlated with increasing BMI. 53% (8/15) of patients with a BMI >30 needed a negative pressure dressing compared with 6% (2/36) of those with a BMI <30 (p=0.004). There was no statistical difference in PCI scores, length of operation, need for a bowel resection or stoma formation between those who had a superficial wound dehiscence and those who did not.

CONCLUSIONS: Wound complications occur in just over one third of patients undergoing CRS and HIPEC with a significant impact on recovery and healthcare costs. Patients with a BMI >30 represent a target group who may benefit from proactive wound management protocols to reduce overall wound infection rates and hospital stay.

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HETEROGENEOUS CLINICAL PATTERNS IN PERITONEAL SPREAD OF APPENDICEAL NEOPLASMS

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BACKGROUND: Appendiceal neoplasms with peritoneal spread comprise a wide spectrum of clinical behavior, being Pseudomyxoma Peritonei (PMP) one of the pictures. In this study we analyze the surgical results in a series of patients treated in our Centre.

METHODS: Retrospective study of patients operated on of peritoneal carcinomatosis from January 2012 to May 2015 with histologic diagnosis of appendiceal neoplasm. Analysis of age, sex, preoperative diagnosis, anatomopathological definitive diagnosis, peritoneal carcinomatosis index, completion of citoreduction, morbidity, mortality and survival were analyzed.

RESULTS: Twenty seven consecutive patients were included. The median age was 63 years (26-73); 16 of them were men. PCI (Peritoneal Carcinomatosis Index)=16±8 (3-31). The suspect preoperative origins were appendix in 23, ovary in 3 y urotelial in 1, nevertheless the whole of the cases were actually appendiceal neoplasm with peritoneal proliferation. Two patients deceased in the postoperative period (7%), 59% of the patients did not have any complication. Major morbidity (Dindo Clavien grades 3 and 4) occurred in 18.5% of patients.

CONCLUSIONS: Mucinous adenocarcinomas with extra-appendiceal spread may exhibit as PMP with mucinous ascitis, jelly-nodular carcinomatosis without ascitis, nodular or desmoplasic plates carcinomatosis without mucus neither jelly mass/nodules. Histology is not correlated to clinical picture. Supposed mucinous ovarian adenocarcinomas in peritoneal carcinomatosis frequently are metastases of appendiceal origin.

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NEED FOR PLEURAL DRAINAGE FOLLOWING CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY IN PATIENTS WITH PSEUDOMYXOMA PERITONEI

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BACKGROUND: Effusion of the pleural space occurs often after stripping of the diaphragm in patients with pseudomyxoma peritonei (PMP). Pleural effusion can limit the vital lung capacity and cause a

prolonged recovery after cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC).
METHODS: - Report the proportion of PMP patients having a need for postoperative pleural drainage after CRS & HIPEC. - Examine whether and how diaphragmatic peritoneal stripping has any influence on the need of pleural drainage. - Investigate the correlation between site of diaphragmatic peritoneal stripping and the need for pleural drainage. All PMP patients undergoing CRS & HIPEC from June 2006 until April 2016 at Aarhus University Hospital (AUH), the single national CRS & HIPEC centre, were included and prospectively followed. Routinely, an x-ray image or an ultrasound of the pleural cavity was conducted the first or second postoperative day. In case of considerable pleural effusion, ultrasound guided drainage was performed. Proportions of PMP patients and stripped patients who had a need for pleural drainage were calculated. Using a chi.square test, comparing stripped and non-stripped patients, the effect of diaphragmatic peritoneal stripping on pleural drainage was presented as a relative risk.
RESULTS: Sixty patients (17 (28.3%) males and 43 (71.7%) females) with a median age of 61 (range 35-76) years were included. In total, 12/60 (20.0%) patients needed pleural drainage postoperatively. During CRS & HIPEC, 32/60 (53.3%) patients were peritoneal stripped under the diaphragm. Among these, 12/32 (38%) patients had the need for pleural drain in the postoperative period with following peritonectomy sites: n=6 right diaphragm side, n=1 left diaphragm side, n=5 bilateral. Therefore, pleural drainage was only needed in patients who underwent stripping of the diaphragm. Comparing strippen and non-stripped patients, the relative risk of pleural drainage was 2.4 (1.72;3.35) (p=0.0003). Stripped patients who have got a pleural drainage showed a trend to have had more peritoneal involvement compared to stripped patients - pleural drainage: median involvement of 7 (range 4-7) regions *versus* 5 (range 3-7) regions, p=0.0577.
CONCLUSIONS: Based on a small cohort of 60 PMP patients undergoing CRS & HIPEC, diaphragmatic peritoneal stripping significantly increases the risk of pleural drainage in the postoperative period. If stripping was performed, more than every third patient needed pleural drainage. These findings suggest that pleural drainage should be performed routinely at the en of surgery in case of upper peritoneal stripping.

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VIDEO REPORT: LAPAROSCOPIC APPROACH IN CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY BY A CO2 TURBULENT FLOW CLOSED SYSTEM IN A PATIENT WITH DISSEMINATED PERITONEAL ADENOMUCINOSIS

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) is the gold standard treatment for peritoneal surfaces malignancies and peritoneal carcinomatosis. Recently, laparoscopy is being reported as a technically feasible and safe approach with an acceptable morbidity profile for cytorreductive surgery and HIPEC, especially in patients with low tumor load (PCI) and low-grade neoplasm such as disseminated peritoneal adenomucinosis (DPAM) or Multicystic Mesothelioma (MM).
METHODS: The aim of our video presentation is to show a new approach and HIPEC delivery method in a patient with a low grade PMP. A 60-year-old woman referred to our specialised unit for evaluation after undergoing appendectomy, finding a perforated appendicular mucinous cystic neoplasm. Imaging work-up found a low-grade peritoneal pseudomyxoma and she was offered a CRS and HIPEC via a laparoscopic approach. After a complete exploration of the abdominal cavity, we confirmed a PCI 3/39 and the feasibility of a total removal of the disease by this route. We performed a right parietal and pelvic peritonectomy, bilateral salpingo-oophorectomies, cequectomy including the line of staples of the remaining stump, greater omentectomy and electroevaporation of several mucinous lesions macroscopically identified. All specimens were extracted thorough a Pfannestiel laparotomy and then, a closed-circuit system with CO2 turbulent flow was used for hyperthermic intraperitoneal chemotherapy with 50mg Mitomicin C during 60 min. Patient was discharged at postoperative day 5 without morbidity. On the 3-4 months of follow-up, the patient is still free of tumor.
RESULTS: N/A.
CONCLUSIONS: Laparoscopy approach is associated with a painless and faster postoperative recovery and with a lower hospital stay. Several groups had reported on the feasibility of a complete cytoreduction by this procedure and the safety of HIPEC administration with closed abdomen technique, with encouraging results in highly selected patients. As longer follow-up and additional studies are required to evaluate its long-term efficacy, no worsening on the prognosis has been reported *versus* open approach.

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CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR VARIOUS MALIGNANCIES: FEASIBILITY, MORBIDITY AND FIRST SURVIVAL RESULTS FROM A SINGLE FRENCH-CANADIAN INSTITUTION

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BACKGROUND: CRS and HIPEC was initially described by Dr. Sugarbaker *et al.* in the 1980s as a means to cure or increase survival of peritoneal carcinomatosis, whether pseudomyxoma peritonei or primary/secondary peritoneal malignancies. It is now well known that, due to its morbidity, costs and needed expertise, CRS and HIPEC should be performed in high volume academic centers. We herein present our initial results from a single French-Canadian academic center with emphasis on feasibility, morbidity and initial survival results.
METHODS: This study's objectives are as follows: - To identify the morbidity of CRS and HIPEC for our patients. - To determine the initial survival results of our patients. - To evaluate feasibility of CRS and HIPEC at our center.
RESULTS: This is a retrospective observational study based on a prospective database of 121 consecutive patients treated by two surgical oncologists. These patients underwent cytoreduction and HIPEC at the Centre Hospitalier Universitaire de Montréal, Quebec, Canada, a French-Canadian institution, from 2005 to 2016. Only first time procedures were considered. Palliative procedures were excluded. The most common tumor origin was the appendix (50 patients). Of those, there were 12 disseminated peritoneal adenomucinosis (DPAM) and 37 peritoneal mucinous carcinomatosis (PMCA). The remaining malignancies originated from the colorectum (48), peritoneum (10), ovaries (6) and stomach (3). Adverse events were reported according to the CTCAE classification. 5-year and 10-year post-intervention survival was estimated using Kaplan-Meier analysis. The average age of our patients was 54.8 (range 15 to 77). Our youngest patient had colorectal carcinomatosis. Fifty-four percent of patients received neo-adjuvant chemotherapy and 46% received adjuvant chemotherapy. The average peritoneal carcinomatosis index (PCI) was 15. Completeness of cytoreduction scores (CCR) were as follows: 70% had a CCR of 0, 23% of 1, 7% of 2 and no patient had a CCR of 3. Average duration of surgery was 8.9h. Sixty percent had one or more anastomosis. Average post-operative hospital stay was 18 days, including 1.8 days in the ICU. There were no 30-day mortalities. With regard to morbidity, 26% of patients had a grade III or IV adverse event (AE) according to the CTCAE classification, which can be considered as major complications. There were 14 grade IV AE and 35 grade III AE. The other 74%

of patients only had minor complications. The 5-year and 10-year survivals of all 121 patients were respectively of 57% and 41%.
CONCLUSIONS: Cytoreduction and HIPEC is a valuable treatment option for patients with various peritoneal malignancies. Our center demonstrated feasibility of a single institution program and we have shown comparable 5-year survival rates and grade III/IV complication rates as in recent series described in the literature. Our center is an approved pan-Canadian referral center part of the Canadian guidelines for CRS and HIPEC.

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THE EARLY AND RAPID CORRECTION OF PLASMA FIBRINOGEN WITH CRYOPRECIPITATE COMBINED WITH THE USE OF ANTI-FIBRINOLYTIC AGENT REDUCES BLOOD PRODUCT USE IN PMP SURGERY, OBSERVATIONAL STUDY

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BACKGROUND: North Hampshire Hospital in Basingstoke was the first of two national centres commissioned by the National Health Service in England for the treatment of PMP. Over the past 20 years, over 1200 patients with peritoneal malignancy have undergone surgery in Basingstoke (Moran *et al.*, 2015). Until recently, FFP was the primary choice of the anaesthetic and surgical teams during CRS in our unit. FFP was used proactively during surgery in a 1: 2 ratio with RBCs. Despite the early use of FFP, these patients continued to experience significant blood loss and often required cryoprecipitate to help maintain fibrinogen levels. Studies at other institutions have suggested as many as 76% of patients having CRS require blood replacement, with almost half (46%) requiring or receiving fresh frozen plasma (FFP) (Preti *et al.*, 2012) in PMP surgery. In trauma patients, guidelines have suggested that a fibrinogen level of 1·5-2·0 g L-1 should be maintained (Rossaint *et al.*, 2010). Based on these findings, and our own experiences, and with growing evidence of the superiority of fibrinogen over FFP, we devised a protocol utilizing proactive cryoprecipitate use in preference to FFP to address the potential coagulopathy that develops with this type of surgery (Kozek-Langenecker *et al.*, 2011).
METHODS: - Reduce Red Cell use. - Optimization of Plasma product use. - No increase risk of Arterial and Venous thrombotic episode.
RESULTS: We created a protocol at Hampshire Hospitals to try to minimize bleeding during this surgery. This involved early use of anti-fibrinolytic (Tranexamic acid) and early use of cryoprecipitate. Cryoprecipitate is a far more concentrated form of fibrinogen as compared to FFP (mean concentration of fibrinogen in a litre of fibrinogen 10 grams verses a mean concentration of fibrinogen in FFP of 3.120 grams). We compared outcomes with our new protocol to our historical practice of using primarily FFP to correct bleeding and coagulopathy. The mean number of Red cells used were 1.8 with the new protocol *vs* 4.2 used in the old protocol.. The mean number of FFP units used were 0.2 *vs* 6.2, platelets 0 *vs* 0.1 and cryoprecipitate 3.5 *vs* 1.1 units. Fibrinogen levels were 2.2 g/L *vs* 1.5 g/L intraopratively and 2.2 g/L *vs* 1.5 g/L postoperatively.
CONCLUSIONS: Although this is an observation study and there are a number of factors which might be contributing to the reduction in red cell and plasma prodcts used it has suggested that early cryoprecipitate and tranexamic acid is superior to FFP. Fibrinogen levels were higher intra-operatively and post-operatively in the cryoprecipitate group which may explain the reduced red cell use. Whether other clotting factors which are at higher concentrations in cryoprecipitate are contributing to reduced red cell use remains unknown. Our next goal is to look at the role of these other clotting factors in reduced blood loss in PMP surgery.

P141

SPLENECTOMY IS AN INDEPENDENT RISK FACTOR FOR POORER PERIOPERATIVE OUTCOMES AFTER CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY: AN ANALYSIS OF 936 PROCEDURES

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BACKGROUND: There is a paucity of data on the impact of splenectomy on peri-operative outcomes after cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS/HIPEC). We report the largest series to date which addresses this topic.
METHODS: Nine hundred and thirty six consecutive patients underwent CRS/HIPEC between 1996-2016 at a high-volume institution in Sydney, Australia. Of these, 418(45%) underwent splenectomy. Perioperative complications were graded according to the Clavien-Dindo Classification. The association of splenectomy with 19 peri-operative outcomes was assessed using univariate and multivariate analyses.
RESULTS: In-hospital mortality was 1.8%. Patients undergoing splenectomy had a higher disease burden (peritoneal cancer index=17) (71% *vs* 22%, p<0.001) and underwent a longer operation (=9 hours) (73% *vs* 34%, p<0.001). Even after accounting for confounding factors, splenectomy was independently associated with an increased risk of grade III/IV morbidity (Relative Risk [RR], 1.94; 95% Confidence Interval [CI], 1.29-2.91; p=0.01), infective complications (RR, 1.63; 95% CI, 1.09-2.44; p=0.018), pancreatic leak (RR, 5.2; 95% CI, 1.81-14.89, p=0.002) and intra-abdominal collection (RR, 1.86; 95% CI, 1.23-2.84, p=0.004). It was also an independent risk factor for long hospital stay (28 days) (RR, 1.98; 95% CI, 1.25-3.11; p=0.003). Splenectomy was not associated with in-hospital mortality (RR, 1.68; 95% CI, 0.32-9.32, p=0.556).
CONCLUSIONS: Splenectomy is an independent risk factor for poorer peri-operative outcomes. Minimizing the likelihood of inadvertent splenic injury through careful dissection and routine vaccination can improve outcomes.

P142

IMPACT OF CONCOMITANT UROLOGIC INTERVENTION ON CLINICAL OUTCOMES AFTER CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: The impact of concomitant urologic procedures (UP) on perioperative and long-term outcomes after cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS/HIPEC) is uncertain.
METHODS: Nine hundred and thirty-five consecutive CRS/HIPEC procedures were performed between 1996-2016 in Sydney, Australia. Of these, 73(7.8%) involved concomitant UP. The association of concomitant UP with 21 peri-operative outcomes and overall survival (OS) was assessed using univariate and multivariate analyses.
RESULTS: In-hospital mortality was 1.8%. Patients requiring UP were more likely to require transfusion of=5 units of red blood cells (p=0.031) and have a complete cytoreduction (79% *vs* 60%, p<0.001). On multivariate analysis, UP was not associated with in-hospital mortality (2.7% *vs* 1.7%, p=0.407) or grade III/IV morbidity (52% *vs* 41%, p=0.376). The incidence of ureteric fistula (4% *vs* 1%, p=0.004), return to theatre (26% *vs* 14%, p=0.005) and digestive fistula (22% *vs* 11%, p=0.005) was higher in the UP group. The addition of a urologic procedure did not significantly impact overall survival for appendiceal cancer (p=0.162), colorectal cancer (p=0.315) or pseudomyxoma peritonei (p=0.120).
CONCLUSIONS: Addition of a UP was not associated with an increased risk of grade III/IV morbidity or poorer long-term survival after CRS/HIPEC.

P143

DOES HAVING A GASTRECTOMY DELAY TIME TO FEEDING AND PROLONG HOSPITAL STAY IN PATIENTS UNDERGOING CRS AND HIPEC?

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BACKGROUND: Cytoreductive surgery (CRS) with hyperthermic intraperitoneal chemoperfusion (HIPEC) are routinely used to treat selected patients with peritoneal carcinomatosis, but can be associated with prolonged hospital stay, significant morbidity and potential mortality.
METHODS: Our objective was to assess if patients who underwent gastrectomy as part of CRS/HIPEC were at increased risk of delayed feeding time and prolonged hospital stay.
RESULTS: Of 214 patients undergoing CRS/HIPEC, those undergoing gastrectomy (19, 8.9%) had an increased time to full feeds (8 *vs* 5 days, p<0.01) as well as duration of SICU and total hospital stay (2 *vs* 1 days, p<0.01 and 16 *vs* 14 days, p=0.013 respectively). There was no significant increase in overall rate of serious complications or 60-day mortality, although an increased risk of pneumonia specifically was noted (21% *vs* 4.1%, p=0.011). However, inclusion of a gastrectomy was not independently prognostic of these outcomes in a multivariate model including PCI score (PCI >12), multiple CRS/HIPEC procedures (number >2) and duration of CRS/HIPEC (>480 min). An extended duration of CRS/HIPEC was the only independently prognostic (p<0.01) factor for increased time to full feeds and durations of SICU and hospitalisation stays. 11 of the 19 (58%) of the patients who underwent gastrectomy had primary appendiceal tumours (was this a significant association?). There was an association between performance of a gastrectomy with higher PCI scores (20 *vs* 10, p<0.01), multiple procedures required (4 *vs* 2, p<0.01) and extended duration of surgery (average 590 *vs* 490 min, p=0.018).
CONCLUSIONS: CRS/HIPEC that require gastrectomy as one of the surgical procedures are associated with more extensive disease and extended duration of surgeries. Although not independently prognostic for delayed feeding, patients who undergo a gastrectomy in CRS/HIPEC should be considered for total parental nutrition in the immediate post-operative period as early oral feeding is less likely in this cohort of patients.

P144

DIAGNOSTIC VALUE OF CONTRAST ENHANCED CT COMBINED WITH PET-CT IN PATIENTS SELECTED FOR CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Contrast enhanced (ce) CT represents the gold standard for selecting patients candidate for cytoreductive surgery (CS)+HIPEC.
METHODS: To investigate the relationships between 18F-FDG PET/CT, ceCT, PET/ceCT and surgical exploration in patients with peritoneal carcinomatosis candidates to CS+HIPEC.
RESULTS: From 2012 to 2016 we prospectively collected data from 27 patients (median age: 52 years; male: 13) with a clinical suspicious of peritoneal carcinomatosis candidates to CS+HIPEC (18 patients with no-mucinous and 9 with mucinous cancer). All patients underwent FDG PET/ceCT in a single session. The acquisition was started after 60 minutes from the administration of FDG. Two nuclear medicine physicians and 2 radiologists independently evaluated PET/CT and ceCT imaging, respectively. In case of discordance, the consensus was reached by a discussion between the specialists. Moreover, the combined images were evaluated by all the specialists in consensus. The images were qualitatively and quantitative analyses, by using the peritoneal cancer index (PCI). A 39-score was used. The PCIs obtained from surgical look, PET/CT, ceCT and PET/ceCT were compared each other. The coefficients of correlation (r) were calculated. PET/CT showed a significant uptake of FDG in 20/27 (74%) patients, being focal in 11 cases, diffuse in 5 and focal+diffuse in 4. The r coefficients were 0.641, 0.639 and 0.99 between PCI at PET/CT *vs* ceCT, PCI PET/CT *vs* PET/ceCT and PCI PET/ceCT *vs* ceCT, respectively. The r coefficients between surgical PCI, PET/CT, ceCT and PET/ceCT were respectively, 0.528, 0.876 and 0.878. Surgical PCI was available only in 21 patients, due to a progression of disease in 6 subjects. Out of 21 patients who underwent surgical look, 12 had a non-mucinous cancer and 9 a mucinous one. The r coefficient between surgical PCI and PET/CT was higher in patients with a non-mucinous cancer than the counterpart (0.601 *vs* 0.303) and the addition of ceCT significantly increase the correlation (r=0.953). Moreover, at FDG PET/CT, peritoneal carcinomatosis from mucinous cancer showed more often a focal pattern. Conversely, the peritoneal carcinomatosis of non-mucinous cancer had a both a focal and diffuse FDG uptake.
CONCLUSIONS: PET/ceCT as single examination seems more accurate than PET/CT and ceCT alone for the definition of PCI in patients candidates to CS+HIPEC. However, a careful selection based on histological pattern should be warranted, although a negative PET/CT scan would provide important prognostic information.

P145

LONG TERM QUALITY OF LIFE AFTER CYTOREDUCTIVE SURGERY AND HEATED INTRAPERITONEAL CHEMOTHERAPY FOR PSEUDOMYXOMA PERITONEI

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BACKGROUND: Cytoreductive surgery and intraperitoneal chemotherapy (CRS and HIPEC) has become the standard of care for pseudomyxoma peritonei (PMP). Although with complete cytoreduction the expected long-term disease-free survival is in the order of 90%, quality of life (QOL) in survivors remains poorly defined. We evaluated long-term QOL in patients undergoing treatment for PMP. Between 2003 and 2011, patients entering our PMP programme were provided with the EORTC-QLQ-C30 QOL questionnaire. This was introduced at pre-operative assessment, post-operative months 3, 6, 9, 12, 18, 24, and yearly thereafter with data prospectively entered into a database. The database was interrogated to identify patients with at least one completed questionnaire where the intention to treat was for CRS and HIPEC. Patients who underwent debulking procedures without HIPEC were excluded. The date of the first CRS and HIPEC procedure was taken as t=0 and data from each time-point were pooled. Analysis was performed according to manuals for

EORTC-QLQ-C30, and compared to reference data for European populations (one-way t tests). No analysis was performed on time-points with less than 10 data-points.
METHODS: - To define long-term quality of life after CRS and HIPEC for PMP. - To measure longitudinal changes in QOL before and up to 5 years after surgery using general EORTC-QLQ-C30 questionnaire. - Assessment of major functional domains including physical, role, social, cognitive and emotional functions, alongside global health scores.
RESULTS: QOL data were held on 217 patients from whom 137 were eligible for analysis. In total 533 QOL questionnaires corresponded to individual time-points, with a mean of 4.3 questionnaires/ patient (range 1-16). Questionnaire data were 99.7% complete. QOL data were obtained to 9.4 years post-operatively, although analysis concluded at 60 months due to limited numbers beyond this time. Physical function scores were impaired out to 12 months post-operatively (84.2 *vs* 92.2, p=0.0006), as was role function (80.0 *vs* 90.4, p=0.0003). Following this they returned to reference levels, and were maintained throughout the study period. Emotional function scores were impaired pre-operatively (74.1 *vs* 83.5, p=0.001), but returned to reference levels immediately post-operatively, and rose above reference values after 48 months (94.3 *vs* 83.5, p=0.0006). Social and cognitive functions showed marked impairment pre-operatively (79.8 *vs* 93.4, and 85.8 *vs* 93.5 respectively, p<0.0014), and persisted to 36 and 48 months respectively (p<0.03). In contrast, global health scores were never significantly below the reference population (p>0.08).
CONCLUSIONS: This study provides longitudinal data on the QOL for PMP patients before and following CRS and HIPEC. Emotional function returns to that of reference populations within three months of surgery, while physical and role function normalizes at 12 months. In addition we have identified that social and cognitive functions sustain long-lasting impairment. Directing support for patients in these areas could shorten the time to recovery and improve QOL.

P146

DIAGNOSTIC AND THERAPEUTIC LAPAROSCOPY IN ASSESSMENT AND MANAGEMENT OF PATIENTS WITH APPENDICEAL NEOPLASMS

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BACKGROUND: Radiological imaging often underestimates the extent of low volume peritoneal disease. The benefit of laparoscopy in assessing peritoneal metastases from colorectal and gastric cancer is accepted, but is inconclusive for appendiceal malignancy.
METHODS: We report our experience of diagnostic (DL) and therapeutic laparoscopy (TL) in patients with appendiceal tumours to determine indications and role in assessment and management.
RESULTS: 73 patients underwent laparoscopy during the study period. The main indication for DL was to clarify imaging(42%) or stage patients with high-risk histology(28%). Indications for TL were an abnormal appendix without gross PMP(65%), an abnormal appendix with low volume PMP(17%), and concerns for fertility in the presence of PMP(17%). DL resulted in 16 patients avoiding laparotomy because of extensive disease(n=12) or no tumour found(n=4). Overall, 28 patients were assessed to have resectable disease and at laparotomy, 25/28 had complete cytoreduction with 3 patients unresectable. In the TL group, laparoscopic appendicectomy and peritoneal lavage was achieved in 3/4 women with fertility concerns, and 1 patient required an open appendicectomy. All 4 patients conceived thereafter. There were no complications.
CONCLUSIONS: Patients with high-risk appendiceal neoplasm may benefit from DL, and potentially avoid unnecessary laparotomy. TL is useful in patients with low volume PMP and may aid fertility in selected patients.

P147

BIOLOGICAL MESH IS A SAFE AND EFFECTIVE METHOD OF ABDOMINAL WALL RECONSTRUCTION IN CYTOREDUCTIVE SURGERY FOR PERITONEAL MALIGNANCY

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BACKGROUND: Patients with peritoneal malignancy have often had multiple laparotomies before cytoreductive surgery (CRS). They may have substantial abdominal wall herniation and/or tumour infiltration of incisions/port sites. Optimal treatment includes complete macroscopic tumour removal, including parietal peritoneum, combined with hyperthermic intraperitoneal chemotherapy (HIPEC) and repair of any incisional hernia defect and involved abdominal wall,. Abdominal wall reconstruction (AWR) is problematic and the unit was an early adopter of biological mesh repair. The aim of this study is to analyse outcomes from biological mesh AWR.
METHODS: The aim of this study is to analyse outcomes from biological mesh AWR. Retrospective analysis of dedicated prospectively collected peritoneal malignancy database between 2004-2015. Details of patients that had biological mesh AWR were analysed. All patients had annual abdominal CT as routine peritoneal malignancy follow-up.
RESULTS: 33 patients (22 women) with a mean age of 53.4 years (19-82) underwent AWR. The majority (23 patients) had CRS for pseudomyxoma (19 low grade) while 6 had colorectal peritoneal metastasis and 4 appendix adenocarcinoma. Eighteen (55%) had re-do CRS and HIPEC in the unit. Twenty four (73%) had abdominal wall involvement during AWR and 8 (24%) had concurrent hernias. Mean operating time was 486minutes (120-795) and mesh size used (27 Permacol, 4 EGIS, 2 Strattice) was 345cm2 (50-654). Twenty eight patients had complete cytoreduction and five had major tumour debulking. All patients received HIPEC. Ten (30%) patients developed wound infections, 6 treated with antibiotics. Four (16%) had seroma, (one requiring drainage and VAC therapy). Two patients developed enterocutaneous fistulae secondary to one anastomotic leak which was managed conservatively and one from disease progression. Three (9%) developed incisional hernia (median follow-up of 31months). Thirteen (39%) had disease recurrence. Six out of these thirteen had disease in their abdominal wall but five had extensive itnra-abdominal recurrent disease with only one patient with isolated abdominal wall recurrence. 4/33 died from progressive malignancy.
CONCLUSIONS: Biological mesh is safe and effective for AWR in patients with peritoneal malignancy. Post-operative wound infections are frequent (comparable to patients undergoing CRS without AWR) but despite this incisional hernia rates are low. No cases of mesh related bowel erosion or fistulation occurred. Only one patient had isolated abdominal wall recurrence. Follow-up is ongoing.

P148

PSEUDOMYXOMA PERITONEI: TRANSCRIPTIONAL SIGNATURE AS ENHANCEMENT OF OUTCOME PREDICTION (AND TREATMENT STRATEGY?)

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BACKGROUND: Pseudomyxoma Peritonei (PMP) is a rare syndrome defined by clinical, biological and histological features. Different histological classifications of PMP are used; the one proposed by Ronnet divided PMP into adenomucinosis (DPAM) and mucinous carcinomatosis (PMCA), with distinct presumed prognostic implications. The 2010 WHO classification identified low and high-grade PMP, while the AJCC staging introduced a three-tier grading system for prognostic staging. However, PMP histopathology doesn't reliably predict tumour prognosis. Recently, tumour markers have been identified as independent prognostic factors; lastly, the transcriptional classifier by Levine identified three distinct subtypes: cluster 1 [PMP, low risk, good prognosis], cluster 2 [PMP, high risk, poor prognosis] and cluster 3 [colorectal cancer (CRC), poor prognosis]. Thus, the lack of a uniformly accepted classification is still a long-standing problem. Good prognosis is generally reported in treatment of PMP by cytoreductive surgery (CRS)+HIPEC, but a non negligible part of patients recur. Aim of the study is to evaluate if transcriptional classification of PMP may have a correlation with patients' outcome.
METHODS: From a prospective database of 130 patients affected by PMP who underwent CRS (CC-0/CC-1) plus HIPEC 38 relapse of disease were recorded. Overall and disease-free survival (OS and DFS) according to pathological classifications and tumour markers levels were calculated. From this cohort of patients, 103 samples of peritoneal metastases were taken on 45 patients with a follow-up higher than 36 months (35 PMP and 10 CRC as control samples). Microarray-based global mA expression profiling was performed.
RESULTS: Survival analysis was performed according with the three different histopathological classification systems and with the levels of three independent tumor markers (Ca125; Ca19.9, and CEA). No correlation was find on OS and DFS except for CEA levels on DFS ($p<0.0016$). Gene expression profiling was then exploited to stratify samples accordingly with Levine transcriptional criteria. This work identified on 35 PMP considered (10 CRC were used for control), 3 clusters of patients and the cluster division has a correlation with prognosis (not only on overall survival, but also on disease-free survival. In fact, 2 clusters are characterized by bad prognosis:1) colorectal (CRC)-like PMP, 2) «High risk» PMP and 3) "proper" PMP characterized by good prognosis. Another interesting finding is the impact of the "stromal score"(SS): high and low stromal score are related to worst prognosis, while intermediate SS seems related to better outcome.
CONCLUSIONS: The analysis has been done only on HIPEC patients CC-0/1 (no bias on outcome by surgery or HIPEC procedure). This work is an independent validation of Levine's oncogenes subset clusters. The 3 clusters identified shown an oncogene expression related with patient's outcome and notably this integrated classification was independent from known histological patterns (cox regression $p<0.05$). This work also underlines the impact of stromal score on prognosis. This observation, if confirmed in larger group of patients, may become an useful tool not only to predict the response to treatment, but also to evaluate different therapeutic strategies on high-risk patients.

P149

CYTOREDUCTIVE SURGERY PLUS HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY IN THE TREATMENT OF PERITONEAL CARCINOMATOSIS OF APPENDICEAL GOBLET CELL TUMORS

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BACKGROUND: We report a case of a 34 yo woman who first was treated by ovarian mass and peritoneal carcinomatosis with debunking surgery. The pathology diagnoses was carcinomatosis secondary to appendicular goblet cell tumor she receive FOLFOX 4, 4 cycles, with good radiologic response.After that we performed a CRS+ HIPEC.We found PCI score 26; surgery consist in extensive peritonectomy, total colectomy, cholecystectomy, reach CC0. Mytomicin C at 35m m2 was the drug provided at HIPEC. The patient was discharge at 10th pod without complications.
METHODS: Its a report a rare case treated with good outcome by CRS+ HIPEC.
RESULTS: - Neoadjuvant chemotherapy could be a first step in the treatment of appendiceal goblet cell carcinomatosis. - Complete cytoreduction and absence of node are the best prognostic factors.
CONCLUSIONS: CRS+ HIPEC is a safe and effectiveness approach in carcinomatosis from appendiceal goblet cell tumor.

A0100

PSEUDOMYXOMA PERITONEI GRADING: IS THERE A HELPFUL ROLE FOR IMMUNOHISTOCHEMISTRY?

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BACKGROUND: Pseudomyxoma peritonei (PMP) is a rare mucinous neoplasm that typically originates from a perforated epithelial neoplasm of the appendix. PMP is characterized by neoplastic epithelial cells growing in the peritoneal cavity and secreting mucinous ascites. Although PMP is uncommon, it has been estimated that about 300 new cases are diagnosed annually in the USA. Here we investigate 14 patients (6 females and 8 males; mean age±SD: 55±11 years) who underwent cytoreductive surgery with hyperthermic intraoperative peritoneal chemotherapy for PMP. In addition to histology, immunostains for CD68+ macrophages, CD3+ and CD20+ lymphocytes, Ki-67+ proliferating cells, CD34+ blood and LYVE-1+ lymphatic vessels, and the tumoral markers Pituitary-Tumor Transforming Gene 1 (PTTG1) and Squamous Cell Carcinoma Antigen 1 (SCCA1) were explored for potential tumor subtyping. Although the small number of patients investigated limits the comparison with the clinical outcome or disease recurrence, we first show that infiltrating adaptive immune cells can be spatially aggregated in clusters or dispersed throughout the tissue. PMPs have been also found highly vascularized by blood vessels when compared to LYVE-1+ lymphatic vessels, and variably proliferative as appeared by different Ki-67+ cell densities. PTTG1 and SCCA1 have been associated with the progression and recurrence of various human malignancies. We first report that PMP dissimilarly express these cancer-related antigens. Taking advantage by this panel of antigens involved in different biological processes, our comprehensive immunohistochemical analysis whether applied to a larger cohort of patients, promises to reveal potential information on the identification of PMP with an aggressive phenotype.
METHODS: We investigate a possible role for immunohistochemistry in management of PMP.
RESULTS: N/A.
CONCLUSIONS: This comprehensive immunohistochemical analysis whether applied to a larger cohort of patients, promises to reveal potential information on the identification of PMP with an aggressive phenotype.

A0106

EFFICACY AND SAFETY OF CYTOREDUCTIVE SURGERY AND HEATED INTRA-PERITONEAL CHEMOTHERAPY IN PERITONEAL CARCINOMATOSIS IN A COMMUNITY SETTING

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BACKGROUND: CRS followed by HIPEC is an invaluable tool in the management of peritoneal carcinomatosis (PC).This procedure is usually performed at the university academic centers.
METHODS: To analyze the efficacy and treatment related morbidity/mortality of CRS+HIPEC in a high-volume community cancer program.
RESULTS: 66 patients underwent CRS+HIPEC. M/F ratio was, 28/38. Median age was 57years. Primary diagnoses were, Appendiceal (47), Colorectal (15), Ovarian, mesothelioma, liosarcoma and PMP(1)each. Mean Peritoneal Cancer Index (PCI) was 22.8 (4-39).

Mean OR time was 741 min (300-1200). Mean blood loss 689.2 ml. Grade III/IV toxicities were seen in 15% of the patients. The common toxicities were, respiratory (33%), GI (31%) and hematologic (20%). Complete/Near complete resection was achieved in 72% of the cases. 30 day mortality was 4.5% (3/66). All 3 deaths were from sepsis. Average length of stay was 15.4 days (6-37). Mean overall survival for all the patients was 657.6 days (14-4822). The overall survival was depended on the diagnosis and the PCI.
CONCLUSIONS: CRS and HIPEC is an effective tool in the management of PC for appropriately selected patients and can be performed even at high volume community cancer programs with required expertise. Our efficacy and safety data correlates well with the other published studies.

AO110

OUTCOMES IN PATIENTS UNDERGOING GASTRIC RESECTION AS PART OF CYTOREDUCTIVE SURGERY AND HIPEC FOR APPENDICEAL NEOPLASMS

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) is an established method for treating peritoneal surface malignancy. Completeness of cytoreduction is a major determinate of long term survival. Invasive disease of the stomach presents a challenge to obtaining complete cytoreduction. We report perioperative and long term outcomes of patients undergoing gastric resection as part of CRS and HIPEC for appendiceal primaries and compare to those not requiring gastric resection.
METHODS: This study aims to determine the perioperative and long term outcomes of patients undergoing gastric resection as part of CRS and HIPEC for appendiceal neoplasms and compare to those not requiring gastric resection. Data on patients with peritoneal surface malignancy due to an appendiceal neoplasm undergoing CRS±HIPEC was extracted from a prospectively collected database at a single Australian centre. Patients were excluded if they were undergoing redo surgery or had an incomplete cytoreduction (*i.e.* CC2/3). Patients were divided in to two groups based upon whether a gastric resection was performed. Complications were graded according to Clavien-Dindo. The amount of stomach resected was dependent on the extent of disease and the perfusion of the stomach after initial cytoreduction. Four types of gastric resection were performed in this study- simple wedge resection, distal gastrectomy, subtotal gastrectomy, or total gastrectomy.
RESULTS: Between January 1996 and February 2016, 803 patients underwent a first-time CRS±HIPEC, 380 for appendiceal neoplasms. Complete cytoreduction (CC0/1) was achieved in 358 patients. Of these, 41 (11.5%) underwent gastric resection. Overall, four patients underwent wedge resection, 33 patients underwent distal gastrectomy, three underwent subtotal gastrectomy and one underwent total gastrectomy. In the gastrectomy group, 16 (39%) patients were low grade (DPAM), and 25 (61%) were high grade (PMCA). The median PCI in the low grade group was 35.5 (IQR 31.5-39) with gastric resection and 23 (IQR15-29) without gastric resection (p=.006). The median PCI in the high-grade group was 30 (IQR 23-37) with gastric resection and 22 (IQR 9-33) without gastric resection (p=.031). Major morbidity occurred in 76% of patients with gastric resection and 45% of patients without resection (p <.001). The rate of mortality during the index admission did not differ significantly between the two groups. The median total length of hospital stay in was 34 days (IQR 22-45) with gastric resection, compared to 23 days (IQR 16-32) without gastric resection (p=.002). For the DPAM group, overall five-year survival was 50% with gastric resection and 89% without gastric resection. For the PMCA group, overall five-year survival was 24% with gastric resection and 51% without gastric resection. The median survival for PMCA was 19.9 months with gastric resection and 63.4 months without gastric resection (p=.001).
CONCLUSIONS: Gastric resection as part of CRS is safe but associated with a significantly increased risk of morbidity. The necessity of performing a gastric resection to obtain complete cytoreduction should be viewed as an indicator that a patient has advanced disease. Despite the high level of morbidity associated with gastric resection in CRS and HIPEC it is possible to achieve acceptable survival for patients with peritoneal surface malignancy due to appendiceal neoplasms.

AO113

THERAPEUTIC LAPAROSCOPY IMPROVES FERTILITY IN YOUNG FEMALE PATIENTS WITH PSEUDOMYXOMA PERITONEI OF APPENDICEAL ORIGIN

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BACKGROUND: Infertility can be a presenting feature of pseudomyxoma peritonei (PMP) of appendiceal origin. Cytoreductive surgery (CRS) with hyperthermic intraperitoneal chemotherapy (HIPEC) is the definitive treatment modality of choice for patients with pseudomyxoma peritonei, but involves bilateral salpingo-oophorectomy, as ovarian involvement is a common feature of PMP. Young women with an active wish to have children may be reluctant to pursue this treatment. An alternative strategy to preserve fertility in patients with low-grade PMP may be laparoscopic evacuation of pelvic and ovarian mucin.
METHODS: • Identification of premenopausal female patients with PMP undergoing laparoscopy with appendicectomy, pelvic mucinous evacuation and washout with copious irrigation between January 2012 and January 2015. • Follow-up of fertility-related outcomes. • Follow-up of oncological outcome 1-year after laparoscopy.
RESULTS: Between January 2012 and January 2015, four premenopausal female patients (aged 28-35 years) with PMP were referred to a national PMP referral unit; these four patients represented 1.5% of 271 female patients undergoing surgery for PMP in this unit during this period. ThreE patients had longstanding infertility at the time of referral. The presenting complaints were infertility in one patient, abdominal pain necessitating laparoscopic appendicectomy in one patient, and incidental imaging findings of an appendiceal mucocele and intra-abdominal mucin in two patients. All four patients had pelvic mucinous disease on radiological imaging, with limited extrapelvic disease in two patients. One patient had elevated carcino-embryonic antigen (CEA) levels at 19 ng/mL; all other patients had normal tumour markers. All patients were offered CRS and HIPEC as definitive management for their PMP, but chose a staging and potentially therapeutic laparoscopy. At laparoscopy, a systematic evaluation of intra-abdominal disease extent was performed, followed by an appendicectomy (except in one patient with a previous appendicectomy) and copious irrigation and washout of the pelvis with stripping of mucinous disease off the surface of the ovaries. At the end of the procedure, the ovaries and pelvis were completely clear of disease and macroscopically normal. Postoperative histology demonstrated a low-grade appendiceal mucinous neoplasm (LAMN) in all patients; the pelvic disease consisted of acellular mucin in two patients and low-grade mucinous carcinoma peritonei in the remaining two. In the patient with elevated preoperative CEA levels, postoperative CEA dropped to <0.5 ng/mL. All four patients successfully conceived subsequently and gave birth to full term healthy babies with only one requiring In Vitro Fertilisation. Currently, after 16-35 months follow-up, all women are well with no radiological evidence of disease recurrence.
CONCLUSIONS: In patients with low-grade PMP, therapeutic laparoscopy can restore fertility. Long-term follow up is required to fully evaluate the oncological outcomes. This modality in premenopausal women with low-grade PMP wishing to have children is a serious alternative to immediate CRS and HIPEC.

AO116

CHEMOTHERAPY IN PATIENTS WITH APPENDICEAL NEOPLASMS WITH PERITONEAL METASTASES, UNSOLVED ISSUE

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BACKGROUND: Appendiceal neoplasms represent a wide spectrum of disease, being Adenocarcinoma the second most frequent histologic type. Roughly, appendiceal adenocarcinoma may be divided in low grade and high grade. Surgical treatment of colorectal cancers is supported by perioperative systemic chemotherapy (ChT) in advanced stages of disease. However, the role of ChT in appendiceal adenocarcinomas is not clearly defined.
METHODS: Analysis of the criteria employed to prescribe ChT in a series of patients operated on of peritoneal mestastases from appendiceal adenocarcinoma. Retrospective study of patients operated on of peritoneal carcinomatosis of appendiceal origin from January 2012 to May 2015. Patients were divided into two groups, high grade and low grade appendiceal neoplasms and analyzed considering the administration of systemic chemotherapy.
RESULTS: 25 patients were included, 16 patients to the low grade group, 9 to the high grade group. In the former group, 4 patients received ChT, 6 in the latter. Recurrences were present in 10 patients, 6/16 in the low-grade group and 4/9 in the high-grade group. In the former group, 1/6 patients was treated with chemotherapy, 3/4 were treated with ChT in the high-grade group. Of the non-recurrent patients, 3/10 patients with low-grade underwent ChT, 3/5 patients underwent systemic treatment in the high-grade group.
CONCLUSIONS: There is ongoing confusion on the exact role of ChT in peritoneal disseminated appendiceal neoplasms, high- or low-grade included. Its use nowadays is at the discretion of the treating medical oncologist.

AO123

ALLOGENIC BLOOD TRANSFUSION IS AN INDEPENDENT PREDICTOR OF POORER PERIOPERATIVE OUTCOMES AND REDUCED LONG-TERM SURVIVAL AFTER CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY: A REVIEW OF 936 CASES

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BACKGROUND: There is a paucity of data on the impact of allogenic blood transfusion (ABT) on morbidity and survival outcomes after cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS/HIPEC).
METHODS: Nine hundred and thirty-five consecutive CRS/HIPEC procedures were performed between 1996-2016 at a high-volume institution in Sydney, Australia. Of these, 337(36%) patients required massive ABT (MABT) (=5 units). Peri-operative complications were graded according to the Clavien-Dindo Classification. The association of concomitant MABT with 21 peri-operative outcomes and overall survival (OS) was assessed using univariate and multivariate analyses.
RESULTS: In-hospital mortality was 1.8%. Patients requiring MABT had more extensive disease as reflected by a higher peritoneal cancer index (=17) (70% *vs* 29%, p<0.001) and longer operative times (=9 hours) (82% *vs* 35%, p<0.001). After accounting for confounding factors, MABT was associated with in-hospital mortality (Relative Risk [RR], 7.72; 95% Confidence Interval [CI], 1.35-10.11; p=0.021) and grade III/IV morbidity (RR, 2.05; 95% CI, 1.42-2.95; p<0.001). MABT was associated with an increased incidence of prolonged hospital stay (28 days) (RR, 1.86; 95% CI, 1.26-2.74; p=0.002) and intensive care unit stay (4 days) (RR, 1.83; 95% CI, 1.24-2.70, p=0.002). It was also associated with a significantly OS in patients with colorectal cancer peritoneal carcinomatosis (RR 4.49; p<0.001) and pseudomyxoma peritonei (RR, 4.37; p=0.026) but not appendiceal cancer (p=0.160).
CONCLUSIONS: MABT is an independent predictor for poorer perioperative outcomes including in-hospital mortality and grade III/IV morbidity. It may also compromise long-term survival, particularly in patients with colorectal cancer peritoneal carcinomatosis.

AO126

CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR PERITONEAL CARCINOMATOSIS IN THE ELDERLY - A CASE-CONTROLLED, MULTICENTER STUDY

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BACKGROUND: Major surgery is associated with higher morbidity and mortality in elderly patients. For PC, CRS and HIPEC is the only current potential curative therapy, but the risks inherent to this patient population have called its benefit into question.
METHODS: To identify factors associated with morbidity and mortality in patients over 70 years who underwent cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) for peritoneal carcinomatosis (PC).
RESULTS: Out of 2328 patients, 188 patients over 70 were matched with 704 younger patients. Patients over 70 demonstrated a higher American Society of Anesthesiologist score (>ASA III 10.8% *vs* 6.6%, p=0.008). There was no difference in overall 90-day morbidity (=70: 45.7% *vs* <70: 44.5%; p=0.171), however patients over 70 had significantly more cardiovascular complications (13.8% *vs* 9.2%, p=0.044). Differences between the older and younger cohorts failed to reach significance for 90-day mortality (5.4% and 2.7%, respectively; p=0.052), and failure-to-rescue (11.6% and 6.1%, respectively; p=0.078). In multivariate analysis, PCI>7 (95%IC: 1.051-5.798, p=0.038) and HIPEC duration (95%IC: 1.106-6.235, p=0.028) were independent factors associated with morbidity in elderly patients.
CONCLUSIONS: CRS and HIPEC appear feasible for selected patients over 70, albeit with a higher risk of medical complications associated with increased mortality.

Colorectal Cancer

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CRS & HIPEC, APPROACH TO CARCINOMATOSIS PERITONI 5 YRS OUTCOME OF A NEW CENTER FOR MANAGING PERITONEAL CARCINOMATOSIS

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BACKGROUND: Many surgeons and oncologists have regarded peritoneal Carcinomatosis (P.C) as a terminal event with fatal consequences, whereby, there is spread and implantation of cancer cells across peritoneal surfaces both parietal and visceral peritoneum and may be associated with so-called malignant ascites. P.C may be a primary peritoneal malignancy such as primary peritoneal carcinoma and peritoneal mesothelioma or it may be more commonly metastatic secondary to cancers from colorectal, ovarian, gastric, pancreatic or appendicular origins.
METHODS: 1. Peritoneal carcinomatosis (P.C) is not a terminal condition. 2. It is possible to adopt cytoreductive surgery as described by Sugerbaker. 3. In selected patients with P.C, longer survival can be achieved with acceptable complications. 4. It may be considered cure in others.
RESULTS: Forty five patient were referred to our specialty during period from January 2011 to December 2015. The mean age 47 years with female to male ration 3 to 1. Mean Peritoneal Carcinomatosis Index (PCI) was 16 (range 2-39). Out of forty five, only 38 patients met the criteria to undergo CRS & HIPEC. Complete cytoreduction was achieved in 87% of patients (CR0 and CR1). There were no perioperative mortalities, with morbidity of 40 percent. Two postoperative deaths, one due to pulmonary emboli and the other acute massive myocardial infarction. Eight patient required a second HIPEC out of whom 6 patient within one year and 2 patients within three years.
CONCLUSIONS: Cytoreductive surgery combined with hyperthermic intra operative intra peritoneal chemotherapy perfusion is a feasible technique carrying acceptable complication rates with good survival and represent a potential cure for selected patients.

P202

REPEAT CYTOREDUCTIVE SURGERY AND PERIOPERATIVE INTRAPERITONEAL CHEMOTHERAPY FOR PERITONEAL SURFACE MALIGNANCY- IS IT FEASIBLE?

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BACKGROUND: A significant proportion of patients with peritoneal surface malignancy (PSM) experienced peritoneal recurrence after initial cytoreductive surgery (CRS). Thus the aims of this study were to determine the perioperative mortality and morbidity outcomes associated with repeat CRS and to evaluate the value of repeat CRS for long-term survival outcomes in a large patient cohort.
METHODS: - To determine the perioperative mortality and morbidity outcomes associated with repeat CRS with or without PIC; - evaluate the value of repeat CRS for long-term survival outcomes in a large patient cohort.
RESULTS: A total of 1013 patients formed the cohort of this study. However there was no significant difference in terms of hospital mortality ($p=0.296$), major morbidity rate ($p=0.672$), intensive unit care stay ($p=0.640$), high dependency unit stay ($p=0.923$) and total hospital stay ($p=0.509$). Patients who underwent repeat surgery had a significantly higher 5-year overall survival (OS) rate ($p<0.001$) and a longer median disease free interval (DFS) ($p=0.007$) as compared to those who only had one surgery. Repeat CRS was also found to be a significant prognostic factor for OS ($p<0.001$) and DFS ($p<0.001$).
CONCLUSIONS: In summary, repeat CRS with or without HIPEC is feasible and could provide survival benefits to patients with PSM with acceptable mortality and morbidity rates. Future multicentric studies for each origin are warranted to evaluate the long-term survival benefits that can be achieved by repeat surgery.

P203

NOVEL INTRAPERITONEAL TREATMENT FOR PERITONEAL METASTASES. RESULTS FROM THE IMMUNOTOXIN IN PERITONEAL CARCINOMATOSIS PHASE I TRIAL

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BACKGROUND: Peritoneal metastasis from colorectal cancer (PM-CRC) is a condition with poor prognosis, even in patients selected for potentially curative treatment with cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS-HIPEC). Recently, we demonstrated preclinical efficacy of MOC31PE immunotoxin, a drug developed in our laboratory, administered intraperitoneally in experimental animal models of PM-CRC. MOC31PE is composed of the monoclonal antibody MOC31, which recognizes the tumor associated cell surface antigen EpCAM, conjugated to pseudomonas exotoxin (PE). The rationale with MOC31PE intraperitoneally is to kill the residual cancer cells in the peritoneal cavity after CRS-HIPEC to improve patient outcome.
METHODS: To administer, for the first time in humans, MOC31PE intraperitoneally in combination with CRS-HIPEC to patients with PM-CRC. • To evaluate toxicity and safety of the combination and determine maximum tolerable dose. • To evaluate pharmacokinetic parameters and neutralizing antibody response.
RESULTS: The ImmunoPeCa phase I/II clinical trial (NCT02219893) started enrolment in 2014 and patients with EpCAM positive PM-CRC accepted for CRS-HIPEC were included. MOC31PE was administered on the first postoperative day through abdominal drainage catheters that were clamped for 6h before they were reopened to evacuate intraabdominal fluid. Standard dose escalation was applied, with four dose levels (2.5, 5.0, 7.5 and 10 µg/kg). Main endpoints were safety and toxicity (CTCAE version 4.0), and pharmacokinetic analyses of serum and peritoneal fluid were performed. Fifteen patients have received MOC31PE without major toxicity, and a maximum tolerated dose was not reached. Interestingly, MOC31PE was not detected in patient serum, suggesting that there was no systemic absorption of the drug. In peritoneal fluid samples at 6h and 24h MOC31PE was present in cytotoxic concentrations based on *in vivo* and *in vitro* studies, at least for the two highest dose levels. Impressively, the retrieved MOC31PE was still fully active after residing 24h in the peritoneal cavity when analyzed in cell based assays. No dose limiting toxicity was observed upon intraperitoneal administration of MOC31PE, which is consistent with no systemic absorption.
CONCLUSIONS: Treatment with MOC31PE represents a unique possibility for intraperitoneal treatment intensification without major systemic toxicity. The highest dose level (10 µg/kg) has been chosen for further testing in a phase II expansion of the trial.

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HYPERTHERMIC INTRA-PERITONEAL CHEMOTHERAPY WITH OXALIPLATIN AS A TREATMENT OF PERITONEAL CARCINOMATOSIS ARISING FROM COLORECTAL CANCER: A LONG TERM SURVIVAL ANALYSIS

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BACKGROUND: Peritoneal carcinomatosis (PC) from a colorectal cancer has been associated with poor prognosis. In the last two decades, evolution in medical imaging, adjuvant therapy and surgical technique gave the opportunity to improve the management of this pathology. Cytoreductive surgery (CRS) with hyperthermic intraperitoneal chemotherapy (HIPEC) have improved survival compared to systemic chemotherapy. The aim of this study was to analyze survival results of CRS and HIPEC using Oxaliplatin in our institution in the last 10 years.
METHODS: Patients with colorectal cancer with PC treated by CRS and HIPEC from 2004 to 2015 at our institution were included. Treatment consisted of CRS and HIPEC with oxaliplatin (460 mg/m2) at 43°C administered over 30 minutes. Overall survival (OS) and disease-free survival (DFS) estimates were calculated and demonstrated using Kaplan-Meier survival curves. Univariate and multivariate Cox regression analyses were used to assess the association between different patient, disease and treatment related factors and survival.
RESULTS: From July 2004 to December 2015, 113 patients underwent laparotomy with curative intent, 91 of which underwent CRS and HIPEC. The OS rates at 3 and 5 years were 75% and 55% respectively. The DFS rates at 3 and 5 years were 50% and 25% respectively. For OS, multivariate Cox regression analysis demonstrated that higher Peritoneal Carcinomatosis Index (PCI) (HR=1.13 (1.05-1.23), p=0.003) and post operative complications of grade III or IV (HR=5.54 (1.29-23.67), p=0.021) and (HR=6.26 (1.16-33.72), p=0.033) respectively, were significant poor prognostic factors. For DFS, higher PCI (HR=1.11 (1.05-1.16), p<0.001) was a significant poor prognostic factor. Synchronous *vs* metachronous presentation and index stage were not significant prognostic factors. In our series, there was no difference in post-operative complications between open and closed techniques.
CONCLUSIONS: CRS and HIPEC with oxaliplatin for PC from colorectal cancer is an effective treatment with encouraging survival results.

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SMALL BOWEL DISEASE A CONTRAINDICATION FOR CYTOREDUCTION AND HEATED INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Small bowel involvement in patients with peritoneal metastasis is discussed as the main limitation for complete cytoreduction during cytroreucitve surgery (CRS). In this study we hypothesized that small bowel disease is a poor prognostic sign and hence a contraindication for cytoreductive surgery and heated intraperitoneal chemotherapy (CRS and HIPEC).
METHODS: A retrospective analysis of 100 patients that underwent CRS and HIPEC. Small bowel disease was assessed by small bowel resection and mesentery stripping at the time of CRS. Kaplan-Meier method was used to estimate survival probability and log rank test to assess the difference in survival between groups. Cox proportional hazards model was used to identify the significant prognostic factors. Logistic regression was performed to model relationship between response variables.
RESULTS: Peritoneal cancer index (PCI) (PCI >18, HR=3.6, p<0.001), R status (R1 HR=3.2, R2 HR=9, p<0.001), mesentery stripping (HR=1.7, p=0.03), primary diagnosis (colorectal: HR=1.79, Ovarian: HR=0.81, other: HR=1.7, p<0.05) and small bowel resection (HR=1.9, p=0.009) were significantly associated with overall survival (OS). Lysis of adhesions (HR=1.8, p=0.1) and number of small bowel resections (more than one *vs* equal or less than one HR=0.76, p=0.4) were not significantly associated with OS. In Multivariate regression model only PCI >18, (HR=2.1, p=0.01) and R status (R1: HR=2.1, R2: HR=4.1, p=0.02) remained significant in multivariate model.
CONCLUSIONS: In this selected group complete cytoreduction and PCI score remain the main determinants of OS. Small bowel resection and mesentery stripping as surrogates of small bowel disease did not have much effect on OS. Prospective studies are needed to better evaluate the hypothesis and evaluate the best management of patients with peritoneal metastasis and small bowel disease

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CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAEPERITONEAL CHEMOTHERAPY FOR PERITONEAL SURFACE MALIGNANCIES AT THE MEDICAL UNIVERSITY OF VIENNA (AUSTRIA): UPDATE ON MORBIDITY AND ONCOLOGIC OUTCOME

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) is a promising therapeutic option for patients with peritoneal surface malignancies. The most promising indications for CRS and HIPEC include pseudomyxoma peritonei, diffuse malignant peritoneal mesothelioma and peritoneal metastasis from colorectal cancer. In May 2011, a HIPEC program was established at the Medical University of Vienna, Austria.
METHODS: Aim of the present analysis was to evaluate the morbidity as well as oncologic outcome of the program.
RESULTS: Fifty patients (27 female, 23 male; median age 53.0 years, range: 18.3-75.7 years) received a total of 54 CRS and HIPEC-procedures. The indications for treatment were as follows: appendiceal malignancy/pseudomyxoma peritonei (19 patients), peritoneal metastasis from colorectal (20 patients), gastric (2 patients) or small intestinal cancer (1 patient), peritoneal mesothelioma (7 patients) and primary peritoneal adenocarcinoma (1 patient). The median Peritoneal Cancer Index (PCI) was 12 (range: 0-33) and a complete or near-complete surgical cytoreduction (CC-0/1) could be achieved in 49/50 patients (98%). The median operation time was 500 minutes (range: 270-895 minutes). HIPEC was administered in a closed fashion and consisted of Mitomycin-C (n=36), Oxaliplatin (n=9) and Cisplatin/Doxorubicin (n=9). The median length of in-hospital stay was 14 days (range: 8-127 days). A postoperative complication that needed further invasive treatment (Clavien Dindo 3 and 4) occurred in 17 of 50 patients (31.5%) and the relaparotomy rate was 22.2% (12/50). The 30-day-mortality was 4% (2/50 patients). The median follow up of the patients is currently 16.2 months (range: 0.6-59.6 months), with 34/50 patients (68%) having a follow-up of more than 12 months. Seven patients (14%) have died during follow-up (median follow-up In these patients: 21 months, range: 10-25.6 months), 16 patients (32%) are alive with disease and 25 patients (50%) have no evidence of disease.
CONCLUSIONS: Our results illustrate that the morbidity data and oncologic outcome of the HIPEC program at the Medical University of Vienna lie within that of previously published series. The significant postoperative morbidity in our series and that of others illustrates once more the importance of accurate documentation and work-up of outcome data in order to optimize treatment results after CRS and HIPEC.

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PERITONEAL METASTASIS FROM COLONIC ORIGIN. 289 PATIENTS TREATED BY CRS+ HIPEC. LESSONS LEARNED IN TEN YEARS EXPERIENCE PERIOD. CATALONIAN PERITONEAL CARCINOMATOSIS PROGRAM (SPAIN)

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BACKGROUND: In 25% of colon cancer patients, peritoneal metastasis (PM) will be detected during follow up. Recent studies in selected group of patients with colorectal PM, treated with CRS+HIPEC and postoperative chemotherapy, report 5-y survival of 30-52%. Correct patient selection and surgical team experience are determining factors in the efficacy and safety of radical treatment, currently considered the treatment of choice. Extensive series of patients treated homogenously allow to define survival independent prognostic factors. We present the experience and results of a PM national treatment program. We describe our action protocol, and present results and prognostic indicators in overall survival.
METHODS: September06/April16: 653 patients with PM from different types of Peritoneal Surface Malignancies have been treated by 729 CRS+HIPEC procedures; 289 had carcinomatosis from colon tumors. Rectum PM and appendiceal PM (non PMP) have been excluded from this analysis. We describe our action protocol: 1. patients diagnosed with colon PM with low volume disease go to CRS+HIPEC and later complete systemic treatment. 2. colon PM median/high volume disease begin treatment with chemotherapy and, when stability or disease response to 4 cycles of treatment is assessed, CRS+HIPEC is indicated and realized after the sixth cycle of chemotherapy. Finally, systemic treatment is completed. 85.1% patients received systemic chemotherapy prior to multidisciplinary treatment. CRS was achieved using peritonectomy procedures, and HIPEC using oxaliplatin (65.1%) or irinotecan (33.6%), 42ºC, 30 min. Bidirectional chemotherapy: iv 5FU plus Folinic acid, 1 hr before HIPEC. Kaplan-Meier curves and Log-Rank tests have been applied to assess the relationship between overall survival and several clinical, surgical and anatomopathological factors. Statistically significant variables have been included in a Cox regression model.
RESULTS: The results showed in this series have been subjected to an external audit. F: 137, M: 152. Mean age 58.6 years. Prior chemotherapy and prior surgery: 96.9% and 92.7%. Mean PCI: 7.5/39. CC0: 91.7%. Mean operative time: 330 min. Blood transfusion: 15.2% Median ICU and Hospital stay: 2 and 12 days. Overall morbidity: 25.3%. Anastomotic leak: 1. In-house and 30-day mortality rate: 0%. Readmissions after hospital discharge: 5.5%. Median follow up: 23.12m. (0.95-108.13). Survival probability at 12 months: 93.3%, 3y: 52.2%, 5y: 31.2%. Mean/ median overall survival of 51.2/ 37.2 m. Rectum PM: median sv: 27.3 m. Of all the data analyzed in this study we describe some with influence on the results. PCI 0-10, sv 41.6 m, PCI 11-20, sv 31.4 m, PCI 21-30, sv 23.3 m, CC0, 38.3 m, CC1, 25.6 m, CC2, 12.2 m. Small bowel involvement 30.5 m *vs* 40.2 m. Signet ring cells, 15.8 m *vs* 40.6 m. Blood transfusion 33 m *vs* 38 m. Visceral involvement: 34 m *vs* 53 m. In a Cox regression model, after adjusting for other significant factors, CC, signet ring cell and small bowel involvement were independently associated with overall survival.
CONCLUSIONS: CRS+HIPEC with systemic adjuvant chemotherapy is considered the standard treatment for PM from colo-rectal origin. Well-known prognostic indicators of improved survival include low to moderate PCI (<21/39) and a complete radical surgery. Based on our results we suggest a very strict selection of rectum PM patients and discard patients with signet ring cells. The selection aim is to achieve survival rates above 35 m median.

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THE IMPORTANCE OF RESECTING SURGICAL SCARS FROM PREVIOUS OPERATION FOR INTRAABDOMINAL MALIGNANCIES, REVISITED DURING SECONDARY CYTOREDUCTIVE SURGERY FOR RECURRENT PERITONEAL DISEASE

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BACKGROUND: Cytoreductive surgery (CRS) with Hyperthermic Intraperitoneal Chemotherapy (HIPEC) is commonly used for the treatment of peritoneal surface malignancies. Most patients present with metachronous peritoneal metastasis appearing months or even years after resection of the primary tumor. One of the potential recurrence sites is surgical scars created during previous operations. Our practice is to resect all scar tissue from previous oncological surgeries during the CRS.
METHODS: The aim of the present study was to evaluate the incidence of malignant tissue in surgical scars resected during CRS and to examine its effect on postoperative complications and disease free survival.
RESULTS: 238 patients underwent CRS and HIPEC between 6/2007-3/2016. Thirty six patients were excluded from the study due to incomplete datasets. Only patients with abdominal scars of previous surgery for the primary tumor resection in the pathology reports were included (n=153). Evidence of malignancy in the scar tissue was found in 49 cases out of the 153 studied (32%), with the following occurrence: Primary colorectal cancer: 32 out of 101 (32%). Appendicular carcinoma: 10 out of 27 (37%). Other tumors: (various cancers): 7 out of 25 (28%). We found that cancer load as estimated by the operative peritoneal cancer index (PCI) was a significant risk factor for scar involvement. For every point in the PCI the risk for scar involvement increases by 7% (OR=1.08. P<0.01). Scar involvement was directly correlated with shorter disease free survival with a mean disease free survival of 16.05 months (±4.5, CI 95%) comparing to 43.6 months (±5.6, CI 95%) (p>0.001). As to immediate surgical outcomes, wound dehiscence was correlated with the presence of scar involvement (P=0.01) whereas surgical site infection and ileus were not correlated with scar involvement.
CONCLUSIONS: The high incidence of surgical scar recurrence in the presence of peritoneal metastasis, calls for resection of old surgical scars during CRS in order to achieve complete cytoreduction. This recommendation, applies for all types of malignancies treated by CRS and HIPEC.

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RISK FASTORS FOR EARLY RECURRENCE FOLLOWING CYTOREDUCTIVE SURGERY AND HIPEC FOR COLORECTAL METASTASIS TO THE PERITONEUM

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BACKGROUND: Cytoreductive surgery (CRS) combined with hyperthermic intraperitoneal chemotherapy (HIPEC) is gaining wide acceptance as the treatment of choice for peritoneal metastases derived from colorectal (CRC) and appendiceal malignancies. It is a complex surgical procedure associated with substantial morbidity. Studies conducted in Europe and the United States have demonstrated a 5-year survival of 22%-37% in CRC patients treated by CRS+HIPEC. Nonetheless, about one third of the patients develops early recurrence and will not benefit from this complex procedure.
METHODS: Assess risk factors associated with early recurrence to identify a subset of patients which may be considered for alternative treatment.
RESULTS: There were 145/273 patients with CRC and appendeceal origin treated by CRS+HIPEC with complete cytoreduction (CC0-1) and a follow up of at least 12 months. Forty-three patients (29.7%) developed early recurrence within 12 months after the procedure and 102 patients (70.3%) did not. Factors associated with early recurrence in a univariate analysis included: extra-peritoneal metastases, location of the primary tumor (colon, rectum, and appendix), grade of the primary tumor, lymph node involvement and the number of chemotherapy lines the patient received prior to operation. The independent significant risk factors identified using a multivariate analysis were extra-peritoenal metastasis (HR 3.2), primary tumor in rectum (HR 10.04) *vs* Colon or appendix, and 1-3 lymph nodes positive for tumor in primary pathology report (N1) (HR 3.3).
CONCLUSIONS: Early recurrence after CRS and HIPEC significantly correlates with extra-peritoneal metastases, rectal origin and aggressive histology. In patients with a combination of the above factors, alternative treatment plan should be considered.

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CORRELATION BETWEEN INTRA-OPERATIVE AND PATHOLOGICAL FINDINGS IN PATIENTS UNDERGOING CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Peritoneal cancer index (PCI) is a well-established prognostic predictor in patients undergoing cytoreductive surgery with hyperthermic intraperitoneal chemotherapy (CRS/HIPEC). However, the prognostic value of pathological tumor burden remains unclear. We aimed to examine the correlation between intra-operative and pathological findings and to determine its prognostic significance.
METHODS: This is a single-center retrospective study. Pathological reports of all colorectal cancer (CRC) patients undergoing CRS/HIPEC between 2009 and 2016 were reviewed. Pathological specimens lacking tumor cells were defined as negative pathological specimens (NPS); organs resected prophylactically, such as the omentum, were not considered NPS. The intra-operative and pathological PCI (excluding NPS) were calculated separately according to the Sugarbaker classification. Receiver Operating Characteristic (ROC) curves were applied to compare the prognostic value of the two scoring systems. Survival probabilities were calculated using the Kaplan-Meier method.
RESULTS: 120 CRS/HIPEC procedures were performed in 114 CRC patients. Out of 909 pathological specimens examined (median per patient: 7, range: 1-22), 179 (19.7%) were NPS. Lesions resected from the bowel wall/mesentery were the most common type of NPS (33%). Overall, NPS were found in 81 patients (67%) and in 53 patients (44%) the pathological PCI differed from intra-operative PCI (median delta PCI: 2 points, range: 1-15). In 5 patients, all specimens were NPS. The median follow-up period was 17.4 months, during which 53 patients (46%) died. Among patients who underwent complete CRS/HIPEC (94%), the number of collected specimens per patient correlated significantly with intra-operative PCI (Pearson's r=0.78, p<0.01) and with overall survival (OS); median OS was 40.5 months in patients with=7 specimens *vs* 20.3 months in those with >7 specimens (p=0.001). The ROC areas for intra-operative PCI and pathological PCI were similar in predicting 1-year OS (0.62 and 0.6, respectively, p=0.79), 2-year OS (0.74 and 0.73, respectively, p=0.74) and 1-year disease free survival (0.78 and 0.79, respectively, p=0.8).
CONCLUSIONS: Although intra-operative PCI frequently overestimates the true burden of peritoneal disease, it is equally effective in predicting prognosis when compared with pathological PCI. Therefore, routine pathological correlation seems unnecessary. However, the number of pathological specimens may serve as a simple and intuitive prognostic tool in CRC patients undergoing complete CRS/HIPEC.

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THE IMPACT OF COMPLETENESS OF CYTOREDUCTION SCORE ON SURVIVAL IN PATIENTS WITH COLORECTAL CANCER COMPARED WITH PSEUDOMYXOMA PERITONEI

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) is an established treatment for selected patients with peritoneal surface malignancies.
METHODS: The purpose of this study was to analyse the effect of the completeness of cytoreduction score (CCS) on the survival of patients with colorectal cancer (CRC) and pseudomyxoma peritonei (PMP) treated with CRS and HIPEC.
RESULTS: Patients with CRC (n=167) and PMP (n=208) and intention to treat with CRS and HIPEC at the Uppsala University Hospital, Sweden, 2004-2015, were included for analysis. Only index operations were included and patients planned for debulking surgery or CRS without HIPEC were excluded. CCS 2 and 3 were analysed as one group. Of the 375 patients, 207 (55%) were females and the median age was 57 years (range 13-78). For CRC, CCS=0 was achieved for 121 (72%); CC=1 in 15 (9%); CC=2-3 in 7 (4%) and open close in 24 (14%). The corresponding figures for PMP were 120 (58%); 56 (27%); 22 (11%) and 10 (5%). The median overall survival for CRC was 2.1 years for CCS=0, 1.3 years for CCS=1; 1.1 years for CCS=2-3 and 0.7 years for open close. The corresponding survival for PMP was 3.0 years; 5.0 years; 3.1 years and 0.5years. The median peritoneal carcinomatosis index (PCI) for CRC was 12 for CCS=0, 22 for CCS=1; 33 for CCS=2-3 and 28 for open close. The corresponding values for PMP was 10; 26; 35 and 39. The most common failure sites registered for CRC were the small bowel (n=28), large arteries (n=4) and liver (n=3). For PMP, 24 patients had the small bowel, nine patients had the liver and three the large arteries as failure site.
CONCLUSIONS: The impact of CCS on survival is different between CRC and PMP. Patients with CRC treated with CRS and HIPEC resulting in CCS=1 or CCS=2-3 have limited benefits from the procedure compared to open close patients. Patients with PMP and CCS=1 do have similar survival to patients with CCS=0 and even CCS=2-3, and they might benefit from CRS and HIPEC regardless of CCS. Due to the risks of the CRS and HIPEC procedure and the reduced quality of life afterwards, it is important to carefully assess the possibility for CCS=0 before a decision is made to perform the CRS and HIPEC procedure in patients with CRC.

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PREDICTIVE VALUE OF PERITONEAL CANCER INDEX FOR SURVIVAL IN PATIENTS WITH MUCINOUS PERITONEAL MALIGNANCIES OF COLORECTAL ORIGIN. A SINGLE CENTER EXPERIENCE

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BACKGROUND: Peritoneal surface malignancy (PSM) treatment depends on tumor type. Mucinous PSM (m-PSM) is associated with better prognosis than non-mucinous PSM (nm-PSM). The PCI´s predictive ability for these tumor types has not yet been evaluated.
This study investigated effects of peritoneal carcinomatosis index (PCI) on patient outcome depending on tumor type.
METHODS: We analyzed 51 patients with PSM from colorectal origin treated with cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) between 2008 and 2015. PCI´s predictive ability was evaluated by multiple Cox-proportional hazard regression analysis and Kaplan-Meier curves.
RESULTS: The analysis of these patients showed a significant difference in PCI score of 15.5±13.0 in patients with m-PSM *vs* 9.1±6.1 in patients with nm-PSM (p=0.023), although there was no significant difference in patient survival (p=0.847). Age, BMI, hospital stay and completeness of cytoreduction showed now significant difference between both groups. Patients with nm-PSM who showed PCI scores=16 demonstrated inferior two-year patient survival (25.0%) compared with patients with PCI scores <16 (77.7%; p=0.011). In contrast, patient survival was not different between the PCI groups in the m-PSM group 80.0% vs66.8%; p=0.785).
CONCLUSIONS: PCI is prognostic in nm-PSM, but not in m-PSM. CRS and HIPEC may benefit not only patients with low PCI, but also those with high PCI and m-PSM.

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CLINICOPATHOLOGICAL AND MOLECULAR FEATURES OF SYNCHRONOUS COLORECTAL CANCER PERITONEAL METASTASIS COMPARED TO NON-PERITONEAL METASTASIS: A SINGLE INSTITUTIONAL STUDY

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BACKGROUND: A total of 226 synchronous metastatic colorectal cancer patients who received primary tumor resection and underwent KRAS, NRAS and BRAF gene mutation detection at the Fudan University Shanghai Cancer Center from January 2014 to September 2015 were included. Among them, 50 had peritoneal metastasis while the other 176 had other metastasis without involvement of the peritoneum. The clinical data were collected for the comparison of features between peritoneal metastatic and non- peritoneal metastatic patients.
METHODS: The peritoneal metastasis is common in colorectal cancer and may have different characteristics from the metastasis to other organs such as liver, lung, etc. This study was performed to summarize the clinicopathological and molecular features of synchronous colorectal peritoneal carcinomatosis, which may be valuable for better understanding and management of this special type of metastatic disease.
RESULTS: In univariate analysis, compared to non-peritoneal metastatic patients, those with synchronous non-peritoneal metastasis had a higher proportion of females (62.0% *vs* 38.6%, p=0.003), right-sided colon location (48.0% *vs* 26.1%, p=0.002), signet-ring cell carcinomas (10.0% *vs* 0.6%, p<0.001), poor-differentiated tumors (61.2% *vs* 35.6%, p=0.001) and T4 cancers (58.0% *vs* 40.9%, p=0.032). The age and N stage were not different statistically between these two groups. The BRAF gene mutation was more frequent in peritoneal metastatic patients (10.0% *vs* 2.8%, p=0.045) while the rates of KRAS and NRAS gene mutation and deficient mismatch repair genes (determined by immunohistochemical analysis) were not significantly different in these two groups. In multivariate analysis (Binary logistic, backward conditional stepwise), only the gender (p=0.006), T4 stage(p=0.042), primary tumor location (p=0.007) and histological type (p=0.004) were independent impact factors of metastatic sites (peritoneal *vs* non-peritoneal).
CONCLUSIONS: Patients with colorectal cancer peritoneal metastasis were more likely to be female and signet ring cell cancer and have right-sided primary location and T4 stage. In univariate analysis, patients with colorectal cancer peritoneal metastasis also have a tendency to be BRAF mutant.

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CHALLENGING THE DOGMA OF COLORECTAL PERITONEAL METASTASES AS AN UNTREATABLE CONDITION: RESULTS OF A POPULATION BASED STUDY

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BACKGROUND: It is hard to study the effect of new treatment modalities such as CRS and HIPEC or palliative systemic chemotherapy in patients with colorectal peritoneal metastases using randomized controlled trials. Instead, population based data may be used to study the impact of these treatment modalities on survival. In this study, the impact of the implementation of novel systemic regimens and loco-regional treatment modalities on survival at population level in colorectal cancer (CRC) patients presenting with peritoneal metastases (PM) was determined.
METHODS: To study all consecutive CRC patients with synchronous PM (<3 months) between 1995 and 2014 by extracting data from the Eindhoven area of the Netherlands Cancer Registry.
To calculate trends in treatment and overall survival in four time periods. Multivariable regression analysis was used to analyze the impact of systemic and loco-regional treatment modalities on survival.
RESULTS: A total of 37,036 patients were diagnosed with primary CRC between 1995 and 2014. Synchronous PM were diagnosed in 1,661 patients, of whom 55% had also metastases at other sites (n=917) and 77% received anticancer therapy (n=1273). Treatment with systemic therapy increased from 23% in 1995-1999 to 56% in 2010-2014 (p<0.0001). Cytoreductive surgery with hyperthermic intraperitoneal chemotherapy (CRS-HIPEC) was applied since 2005 and increased from 10% in 2005-2009 to 23% in 2010-2014. Surgery for lymphatic or hematogenous metastases increased from 2% to 10% in these periods. Median overall survival of the complete cohort improved from 6.0 months in 1995-2000 to 12.5 months in 2010-2014 (p<0.0001), with a doubling of survival for both PM alone and PM with other involved sites. The influence of year of diagnosis on survival (HR 2010-2014 *vs* 1995-1999; 0.5, 95%CI 0.43-0.62, p<0.0001) disappeared after including systemic therapy and loco-regional treatment modalities in subsequent multivariable models.
CONCLUSIONS: CRC patients presenting with PM are increasingly offered a multi-disciplinary treatment approach, resulting in an increased overall survival for the entire cohort. This underlines the need and effectiveness of multi-disciplinairy treatment for these patients and proves that colorectal peritoneal metastases should no longer be considered as an untreatable condition.

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PROACTIVE TREATMENT FOR PELVIC T4 LOCALLY ADVANCED AND RECURRENT COLORECTAL CANCER

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BACKGROUND: Colorectal cancer with localized pelvic disease is amenable to a curative approach. Even more advanced cases, including T4 tumors and recurrent pelvic cancer can be managed with extensive surgery to achieve local control. Peritoneal involvement can also be dealed with an early referral or simultaneous HIPEC, together with appropriate surgery; it may provide a complete clearance of the primary cancer and prevent intra-abdominal diffusion of the disease.
METHODS: To evaluate the results of a series of 50 consecutive pelvectomies performed from 2010 to 2015, both for pelvic recurrence or locally advanced recto-sigmoid tumors, among which we performed 13 simultaneous HIPEC (proactive treatment). Total pelvectomy was performed in 3 patients: 2 for T4 tumors (1 mucinous) and one for pelvic recurrence (mucinous); posterior pelvectomy was performed in 10 patients: 3 for T4 tumors (all mucinous) and 7 for pelvic recurrence (4 mucinous). All patients received extended pelvic peritonectomy, intraperitoneal oxaliplatin with systemic 5-Fluorouracil for a 30 minutes HIPEC treatment. Peritoneal dissection was started at the transverse umbilical line.
RESULTS: Among patients treated with HIPEC there were 4 Clavien Dindo grade III-IV complications. No postoperative death occurred. The median postoperative hospital stay was 17 days. Up to date 11 patients are disease free: respectively after 64, 52, 47, 40, 38, 26, 25, 17, 4 and 3 months. Of these 1 patient developed liver disease and is now disease free after chemotherapy; 1 patient, pretreated with chemotherapy for a lung metastasis before proactive HIPEC, underwent lung resection after abdominal surgery; 2 patients underwent an APR for recurrent cancer on rectal stump and colorectal anastomosis respectively. None of these patients developed a peritoneal recurrence. One patient died after 20 months with a huge pelvic recurrence of a G3 mucinous tumour and 1 patient is alive at 30 months with metastatic disease (liver and lung).
CONCLUSIONS: In high risk patients (peritoneal involvement, ovarian metastases, perforated tumours, previous R1-2 resections or intraoperative tumour disruption, positive cytology, adjacent organs involvement, T3 mucinous tumor, T4 cancers)" proactive" HIPEC is a very promising treatment option to prevent intra-abdominal diffusion of pelvic disease. Our results, in line with other series, show the feasibility and the oncological safety of this approach with acceptable morbidity and no mortality.

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CYTOREDUCTIVE SURGERY AND HYPERTHERMIC CHEMOTHERAPY FOR COLORECTAL PERITONEAL CARCINOMATOSIS: A SINGLE-CENTER EXPERIENCE

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intra-peritoneal chemotherapy (HIPEC) treatment of colorectal peritoneal carcinomatosis (PC) has been proven to be effective and improve overall survival. This study aimed to analyze the outcome and prognostic variables of colorectal PC in patients who underwent CRS with HIPEC.
METHODS: Data were retrieved from a prospective maintained database and reflect all patients operated between May 2005 and May 2016. Analysis have been performed using SAS software, version 9.2.
RESULTS: A cohort of 150 patient (78 female (52%), 72 male (48%)) underwent CRS with HIPEC for colorectal PC. The mean age was 56±12 years (range: 18-80). In 45% of cases, PC was diagnosed synchronous with diagnosis of colorectal cancer. The mean PCI was 7,7±5,6 (range: 0-25). Mean operating time was 350±90 minutes. In hospital mortality was one (0,6%). The median OS was 48,2 months, with a five- and ten-year OS of 45% and 32% respectively. OS for patients with PCI of <6 and 6-12 was significantly better (p<0,0001 and p=0,11) than those with PCI >12, with a mean OS of 78 months, 38 months and 27 months respectively. Mean follow-up was 32±19 months.
CONCLUSIONS: Complete Cytoreductive surgery is essential to obtain long-term survival. The role of CRS and HIPEC in patients with PCI >12-15 remains debatable, especially in view of new available systemic treatment. A randomized trial in this subgroup should be performed.

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PREDICTION OF 2-YEARS SURVIVAL IN PATIENTS WITH NON RESECTABLE PERITONEAL CARCINOMATOSIS FROM COLORECTAL ORIGIN USING FUNCTIONAL IMAGING: ANCILLARY STUDY OF A MULTICENTER PROSPECTIVE STUDY (PRODIGE 9)

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BACKGROUND: Peritoneal carcinomatosis (PC) is a frequent and severe evolution of colorectal cancer (CRC), which is associated with poor survival (5.2 months). The assessment of response to chemotherapy is difficult and is based on morphological changes on computed tomography (CT). Recently, new non-invasive and innovative functional imaging techniques such as texture analysis (TA) have been developed to obtain early information regarding tumor response to therapy.
METHODS: To determine whether texture analysis (TA) on pre-treatment and two months post-chemotherapy computed tomography (CT) images can predict 2-year survival in patients with metastatic non resectable colo-rectal cancer (CRC) and peritoneal carcinomatosis (PC) nodules treated by Folfiri and bevacizumab.
RESULTS: This is an ancillary study from PRODIGE-9 multicenter prospective study for which 494 patients with metastatic CRC treated by Folfiri and bevacizumab had been enrolled. In 24 patients who had PC nodules greater than 300 mm2, TA was performed by two abdominal radiologists in consensus using TexRAD® software on the dominant PC nodule during the venous phase of a contrast-enhanced CT examination, at baseline and two months post-chemotherapy. PC nodules surface area, baseline TA parameters and their changes from baseline were correlated with the 2-year survival status. Receiver operating characteristic (ROC) curves were performed and the 2 strongest parameters were incorporated into a multivariate logistic regression model to identify predictive factors for 2-year survival and their odd-ratios (OR). A score combining these 2 factors was built and optimal cutoff values for predicting 2-year survival status was determined with ROC curve analysis. Survival was estimated with the Kaplan-Meier method and compared between groups with the log-rank test. The strongest predictive factors for 2-year survival status were two baseline parameters: baseline mean value (ssf=0) (AUC=.72 (.44-.1.00)) and the baseline skewness value (ssf=6) (AUC=.77;(.50-.1.00)). On ROC curve analysis, optimal cut-off values were determined. A base-

line mean value (ssf=0)<27 UH yielded an sensitivity of 83.3% and a specificity of 66.6%. A baseline skewness (ssf=6) value <0 yielded a sensitivity of 66.7% and a specificity of 83.3%. Patients with only mean value (ssf=0)<27 UH or baseline skewness (ssf=6) value <0 but not both simultaneously had a higher overall survival rate (median=2.0 year *vs* 1.1 years, P=.01).

CONCLUSIONS: TA parameters on baseline CT may be able to predict which patient will have a long overall survival in metastatic CRC with PC nodules treated by Folfiri and bevacizumab. These results need to be replicated in further studies.

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READMISSION RATES AND RISK FACTORS FOR READMISSION FOLLOWING CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR PERITONEAL SURFACE MALIGNANCIES

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BACKGROUND: Cytoreductive Surgery (CRS) and Hyperthermic Intraperitoneal Chemotherapy (HIPEC) are gaining acceptance as effective therapy for peritoneal surface malignancies. This complex procedure involving radical surgery and intra-operative chemotherapy is associated with high morbidity. This procedure mandates analysis of risk and quality management, among them readmission rates. The aim of this study was to assess readmission rates after CRS/HIPEC and risk factors associated with readmission.

METHODS: N/A.

RESULTS: 223 patients were included in the study. The 7 and 30 day readmission rates were 3.5% (n=8) and 11% (n=25), respectively. Late readmission rates (longer than 30 days) were 11% (n=25). The most common causes for readmission were; surgical site infection and intra-abdominal abscesses (35%), small bowel obstruction or abdominal pain (17.5%) and dehydration (14%). Post-operative complications were highly associated with higher readmission rates (p=0.0001). However, PCI score or lengths of stay in the first hospitalization were not associated with higher rates of readmission.

CONCLUSIONS: The readmission rate following CRS/HIPEC are relatively high indicating both the slow recovery form this complex procedure and the delayed appearance of post-operative complications. Better understanding the risk factors for readmission can optimize quality management in this highly complicated surgical procedure.

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EARLY POSTOPERATIVE RECOVERY IN PATIENTS TREATED WITH CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR COLORECTAL PERITONEAL CARCINOMATOSIS

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BACKGROUND: Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS+HIPEC) for peritoneal malignancies are related with high costs and morbidity rates. Patient recovery is often hampered by ileus, gastroparesis or infectious complications. Postoperative management and recovery after CRS+HIPEC deserves scientific interest. Patients treated in two Dutch HIPEC centers were case matched and compared using a retrospective database containing relevant patient-, tumor-, recovery- and treatment(procedure)-related data. Matching variables were age, BMI, metachronous or synchronous disease presentation and peritoneal cancer index (PCI). Patient selection, CRS+HIPEC are identical in both hospitals but a few peri-operative management items differ. In the Radboud University Nijmegen Medical Centre (RUMC) total parenteral nutrition (TPN) started on this first post-operative day, suprapubic-catheters (SPCs) and selective decontamination of the digestive-tract (SDD) are part of the standard care for these patients, in the Catharina Hospital Eindhoven (CHE) they are not.

METHODS: To evaluate two different postoperative management treatment strategies on: - Urgency of TPN and incidence ileus. - Hospital stay (HS). - Complication grades, types and incidence. - Infection incidence. -in patients treated with CRS+HIPEC for peritoneal carcinomatosis of colorectal origin.

RESULTS: Of 136 included patients median age was 63.0 years (31.3-82.4) and 44.1% was male. Median PCI was 9 (1-24) and complete cytoreduction was achieved in 97.8%. Matching resulted in two identical groups. TPN was administered per protocol in 100% of patients in the RUMC and was necessarily given to 54.4% of CHE patients. Duration of TPN was longer in CHE with a median of 10 (4-65) days *versus* 8 (2-28) days postoperatively in RUMC (p=0.043). Nasogastric tube removal was one day earlier in CHE (p<0.001), but were reinserted more frequently: n=18 *versus* n=7 in RUMC(p=0.018). Oral tolerance was achieved at median day 5 (1-17) in CHE and 6 (2-76) in RUMC (p=0.034). Median time until first stool was 5 days in both hospitals. A complicated post-operative course was observed in 105 (78.2%) of all patients and 54.4% had a grade III-IV Clavien-Dindo complication score. Grade III-V were more frequently observed in CHE: n=18 (26.4%) *versus* n=8 (11.8%) in RUMC (p=0.03). Grade III-IV complications were mainly anastomotic leakages, fistulas or intra-abdominal abscesses. Other infectious complications were more common in CHE 29 (42.6%) *versus* 13 (19.1%) in RUMC (p=0.003). In RUMC, where SPCs are standard of care, urinary tract infections occurred less n=2 (2.9%) *versus* n=9 (13.2%) in CHE (p=0.028). Hospital stay was not statistically different between the centers 12(7-84) in CHE and 11(6-80) in RUMC (p=0.546). A higher PCI was related with a longer hospital stay (p=0.03).

CONCLUSIONS: TPN can be avoided in a minority of HIPEC+CRS patients. A perioperative care program including standard TPN and SDD appears to be associated with fewer major surgical complications. The incidence of urinary tract infections was lower in this group, possibly explained by the standard use of suprapubic bladder catheters. Hospital stay was identical with use of either postoperative management strategy. Prospective, randomized studies are needed to elucidate the effects of TPN, SDD and SPCs on recovery and infection rate in the HIPEC patient population.

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COMPLEX ABDOMINAL WALL RECONSTRUCTION IN PATIENTS WITH PERITONEAL CARCINOMATOSIS

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BACKGROUND: The results obtained with the realization of cytoreduction and HIPEC have been so beneficial decreasing mortality rates in certain types of intra-abdominal malignancies, however, the commitment to this type of pathology has reached as complex as the abdominal wall structures, this makes procedures such as cytoreduction and HIPEC in these patients complications associated changing the figures for successful results.

METHODS: Show an a number of cases in which it has required complex handling abdominal wall with successful results in patients with peritoneal carcinomatosis.

RESULTS: Standardize techniques used in the management of complex abdominal wall in patients with carcinomatosis.

CONCLUSIONS: Show experience in handling complex abdominal wall used in hospitals in Bogota Colombia.

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PATTERN AND TREATMENT OF RECURRENCE AFTER CYTOREDUCTIVE SURGERY FOR PERITONEAL CARCINOMATOSIS OF COLORECTAL ORIGIN: LONG TERM SURVIVAL IS STILL ACHIEVABLE?

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BACKGROUND: Despite optimal treatment by complete cytoreductive surgery followed by hyperthermic intraperitoneal chemotherapy (CRS-HIPEC) of peritoneal metastases (PM) from colorectal cancer, most of the patients will develop local and/or distant recurrences, which are usually considered as to be inaccessible to a new curative intent treatment.
METHODS: The aim of the study was to determine the patterns of recurrence and to analyze long-term outcome after iterative curative treatment. All the patients, who underwent CRS-HIPEC for colorectal PM between April 1993 and December 2015, were selected from a prospective database. When recurrence was diagnosed, an iterative procedure (surgical and/or local ablation) with curative intent (R0/R1) was proposed whenever feasible and after ensuring that the disease was controlled by systemic chemotherapy.
RESULTS: Among 336 patients who underwent CRS-HIPEC, 247 (73.5%) experienced recurrence after a median free-interval of 15.4 months. Isolated peritoneal relapse was observed in 33% followed by multisite (31%), pulmonary (15%), hepatic (10%) and lymph nodal (4%) recurrence. The only two independent predictive factors of relapse were the presence of extraperitoneal synchronous metastases at diagnosis of PM (HR 2.1;95%CI 1.09-4.06; p=0.03) and a high PCI (HR 1.01;95%CI 1.03-1.2; p=0.002). Iterative R0/R1 procedures were performed in 86 (35.1%) of 245 patients including surgical resection (n=69, 77.9%), repeated CRS-HIPEC (n=15; 17.4%) or percutaneous ablation (n=2; 4.7%). Secondary-R0/R1 resection rate was mostly achievable in case of isolated recurrence (40.2% *vs* 23.7%;p 0.01), interval longer than 12 months (42.9% *vs* 28.6%; p 0.02) and according to site of recurrence with a higher curative intent for peritoneal (49.4%), nodal (50%) or liver metastases (32%) than pulmonary (21.6%) and multisite metastases (23.4%) (p=0.005). Predictive factors of failure of a curative treatment were PCI at diagnosis of PM (HR 1.1;95%CI 1.05-1.2; p=0.0001), extraperitoneal synchronous metastases at diagnosis of PM (HR 2.9;95%CI 1.4-5.8; p=0.004), pulmonary (HR 4.8;95%CI 1.6-14.6; p=0.006) and multisite relapse (HR 2.7;95%CI 1.1-6.4; p=0.02). Median overall survival of the patients underwent a secondary-R0/R1 resection was significantly increased compared to that of patients palliatively treated (56.9 *vs* 17.4 months; p=0.0001). Prolonged survivals were mainly obtained after treatment of pulmonary (60.9 months), hepatic (48 months) and peritoneal (46.6 months) relapses. Median disease-free survival in patients underwent a secondary R0/R1 resection was 14.1 months.
CONCLUSIONS: Peritoneal and extraperitoneal relapses after CRS-HIPEC for colorectal PM can be accessible to an iterative curative-intent treatment in more than one third of the patients. This secondary R0/R1 status can achieve prolonged survival in selected patients, even in case of extraperitoneal relapses.

P222

THE ROLE OF DIAGNOSTIC LAPAROSCOPY IN THE MANAGEMENT OF COLORECTAL PERITONEAL METASTASIS

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BACKGROUND: There has been cumulative evidence in favour of cytoreductive surgery (CRS) combined with hyperthermic intraperitoneal chemotherapy (HIPEC) in the management of colorectal peritoneal metastasis (CPM). Peritoneal Cancer Index (PCI) score is known to be a strong survival factor, being inversely correlated with the likelihood of achieving complete cytoreduction. It is crucial to establish an accurate preoperative PCI score to aid patient selection; however, the currently available imaging, namely CT or PET, has been suboptimal.
METHODS: We aimed to evaluate the role of diagnostic laparoscopy in the management of CPM at our tertiary referral center. A total of 44 patients with CPM underwent diagnostic laparoscopy between 2012 and 2016. Pathological confirmation, PCI score, morbidity and the likelihood of complete cytoreduction were evaluated.
RESULTS: The median age was 58 (range, 38-76).
The primary tumours were in the appendix in 17 patients, 26 in the colon and 1 in the rectum. Histological confirmation of peritoneal disease was obtained in all patients: tubular adenocarcinoma in 17, mucinous in 16, signet-ring cell in 9 and others in 2. The median PCI score was 17 (range, 3-39). There was 1 Grade III (Clavien-Dindo) morbidity with no mortality. Complete cytoreduction was achieved in 25 out of 27 patients on whom complete cytoreduction had been deemed possible at the time of laparoscopy.
CONCLUSIONS: Diagnostic laparoscopy is highly useful to a) confirm the pathology, b) assess the PCI score and c) predict the likelihood of CRS.

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THE IMPACT OF REGIMEN AND DOSE ON PROGNOSIS IN PATIENTS WITH PERITONEAL METASTASES TREATED WITH HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) is today standard treatment in patients with peritoneal metastasis (PM). However, there is limited evidence regarding the benefit of HIPEC on prognosis.
METHODS: The aim of this study was to evaluate the effect of different chemotherapy regimens and dosing on prognosis in patients with colorectal cancer (CRC) and pseudomyxoma peritonei (PMP).
RESULTS: A total of 422 patients underwent CRS and HIPEC at the Uppsala University Hospital, Sweden 2004-2015. Patients with CRC PM (n=124) and PMP (n=112) with a completeness of cytoreduction score (CSS) of 0 were included in the analysis. The HIPEC regimen used in CRC was Oxaliplatin (Ox) or Ox plus Irinotecan (OxIr) and in PMP Mitomycin C (MMC). Survival curves were constructed with the Kaplan Meier method and differences assessed with the log rank test. Of 236 patients with CRC and PMP 67% (n=159) were women and the median age was 56 years (range 13-76). The projected 5 year overall survival for CRC was 55% and for PMP 69%. 5-year survival for patients with CRC treated with Ox (n=63, mean PCI 14) was 34% and for patients receiving OxIr (n=46, mean PCI 14) 46% (p=0.70). Patientstreated with an Oxdose as intraperitoneal monotherapy above the median had a 5-year survival of 61%, and for those with a dose below the median 13% (p=0.005). Patients treated with an Oxir dose above the median had a 5 year survival of 38% *vs* 54% for those with a dose below the median level (p=0.78). A MMC dose above median was associated with a 5 year survival of 90% and a lower dose 78% (p=0.19).
CONCLUSIONS: In this study there was no clear association between chemotherapy regimen and survival. A higher oxaliplatin dose was associated with an improved survival when Ox was used as intraperitoneal monotherapy but not when combined with irinotecan. These results demands further studies.

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MOLECULAR FLUORESCENCE GUIDED SURGERY OF COLORECTAL PERITONEAL METASTASIS, THE RESULTS OF THE HI-LIGHT STUDY

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BACKGROUND: Optimal cytoreductive surgery (CRS) combined with hyperthermic intraperitoneal chemotherapy (HIPEC) is essential for the curative treatment of peritoneal carcinomatosis of colorectal cancer. The mechanism for recurrence of disease is still unclear. One of the proposed mechanism for early recurrence of disease is the (unintended) residual disease after cytoreductive surgery. Currently, surgeons depend on visual inspection and palpation for tumor detection. In the Hi-Light study we evaluated the detection of colorectal peritoneal metastasis using Molecular Fluorescence Guided Surgery (MFGS) in order to attain a complete cytoreduction.

METHODS: Patients with colorectal peritoneal metastases scheduled for CRS and HIPEC were included. Two days prior to surgery, 4.5mg of the near-infrared fluorescent tracer bevacizumab-IRDye800CW was administered intravenously. The primary objectives were to determine the safety of bevacizumab-IRDye800CW and feasibility of molecular fluorescence guided surgery. The secondary objectives were to correlate fluorescence with histopathology by imaging of the fresh surgical specimen and furthermore the semi-quantitative *ex vivo* analyses of formalin-fixed paraffin embedded tissue on all peritoneal lesions supported by VEGF-A immunohistochemical staining and fluorescence microscopy.

RESULTS: No serious adverse events related to bevacizumab-IRDye800CW occurred. Intraoperatively, fluorescence was observed in all patients. In two patients, additional tumor tissue was detected by molecular fluorescence guided surgery that was initially missed by the surgeons. During back table imaging of the fresh surgical specimen, a total of 80 areas were imaged, marked and analyzed. All of the 29 non-fluorescent areas were found to contain only benign tissue, whereas tumor tissue was detected in 27 out of 51 fluorescent areas (53%). *Ex vivo* semi-quantification of formalin-fixed paraffin embedded peritoneal lesions showed a tumor-to-normal ratio of 6,92 (±2,47).

CONCLUSIONS: Molecular fluorescence guided surgery using the near infrared fluorescent tracer bevacizumab-IRDye800CW is safe and feasible. This technique might potentially be of added value for the treatment of patients with colorectal peritoneal metastases through improved patient selection and more optimal cytoreductive surgery and might also prevent overtreatment by avoiding resection of benign lesions. A subsequent multicentre phase II trial will be designed to assess the diagnostic accuracy and so the impact on clinical decision-making of molecular fluorescence guided surgery.

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SYNCHRONOUS LIVER METASTASIS AND PERITONEAL CARCINOMATOSIS OF COLORECTAL CANCER: A MULTICENTER RETROSPECTIVE COHORT STUDY

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BACKGROUND: The aim of the current study is to evaluate our experience in colorectal cancer patients with synchronous peritoneal and liver metastases treated with cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC).

METHODS: A prospectively maintained database of patients with peritoneal carcinomatosis (PC) of colorectal cancer treated with complete CRS+HIPEC, between April 2005 and July 2014, in two tertiary referral hospitals was retrospectively analyzed. Patients with synchronous liver metastases (N=18) were compared to patients without liver metastases (N=276).

RESULTS: In our cohort, liver metastases were significantly more present in patients with metachronous peritoneal metastases compared to patients with synchronous peritoneal metastases (67 *versus* 41%, respectively, p=0.03). Patients with liver metastases showed a trend towards more extensive dissemination of PC (median number of affected regions: 4 *versus* 3, p=0.08). Severe complications did not occur more in patients with synchronous liver metastases (44.4 *versus* 36.6%, p=0.50). After a follow-up of 33.7 months, the overall median survival was 33.3 months, with a five year survival rate of 34%. Overall survival was not significantly different in patients with or without concomitant liver metastases (median overall survival: 32.1 *versus* 34.6 months, p=0.91).

CONCLUSIONS: In carefully selected patients with peritoneal carcinomatosis and synchronous liver metastases, CRS+HIPEC is feasible and results in a similar survival compared to patients without liver metastases. This study justifies further exploration of combined treatment of hepatic and peritoneal metastases under careful and well-defined conditions.

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HOW DOES MORBIDITY EFFECT THE QUALITY OF LIFE OF PATIENTS AFTER CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR PERITONEAL CARCINOMATOSIS OF OVARIAN AND GASTROINTESTINAL ORIGIN

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BACKGROUND: Peritoneal carcinomatosis of ovarian and gastrointestinal origin is increasingly treated with cytoreductive surgery (CRS) plus hyperthermic intraperitoneal chemotherapy (HIPEC). Although CRS and HIPEC can offer patients expect of treatment, it is a specific operation which is known to cause considerable morbidity. Patients 'health-related quality of life (HRQOL) greatly decreases in the postoperative time due to complications related symptoms and emotional and social stress. We analysed the HRQOL of patients by using functional assessment of cancer therapy (FACT) following CRS plus HIPEC.

METHODS: Between January 2012-June 2016, 36 patients being applied CRS+HIPEC for the presence of peritoneal carcinomatosis due

to gastrointestinal and over cancer (12 males, 24 females, with a mean age of 56,5±25,8; median ASA score was II) were included. Quality of life comprises four subscales: physical wellbeing (PWB), social/family well-being (SWB), emotional wellbeing (EWB), and functional well-being (FWB) were evaluated using the FACT-C for gastointestinal cancer and FACT-O for over cancer 6 months after surgery. Patients quality of life with and without complications were compared.
RESULTS: Our morbidity rate was 54%. The questionnaire was responded by 28 patients (16 with complications). The mean FACT scores at 6th month in patients with morbidity and without morbidity were PWB:13±1,26 and 7±5,11; SWB: 5,75±3,82 and 2,98±1,64; EWB: 9±2,42 and 6,16±1,49; FWB:15,25±1,52 and 17±2,25 respectively. Statistical evaluation showed the PWB (p=0.001) and EWB (p=0.002). Mean total score consist of PWB score+SWB score EWB score+FWB score+ CCS score (OCS score for over cancer) in patients with morbidity and without morbidity were 15 and 20±1,07 (p=0.004) for gastrointestinal cancer; 58,40±3,20 and 61,15±4,11 (p=0.083) for over cancer, respectively.
CONCLUSIONS: Our study shows that patients having morbidity after CRS and HIPEC for gastrointestinal cancers have worse QOL in postoperative period at 6th month.

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CARCINOMATOSIS FOUND IN ROUTINE RESECTIONS AFTER CYTOREDUCTIVE SURGERY

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BACKGROUND: The purpose of cytoreductive surgery (CRS) is to remove all visible peritoneal spread in the abdominal cavity prior to treatment with heated intraperitoneal chemotherapy (HIPEC). Some locations in the abdomen are historically prone to contain peritoneal carcinomatosis, like the greater omentum, and are, therefore, routinely resected. In our department we routinely resect also the umbilicus, the falciforme ligament and the ovaries.
METHODS: The purpose of this study is to investigate the frequency of carcinomatosis found by microscopy in these additionally resected tissues. We investigated patients diagnosed with adenocarcinoma from colo-rectal cancer (CRC) or pseudomyxoma peritonei (PMP). Patients operated with CRS and HIPEC at the single national center at Aarhus University Hospital, Denmark, were included in the study (n=167). The period of investigation was June 2006 to May 2016. Patients were prospectively registered, but pathology reports were retrospectively investigated for present study.
RESULTS: One hundred and seven patients were diagnosed with CRC (85 glandular;18 mucinous; 4 others) and 60 patients were diagnosed with PMP (50 low grade; 6 high grade; 4 not graded). In the great majority, carcinomatosis was not suspected in the umbilicus and the falciforme ligament, but this parameter was not registred. One hundred and fifty patients had their umbilicus resected (89.8%). We found microscopic proven carcinomatosis in 16 (10.7%) of umbilical resections (CRC 9.6%; PMP 13.0%). One hundred and twelve (67.1%) patients had their falciforme ligament removed and 10 (8.8%) of the resections contained microscopic carcinomatosis (CRC 3.7%; PMP 22.6%). Seventy-four (69.3%) of the 114 women had their ovaries resected. In the remaining part, the ovaries had been resected during prior surgery. In 45 (39.2%) of the women we found microscopic carcinomatosis in at least one of the ovaries resected at time of CRS (CRC 44.6%; PMP 26.1%).
CONCLUSIONS: Routinely resection of the umbilicus and the ovaries seems justified since we found that a substantial proportion of patients had microscopic carcinomatosis detected in routinely resected umbilicus (11%), and ovaries (39%). A large variation in the frequency of carcinomatosis in the resected falciforme ligaments was, however, observed with only 4% in CRC patients. A differentiated approach for resection of the falciforme ligament may be considered.

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PARALYTIC ILEUS AFTER HEATED INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Patients treated with cytoreductive surgery (CRS) followed by heated intraperitoneal chemotherapy (HIPEC) are prone to develop postoperative paralytic ileus. Postoperative ileus is known to significantly increase both morbidity and mortality. To prevent postoperative ileus several actions are undertaken such as epidural analgetics, laxatives as well as early feeding and mobilization.
METHODS: Our objective is to describe the extent of postoperative ileus when applying these contemporary postoperative regimes. All patients operated with CRS and HIPEC during January 2014 to May 2016 at the Department of Surgery, Aarhus University Hospital, Denmark was included into the study (n=95). HIPEC consisted of perfusion during 90 minutes using mitomycin C. Patients and details on disease, treatment and outcome were prospectively registered, but data regarding POI was retrieved retrospectively from patient records. Outcome measures for paralytic ileus included time for flatus and time for defecation. Time for removal of gastro-jejunal tube was used as a measure for gastric emptying.
RESULTS: Mean time for flatus was 2.4 days (sd 1.6). Mean time for defecation was 4.8 days (sd 2.5). Mean time for removal of gastro-jejunal tube was 5.1 days (sd 1.9). We found no correlation between duration of surgery and time to flatus, defecation or removal of tube. When we compared the group with stoma (n=28) with the group without stoma (n=67) we found that mean time for flatus was 1.8 (sd 1.7) *vs* 2.6 days (sd 1.6) (p=0.04) and mean time for defecation was 3.4 (sd 2.5) *vs* 5.4 days (sd 2.3) (p=0.0002). However, we found no difference in gastric emptying between the stoma group and the group without stoma. Mean time for removal of gastro-jejunal tube were 5.6 days (sd 1.6) in the stoma group *vs* 4.7 days (sd 2.0) in the the group without stoma (p=0.1).
CONCLUSIONS: Postoperative gastrointestinal paralysis remains a considerable problem in CRS and HIPEC. Creation of a stoma reduces POI. POI should be investigated after other HIPEC regimens also.

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PATTERNS AND TIME OF RECURRENCE FOLLOWING CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY IN COLORECTAL CANCER PATIENTS

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) has improved prognosis considerably of selected patients with peritoneal carcinomatosis (PC) from colorectal cancer. Nevertheless, many patients develop recurrences following CRS and HIPEC. The site and time of recurrences is not well-described.
METHODS: To report patterns and time of recurrent disease following CRS and HIPEC in patients with PC from colorectal cancer in a national setting. Patients with PC from colorectal cancer who underwent CRS and HIPEC at the Danish national CRS and HIPEC centre were prospectively recorded. CRS and HIPEC was indicated according to international standards. Complete cytoreduction was achieved in all patients. Mitomycin C (35 mg/m2) was used during HIPEC for 90 minutes. Patients were followed-up by clinical examination and a (PET)CT scan at 3, 6, 12, 18, 24, 26, 48, and 60 months after surgery. Patients were followed until 4th January 2016 or death. The incidence of recurrence was estimated using reverse Kaplan-Meier analysis and presented as the cumulative recurrence proportion.
RESULTS: From June 2006 to September 2015, 79 patients (26 (33%) males) with PC from colorectal cancer were treated with CRS and HIPEC. Median age was 60 years (range 24-76). The median number

of disease involved regions by means of the Dutch 7 Region count score was 3 (range 0-7) at time of CRS. During a median follow-up time of 23 months (range 1-109), 51 (65%) patients developed a recurrence. Cumulative recurrence proportion was 26% at 1 year and 69% at 2 years. The recurrences were distributed according to anatomical site as: 20 (39%) had isolated peritoneal recurrence, 5 (10%) had isolated abdominal wall recurrence, 11 (22%) had distant metastases, 14 (27%) had peritoneal recurrence combined with distant metastases), and 1 (2%) developed a metachronous rectal cancer. In total 25 (42%) patients developed distant metastases with or without locoregional recurrence. The anatomical site for the distant metastases was the lungs in 11 (44%) patients, the liver in 5 (20%) patients, the liver and lungs in 5 (20%) patients, and other locations in 4 (16%).
CONCLUSIONS: Most recurrences following CRS and HIPEC in colorectal cancer patients developed within 2 years. Almost half of the patients had isolated recurrences in the peritoneal cavity or in the abdominal wall, whereas the remaining half had distant metastases with or without peritoneal metastases. As many as 44% of patients with distant metastases, had lung metastases. Whether this observation is caused by different tumor biology in patients with peritoneal carcinomatosis should be examined in larger studies.

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TREATMENT AND OUTCOME OF RECURRENCE FOLLOWING CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY IN COLORECTAL CANCER PATIENTS

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) has improved prognosis considerably of selected patients with peritoneal carcinomatosis (PC) from colorectal cancer. However, recurrence is nevertheless commonly seen following CRS and HIPEC. Treatment and outcome of recurrences following CRS and HIPEC is only sparingly reported.
METHODS: To report treatment and outcome of recurrence following CRS and HIPEC in patients with PC from colorectal cancer in a national setting. Data of patients with PC from colorectal cancer who underwent CRS and HIPEC at the Danish national CRS and HIPEC centre were prospectively recorded. Criteria for CRS and HIPEC were used according to international standards. Complete cytoreduction was achieved in all patients at the first HIPEC and mitomycin C (35 mg/m2) was used during HIPEC for 90 minutes. Patients were followed-up by clinical examination and a (PET)CT scan at 3, 6, 12, 18, 24, 26, 48, and 60 months after surgery. Patients were followed until 4th January 2016 or death. Survival was estimated using the Kaplan-Meier analysis and calculated from time of CRS and HIPEC.
RESULTS: Seventy-nine patients with PC arising from colorectal cancer were treated with CRS and HIPEC at our centre in the period June 2006 to September 2015. Median age was 60 years (range 24-76), and 26 (33%) patients were males. The median number of disease involved regions by means of the Dutch 7 Region count score was 3 (range 0-7) at time of CRS. In total 51 (65%) patients developed a recurrence during a median follow-up time of 23 months (range 1-109). The recurrences were classified according to anatomical site as isolated locoregional in 25 (49%) patients, distant metastases in 11 (22%) patients, peritoneal recurrence combined with distant metastases in 14 (27%) patients, and 1 (2%) patient developed a metachronous rectal cancer. Recurrent disease was treated with curative intent in 11 (22%) of patients, while 39 (76%) patients received palliative treatment, and one (2%) had supportive care only. The median time interval between CRS and HIPEC until recurrence was longer for patients who had treatment with curative intent of their recurrence, 17 months (range 8-26), than patients which recurrence could be treated palliative only, 12 months (3-31). In total 28 (35%) were disease-free throughout the observation period. Their 2-year survival was 85%. Overall survival of patients who developed recurrence, irrespective of its treatment, had a 2-year survival of 67% and 3-year survival of 51%.
CONCLUSIONS: Curative treatment of recurrences was possible in 22% of patients and their recurrence occurred non-significantly later than non-curative recurrences, why long follow-up seems justified. Based on high survival rates, irrespective of recurrence or not, CRS and HIPEC has a beneficial effect on survival in colorectal cancer.

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LOCALLY ADVANCED COLORECTAL CANCER: PERITONEAL PENETRATION AS A PREDICTIVE FACTOR FOR PERITONEAL METASTASES

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BACKGROUND: T4 stage of colorectal cancer (CRC) is a risk factor for developing peritoneal carcinomatosis (PC). However, when taken all T4 colorectal cancers together, reported risks of developing PC varies widely from 8-50%. Besides mode of detection (imaging, relaparotomy, autopsy), this might be explained by the various definitions of T4. As a consequence, heterogeneity of included tumours within T4 cohorts exists, especially with respect to local peritoneal involvement. Peritoneal involvement of CRC can be peritoneal hyperplastic or mesothelial inflammatory reaction or true tumour penetration.
METHODS: The aim was to assess the association between the extent of peritoneal involvement and risk of developing peritoneal carcinomatosis (PC).
RESULTS: All patients who underwent resection of pT4 CRC in the UZ Leuven between Jan 2010 and Jul 2013 were eligible. Pathologists systematically divided peritoneal involvement (pT4) into two categories: peritoneal reaction with tumour within 1 mm of the peritoneal surface and peritoneal tumour penetration. Information on the extent of peritoneal involvement was available in 159 of 183 eligible pT4 CRC patients: peritoneal reaction with tumour <1 mm was present in 43 (27%) and peritoneal penetration in 116 (73%). Overall, 29 (18%) patients were synchronously diagnosed with PC. Another 30 of the remaining 130 patients (23%) developed metachronous PC. Peritoneal penetration (OR 2.86 95%CI 1.26-6.51; p=0.012) was associated with any PC in univariable analysis. In multivariable regression analysis, only lymph node involvement was significantly associated with PC.
CONCLUSIONS: Histological confirmation of true peritoneal penetration seems to be able to define a high risk subset of T4 tumours regarding development of PC, but larger studies are needed to confirm this observation. In current TNM classification systems, the evaluation of the exact peritoneal involvement of the tumour is not incorporated. With evolving treatment strategies that aim to treat PC at an earlier or even preventive setting, identification of high risk patients becomes of more clinical importance.

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AN EPICUTANOUS NEGATIVE PRESSURE WOUND MANAGEMENT REDUCES THE RISK OF WOUND INFECTIONS AFTER CRS AND HIPEC

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BACKGROUND: Postoperative wound infections are a major cause

of morbidity. This is true especially for patients undergoing CRS and HIPEC. In these patients wound infection not only prolong the hospital stay, but also delay the beginning of adjuvant therapy and are a remarkable cause of readmission. The incidence of wound infections in these patients is reported between 5-15%. In patients undergoing additional resections of the abdominal wall the incidence of wound infections even reaches 23%. Recent studies have shown a positive effect of epicutaneous negative pressure (ECP) wound dressing on the incidence of postoperative wound infections. In this study we tried to test this effect in patients undergoing CRS and HIPEC.

METHODS: 40 consecutive patients with CRS and HIPEC (n=37) or palliative HIPEC alone (n=3) were treated with an epicutanous continuous negative pressure wound dressing (ECNP,- 60 mm Hg) for 6-8 days postoperatively. All patients received perioperative antibiotic therapy up to 7 days according to surgeons preference. HIPEC was performed after closing the midline incision in all patients. Of the 37 patients that underwent CRS, 22 underwent resection of the small or large intestine, eight patients underwent splenectomy and six had a resection of the abdominal wall. 24 patients received cytotoxic chemotherapy before surgery.

RESULTS: Three patients had postoperative complications that demanded relaparotomy. Of these two patients needed intraabdomnal continous negative pressure therapy (one intraabdominal bleeding, one generalized peritonitis). These patients were not included in the analysis. The third had a wound infection. CT scan diagnosed an underlying fistulating subphrenic abscess due to local pancreatitis. One patient developed a subcutaneous hematoma demanding surgical evacuation on day 4 postoperatively. A ECNP wound dressing was applied again with subsequent uneventful wound healing. In the remaining patients no wound infections were observed.

CONCLUSIONS: We observed only one wound infection in our series of patients (2,6%), although this was due to an intraabdominal abscess. The incidence of wound infections in our patient series is much lower than reported in the literature. We conclude that ECNP might reduce the risk of wound infections after CRS and HIPEC. Even after local wound complications ECNP could be considered.

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CYTOREDUCTIVE SURGERY AND HIPEC IN PERITONEAL CARCINOMATOSIS FROM RECTAL CANCER

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BACKGROUND: Cytoreductive surgery (CRS) followed by Hyperthermic Intraperitoneal Chemotherapy (HIPEC) is associated with prolonged survival in selected patients with peritoneal surface disease. Still remains a controversial issue for the treatment of peritoneal carcinomatosis from rectal cancer due to its retroperitoneal location.

METHODS: We retrospectively analyzed our database of 260 cytoreductive surgery and HIPEC procedures. Site of primary tumor, patients age and performance status, PCI, cc score, complications and overall survival were reviewed.

RESULTS: Eight patients with peritoneal metastases from rectal cancer and 56 patients with peritoneal disease from colon cancer were treated with cytoreductive surgery and HIPEC. Cytoreduction score cc0 was achieved in 63% of the patients with rectal cancer and in 60% in patients with colon cancer. Morbidity and mortality were 50% and 0% respectively for rectal cancer cases, whereas it was 45% and 1,8% in patients with colon cancer. Median survival was 16,4 for rectal cancer patients *versus* 20,8 for colon cancer patients. The 3 year survival rate was 28% for rectal cancer patients *versus* 31% for colon cancer patients.

CONCLUSIONS: In our study there are not significant statistical differences in survival and morbidity, mortality rates, between patients with colon and rectal cancer. Selected patients with rectal cancer should not be excluded from CRS and HIPEC procedure.

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REFERRAL PATHWAYS AND OUTCOME OF PATIENTS WITH PERITONEAL METASTASES OF COLORECTAL ORIGIN IN THE UNITED KINGDOM

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BACKGROUND: Traditionally patients with PMCR have been treated with palliative chemotherapy and best supportive care. With the introduction of a programme of cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherpy (HIPEC) cohorts of patients in the UK have been referred to National registered centres. We analysed the patterns of referrals and outcomes of patients in our centre. From a prospective register of referrals since 2002 patient demographics, prior treatment pathways, and multidisciplinary team (T) decisions were evaluated. Outcome for all patients included overall survival (OS) and disease free survival (DFS). In patients who underwent CRS and HIPEC, peritoneal cancer index (PCI) and completeness of cytoreduction (CC) scores were recorded intraoperatively; post operative complications were stratified using the NCI v 4 index. Groups were compared using Kaplan Meier estimates, chi-square analysis and hazard ratios as appropriate.

METHODS: - To Understand the complex pathways followed by patients with PMCR. - To evaluate the reasons for deferral by the T. - Determine long term outcome for patients with PMCR.

RESULTS: From 286 patients, mean age of 57.7y with a confirmed diagnosis of PMCR, 50.3% were males. In 169 (59.1%) patients, the T advised against surgery due to: extent of peritoneal disease 40.5%, active systemic disease 28.6%, progressive disease on chemotherapy 11.3%; 9.5% were unfit for surgery and 4.2% refused CRS. 117 (40.9%) of patients underwent CRS/HIPEC demonstrating a median PCI of 7 (0-31) and CC0/1 score achieved in 86.3%. Median hospital stay was 10.5 (5-26) days; grade 3/4 morbidity occurred in 11 patients (9.4%) and one patient died (0.85%) postoperatively. The median DFS following CRS/HIPEC was 42.2 months and median OS was 84.9 months compared to 28.4 months for those receiving palliative treatments ($p<0.001$). Over time there was a significant increase in referrals/year (1-80) and a decrease in the T advising CRS/HIPEC from 64.5% to 37.1% ($p<0.017$).

CONCLUSIONS: Almost 60% of PMCR referrals are not suitable for CRS and HIPEC and an experienced T is key to selecting patients who will benefit. This data allows us to provide guidelines for referral. For those who do undergo surgery a low morbidity and mortality can be achieved and significant survival benefit obtained. By increasing awareness of the potential benefits and low risks of CRS and HIPEC for PMCR, an increase in appropriate referrals are to be encouraged.

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PCI AS PROGNOSTIC FACTOR IN COLORECTAL CANCER– RESULTS FROM THE SWEDISH NATIONAL DATABASE

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BACKGROUND: In Sweden, where a population of almost 10 million is scattered over a vast geographic area, four centers are appointed to perform cytoreductive surgery and HIPEC. To overcome low volume issues a national network for close collaboration and a national registry has been established. The national prospective registry of clinicopathological data has been linked to the population registry. The presented data is the complete national data on CRS+HIPEC with subgroup analysis of peritoneal cancer index (PCI) in colorectal cancer (CRC) during 2013-2015. Kaplan-Meier and Log Rank test was used for survival analysis and Kruskal-Wallis for mean comparison.
METHODS: 1. To evaluate the national prospective registry. 2. To assess PCI as a prognostic factor in colorectal cancer.
RESULTS: The total intention to treat with CRS+HIPEC was 379 cases for the years 2013-2015. Of these 310 (81.8%) were completed and 37 (9.8%) open-close procedures. This includes 183 (48.3%) CRC and 108 (28.5%) pseudomyxoma cases. Median follow up was 388 d, no cases lost to follow up. The 90-days mortality was 6/379 (1.6%) and complications (Clavien-Dindo >II) occurred in 25.6%. In Kaplan-Meier analysis of CRC cases with complete procedure (n: 150) the overall survival (OS) is significantly different in groups of PCI 1-11, 12-17 and 18-39. This difference is however non-significant if removing the 8 cases with residual tumor. Age and Karnofsky performance status was similar between groups but CC 0 was more seldom achieved in the high PCI group.
CONCLUSIONS: Extraction of national data for 2013-2015 proves the feasibility of a national registry covering all cases with complete follow up. The overall procedure related mortality (90-days mortality) is low; 1.6%. The data indicates that short term results from these moderate volume centers are similar to the largest published series, possibly due to beneficial organization and structure. In subgroup analysis of CRC we can see a tendency towards difference in OS between PCI groups but possibly due to short follow up no significance if cases with residual tumor are removed.

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CURATIVE TREATMENT FOR PATIENTS WITH SYNCHRONOUS LIVER METASTASES AND PERITONEAL CARCINOMATOSIS OF ADVANCED COLORECTAL CANCER: A MULTICENTER STUDY OF THE FRENCH ASSOCIATION OF SURGERY

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BACKGROUND: Patients with synchronous peritoneal carcinomatosis (PC) and liver metastasis (LM) of colorectal cancer (CRC) are generally considered for exclusive systemic palliative chemotherapy. Aggressive surgical approaches combining hepatectomy and peritoneal resection with curative intent remain controversial in such a setting and based on no solid data
METHODS: The aim of this prospective cohort was to assess morbidity, disease-free survival (DFS) and overall survival (OS) of patients with PC and LM of CRC origin treated with an aggressive therapeutic approach combining surgical resection of liver and peritoneal lesions followed by hyperthermic intraperitoneal chemotherapy (HIPEC).
RESULTS: From 1993 to 2015, 146 patients were analyzed. After a mean follow-up of 24 months, the median OS and DFS were respectively 33±4.08 [95%IC: 25.01 - 40.99] and 9.30±0.65 [95%IC: 8.3 - 10.57] months. The median number of LM was 4 [range: 1-8]. Postoperative morbidity Grade III-IV (Clavien - Dindo Classification) rate was 13.7% with no postoperative death reported. PCI of 12 or more was identified as independent prognostic factor for poor OS (P=0.02) in only univariate analysis. On univariate analysis, left site of primary tumor, number >3 of LM and Grade III-IV postoperative complications were identified as prognostic factors for poor DFS (P=0.045, P=0.01 and P=0.009 respectively) but on multivariate analysis, Grade III-IV complications was the only independent predictive factor (P=0.001). The simultaneous liver resection was associated with higher post- operative hospital stay (P=0.01). The number of LM and the type of liver resection were not identified as independent factors for complications.
CONCLUSIONS: This multicenter study is the largest series currently reported confirming the feasibility of combined treatment with curative intent including hepatectomy and peritoneal resection and HIPEC in selected patients with liver and peritoneal metastases of colorectal cancer. This surgical approach allows prolonged overall survival with an acceptable rate of complications.

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LYMPHOCYTE, MONOCYTE AND NEUTROPHIL DYNAMICS IN PERITONEAL FLUID AND BLOOD OF PATIENTS TREATED WITH CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR PERITONEAL CARCINOMATOSIS

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BACKGROUND: Cytoreductive surgery (CRS) with hyperthermic intraperitoneal chemotherapy (HIPEC) has changed the therapeutic landscape, improving overall survival in patients with peritoneal carcinomatosis (PC). It is now the preferred treatment of many gastrointestinal and ovarian cancers. The cellular mechanisms involved in beneficial effects of CRS-HIPEC remain unexplored. Nevertheless, systemic inflammatory markers have been introduced as prognostic factors in several cancers including circulating lymphocyte subsets, neutrophil-to-lymphocyte ratio (NLR), derived neutrophil-to-lymphocyte ratio (dNLR), platelet-to-lymphocyte ratio (PLR) and monocyte-to-lymphocyte ratio (MLR).
METHODS: The objective of this study was to evaluate the correlations between these systemic markers and pre- and post- CRS-HIPEC as prognostic factor in patients diagnosed of ovarian and gastrointestinal CP treated with CRS-HIPEC.
RESULTS: 61 consecutive patients (22 males and 39 females) belonging to the surgery department of Son Espases's Hospital between March 2014 and July 2016 were prospectively collected and analysed. All patients (24 ovarian (OC)/ 37 gastrointestinal cancers (GC)) were treated for PC receiving CRS-HIPEC. Preoperative and postoperative systemic blood, serum and peritoneal fluid samples were analysed for blood cell counts (neutrophil, monocyte, lymphocyte (lymphocyte subsets) and platelet counts). Clinical dates were also recorded. We observed significant differences in the dynamics of lymphocytes, monocytes and neutrophils in peritoneal fluid pre- and 24h, 48h, 72h post-CRS-HIPEC. Lymphocytes and monocytes numbers in peritoneal fluid decreased while neutrophils increased. We compared dNLR, NLR, PLR and MLR pre- and post-CRS-HIPEC between patients with and without surgical complications and we didn't found differences. NLR, dNLR and PLR pre-CRS-HIPEC were significantly increased in

systemic blood in GC compared with OC patients. There were not significant differences between PLR pre-CRS-HIPEC in systemic blood GC and OC patients.
CONCLUSIONS: Even though the peritoneal fluid plays a crucial role in the spread of ovarian and colorectal cancer, the contribution of its host derived cellular constituents is poorly understood. The accessibility of peritoneal fluid and its cellular components makes an excellent source of tumour and their environment for investigation of prognostic and predictive biomarkers. In this preliminary report we analysed the nature and relation among cellular components and the effects of CRS-HIPEC. CRS-HIPEC causes significant metabolic and immunological alterations that can influence in the patient's course. The prognostic value of the dNLR, NLR and PLR in patients with several types of cancer including colon and ovarian cancer is still controversial. We found that GC patients present dNLR, NLR and PLR more elevated than OC patients in the moment before CRS-HIPEC but we didn't find correlation with the post-surgery course. Nevertheless, the different blood and lymphocyte subsets cells dynamics in peritoneal fluid before de CRS-HIPEC shows encouraging results.

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RISK FACTORS OF METACHRONOUS PERITONEAL METASTASIS AFTER CURATIVE RESECTION OF COLON CANCER

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BACKGROUND: The prognosis of colorectal peritoneal metastasis (PM) is poor but its detection in early stage is often difficult due to limited sensitivity of current radiological examinations and tumor markers. Therefore risk prediction of PM based on clinical factors is important. The purpose of this study is to elucidate risk factors of metachronous PM after curative resection for colon cancer.
METHODS: A total of 1740 patients with stage 1-3 colon cancer underwent curative resection at the University of Tokyo Hospital during 1997-2015. Their perioperative clinicopathological data and postoperative outcome were retrospectively retrieved from their medical records. Time to metachronous PM was measured as the time from the date of curative resection of primary tumor to the date of clinical diagnosis of PM. Death without PM was considered to be a competing risk. The probability of metachronous PM was calculated using a cumulative incidence method, and subdistribution hazards model was used to determine independent predictors of metachronous PM.
RESULTS: The median age of patients at the operation for primary tumor was 67 years old [Interquartile range (IQR): 60-75]. The percentage of stage 1,2,3 cancers was 27.9%, 37.2% and 34.9%, respectively and 7.3% of them were poorly differentiated adenocarcinoma. 35.4% of operations were performed laparoscopically and all patients had R0 resection. Adjuvant chemotherapy was performed in 23.3%. The median time to diagnosis of metachronous PM was 14.7 months (IQR: 8.2-29.1) and 5-year cumulative incidence of PM was 5.7%. 90% of the patients had limited disease (Peritoneal Cancer Index less than 10) and 53.5% had concurrent metastases at the diagnosis of PM. Independent risk factors for developing metachronous PM were age [hazard ratio (HR) 0.97, 95% confidence interval (CI):0.95-0.98 p=0.001], differentiation of the primary tumor (HR 4.74, 95%CI: 2.54-8.84, p<0.001 for poorly differentiated adenocarcinoma), pathological T category (HR 20.99, 95% CI:6.13-71.93, p<0.001 for T4), pathological N category (HR 2.64, 95%CI: 1.30-5.38, p=0.007) and adjuvant chemotherapy (HR 0.58, 95%CI: 0.34-0.98, p=0.04).
CONCLUSIONS: Several risk factors of developing PM have been identified. Since diagnosis of PM is still difficult, recognition of risk factors is important to plan surveillance or therapeutic strategy after curative surgery for colon cancer.

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PREOPERATIVE RADIOLOGICAL FINDINGS PREDICT RISK OF "OPEN-CLOSE" SURGERY AND OVERALL SURVIVAL IN PATIENTS WITH PERITONEAL CARCINOMATOSIS FROM COLORECTAL CANCER

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BACKGROUND: Cytoreductive surgery (CRS) in combination with hyperthermic intraperitoneal chemotherapy (HIPEC) has been recognized as an effective treatment in selected patient with peritoneal carcinomatosis (PC) from colorectal cancer (CRC). Preoperative radiological imaging, most commonly computed tomography (CT) is performed to rule out distant metastasis but also to estimate the extent of peritoneal carcinomatosis. The Peritoneal carcinomatous index (PCI) score, which originally intended to be counted intraopatively, is now also being estimated by preoperative imaging. In 10-25% of the patients, a PCI score over 20 or too extensive peritoneal carcinomatosis on the small bowel or in the hepatic hilum are found at surgery. In these patients the abdomen is closed without CRC and HIPEC, so called "open and close" surgery.
METHODS: The purpose of this study was to determine whether preoperative CT findings correlate with the risk of "open and close" surgery as well as overall survival (OS).
RESULTS: A total of 81consecutive patients scheduled for CRS with HIPEC were evaluated. All patients had preoperative CT, CT colon or PET-CT. Thirteen patients ended up with "open and close" surgery and 68 patients underwent CRS and HIPEC. PC in the right upper area (region 1) (Odds ratio 3.41, p=0.013) as well as one confluent or more than two parts of involvement of small bowel mesenteries (Odds ratio 9.90, p=0.03) indicated high risk for "open and close" surgery other than radiological PCI score >=20 (Odds ratio 20.6, p=0.001). For patients those accomplished HIPEC, PC in the right upper area (region 1), left side involvement (region 3 and 4) and pelvic involvement (region 6) were significant adverse prognostic factors for OS, whereas extensive involvement of small bowel mesentery was not. Among these three survival factors, left side involvement was the most distinctive poor survival factor (HR 5.88, p=0.003).
CONCLUSIONS: Location of PC may correlate with prognosis in patients who could undergo CRS with HIPEC. PC in the left side should be recognized as a significant poor prognostic factor other than PCI >=20. If this prognostic value could be confirmed in a prospective larger study, current treatment and follow-up algorithms for patients with left sided PC should be questioned and updated.

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ANALYSE OF OPEN AND CLOSE SURGERY OF PATIENTS WITH COLORECTAL CANCER AND PERITONEAL CARCINOMATOSIS

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BACKGROUND: 10-15% of patients diagnosed with colorectal cancer (CRC) have synchronously peritoneal carcinomatosis (PC). Other patients develop PC as the only site of recurrence. Preoperative multidisciplinary assessment of PC with colonoscopy, computed tomography and often diagnostic laparoscopy are necessary to select patients for surgery. Surgical treatment including cytoreductive surgery (CRS) with hyperthermic intraperitoneal chemotherapy (HIPEC) has been recognized as an effective treatment in well selected patient. Despite careful assessment "open and close (O&C)" surgery happens, where the surgeon has to close the abdomen because of too extensive PC. Peritoneal carcinomatous index (PCI) is used worldwide for determine the extent of PC both preoperatively radiological and perioperative. The study is a retrospective single center cohort study including prospectively all patients with PC of CRC who have undergone surgery with the intention of CRS and HIPEC between September 2012 and August 2015. Medical records, registry data were scrutinized and the radiology of computed tomography was reevaluated blinded for O&C.
METHODS: The aim of this study is to analyze patients with open and close surgery in a consecutive cohort of patients undergoing surgery with intention of CRS and HIPEC in order to see if O&C could have been prevented during a learning period of 3 years after the introduction of CRS and HIPEC.
RESULTS: 81 patients underwent surgery with the intention of CRS and HIPEC. Of these 13 (16%) became O&C surgery. Comparing the characteristics of the group with O&C with the group with complete CRS and HIPEC age and gender were similar, the median PCI was 21:9.Concerning small bowel engagement the O&C had >1 in all four regions whereas the CRS and HIPEC had <1. Engagement of PC in the liver hilum was more common in O&C: 6 of 22 (27%) compared with 2 of 60 (3%.) In all 57/81 were underestimated in PCI. The median survival was 8 months of the patients without CRS and HIPEC.
CONCLUSIONS: During the learning period the preoperative radiologic assessment of PCI compared to perioperative PCI underestimated most often the PCI. High PCI, extensive small bowel involvement and PC in the area of the liver hilus were factors that increased the risk of O&C.

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SHORT-TERM OUTCOMES AFTER CYTOREDUCTIVE SURGERY WITH HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR COLORECTAL CANCER WITH PERITONEAL CARCINOMATOSIS: A PROSPECTIVE STUDY OF TWO-TERTIARY REFERRAL CENTERS IN KOREA

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BACKGROUND: Hyperthermic intraperitoneal chemotherapy after cytoreductive surgery is regarded as an effective treatment to improve survival in patients with peritoneal carcinomatosis. Our institutions began CRS with HIPEC to treat peritoneal carcinomatosis from colorectal cancer origin since July 2014. In this study, we evaluated a total of 70 patients who underwent CRS with HIPEC, between July 2014 and March 2016, to treat colorectal cancer with peritoneal carcinomatosis in two tertiary referral centers (Severance Hospital and Gangnam Severance Hospital) in Korea. Cytoreductive surgery was performed by resection of metastatic organs from primary cancer with a peritonectomy. The HIPEC solution was composed of 35mg/m2 of mitomycin-C and 3L of 1.5% dextrose peritoneal dialysis solution. The mixed solution was circulated 800-1000 ml/min by a HIPEC pump (The Belmont® Hyperthermic Pump, USA) to maintain 42-43°C for 90 minutes. Perioperative clinical outcomes and postoperative complications were evaluated prospectively. Postoperative complications were assessed by the Clavien-Dindo classification of surgical complications.
METHODS: This study aimed to evaluate short-term outcomes of cytoreductive surgery with hyperthermic intraperitoneal chemotherapy in patients with colorectal cancer with peritoneal carcinomatosis as an early experience in Korea.
RESULTS: The mean peritoneal cancer index (PCI) was 15.9±10.8 (range, 1-39): PCI<10, 32.9%; PCI 10-19, 34.2%; PCI=20, 32.9%. In the results of completeness of cytoreduction (CC), CC-0 was achieved in 58.6% of patients, compared with 18.6% of CC-1 and 22.8% of CC-2. There were 62.9% of patients with curative intention, whereas 34.3% for palliative aim. The operation time was 9.7±3.4 (mean±SD) hours and the length of hospital stay was 20.4±13.3 days. Within 8.0 postoperative weeks, 74.3% of patients received adjuvant chemotherapy. Short-term postoperative complications within postoperative 30 days occurred in 74.3% of patients and long-term complications in 10.0%. However, during the short-term period, most complications occurred as grade I-II complications (44 patients, 62.9%), compared with grade III-IV of 7 patients (10.0%). Meanwhile, all long-term complications were developed in 7 patients (10.0%) with grade III-V. In the short-term complications, hematologic abnormalities were the most common in grade II complications: neutropenia (15.7%) and thrombocytopenia (5.7%).
CONCLUSIONS: CRS with HIPEC was feasible to treat stage IV colorectal cancer patients with peritoneal metastasis in our initial experiences of 70 cases. It is expected that CRS with HIPEC can enlarge treatment strategies for stage IV colorectal cancer.

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THE IMPACT OF PERITONEAL CANCER INDEX TO THE POSTOPERATIVE COMPLICATIONS AFTER CYTOREDUCTIVE SURGERY WITH HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR COLORECTAL CANCER WITH PERITONEAL CARCINOMATOSIS

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BACKGROUND: The peritoneal cancer index (PCI) is an important factor to assess the extent of peritoneal carcinomatosis for cytoreductive surgery (CRS) with hyperthermic intraperitoneal chemotherapy (HIPEC). Because it is strongly related with the aggressiveness of CRS, assessment of PCI is meaningful to predict the completeness of cytoreduction as well as perioperative clinical outcomes. In this sutdy, sixty-six patients who were diagnosed colorectal cancer with peritoneal carcinomatosis and underwent CRS with HIPEC for curative intention were evaluated prospectively in two hospitals (Severance Hospital and Gangnam Severance Hospital) in Korea from July 2014 to March 2016. The patients were classified into 3 groups following PCI: group 1 (PCI<10, n=23), group 2 (PCI 10-19, n=23) and group 3 (PCI=20, n=20). Postoperative complications were assessed by the Clavien-Dindo classification of surgical complications. Also the perioperative clinical outcomes and postoperative complications were evaluated among the three PCI groups.
METHODS: The purpose of this study is to evaluate whether PCI affects postoperative complications and oncologic outcomes in patients with colorectal cancer with peritoneal carcinomatosis after CRS with HIPEC.
RESULTS: The rate of completeness of cytoreduction was 95.7% in group 1, compared with 52.2% in group 2, and 20.0% in group 3. The operation times of group 1 was shorter than groups 2 and 3: 7.0 hour, 10.7 hour, and 10.9 hour, respectively (p<0.001). Synchronous operations were performed more frequently in groups 2 and 3 than group 1 (p=0.038). The length of hospital stay was 14.9 days in group 1, which was shorter than 24.6 days in group 2 and 21.0 days in group 3.

According to the assessment of postoperative major complications (grade III-V complications), patients in group 2 had the highest rate with 34.8% compared with 8.7% of group 1 and 10.0% of group 3 (p=0.050). Although there was no significant difference in the overall survival, the disease-free survival in patients with postoperative major complications were lower than no complications (64.3% *vs* 23.3%, p=0.027). In addition, patients in group 1 had improved disease-free survival rates than groups 2 or 3 (83.0%, 44.3%, 40.3%, respectively, p=0.038).
CONCLUSIONS: A high PCI affected the increased rate of postoperative major complications with poor disease-free survival because it was correlated with extensive cytoreduction during CRS with HIPEC. Adequate patient selection and proper management are required to improve clinical and oncologic outcomes for CRS with HIPEC.

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PRESSURIZED INTRAPERITONEAL AEROSOL CHEMOTHERAPY SAFETY EVALUATION FOR SURGICAL TEAM: AN ESSENTIAL STEP BEFORE THE CLINICAL PRACTICE

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BACKGROUND: PIPAC is a recent procedure with promising results in local control and survival for patients treated for peritoneal carcinomatosis.
METHODS: To evaluate the contamination level of chemotherapy at which has been exposed the surgical team.
RESULTS: During one of the first PIPAC procedures using cisplatin performed after implementation of the technique, samples were drawn from urines of 14 persons in the surgical team and 5 control persons (not exposed in the surgical field). Samples for surface contamination have been collected from different areas in the operating room (OR). Regarding median cisplatin level in past 24h urines, there was no difference between the two groups (control: 12ng/l *vs* PIPAC exposed <10ng/l). Regarding cisplatin in the OR environment, there was an elevated level of drug contamination after PIPAC measured in 3 areas: the external gloves of the surgeon (1572ng), the section between the operating table and the room door (1158ng), possibly be due to the moving out of the PIPAC injector, and in the syringe holder (1164ng). These results lead to a new protocol for room cleaning optimization. After implementation of this new protocol, the measures were repeated. The highest level of cisplatin detected in the OR was only on the syringe holder (41.7ng), but was decreased significantly.
CONCLUSIONS: PIPAC appears as a safe procedure for the surgical team, but frequent control tests and specific measures are needed to limit the exposure for the surgical team, and keep PIPAC safe for the team.

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TARGETED NANOPARTICLES FOR VISUALIZATION AND FOCAL ABLATION OF MICROMETASTASES IN A PERITONEAL CARCINOMATOSIS MODEL

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BACKGROUND: One of the biggest challenges for achieving a cure for peritoneal carcinomatosis from primary colorectal tumors is the presence of residual disease and micrometastases which can escape debulking and chemotherapy leading to a recurrence. Agents that increase cancer cell visibility afford more complete tumor resection; however, current limitations in surgical and imaging techniques do not allow for precise damage to cancerous cells with sparing of healthy neighboring cells.
METHODS: - Synthesize an organic polymer nanoparticle that produces *in situ* fluoresence with an added benefit of on-demand heat production for hyperthermia. - Conjugate folic acid to the surface of nanoparticles to selectively target colorectal cancer cells. - Develop a mouse model of closed peritoneal perfusion mimicking the HIPEC procedure to investigate nanoparticle binding to colorectal cancer cells *in vivo*.
RESULTS: There were no complications from either perfusion procedure or the nanoparticles. Following perfusion, the fluorescence was detected in focal areas using a whole animal *in vivo* imaging system allowing us to evaluate binding and approximate the dosage of nanoparticles remaining in the peritoneum following a 5-minute wash with saline. It was observed that in the absence of targeting with folic acid, our nanoparticles had minimal binding to tumor or healthy tissues in the peritoneum. Folic acid functionalization was found to be beneficial for specific localization of tumors with folic acid nanoparticles not observed in appreciable quantities in tissues other than the tumor.
CONCLUSIONS: This project represents the first step in understanding the binding of these nanoparticles to disseminated peritoneal carcinomatosis. Now that a viable pre-clinical model for evaluating nanoparticles has been established, the next step is to deploy the heat generating capabilities for ablation of micrometastases and/or generation of localized regions of mild hyperthermia to enhance selective delivery of chemotherapeutic agents.

P245

INCISONAL HERNIAS FOLLOWING CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY: A NATIONAL PROSPECTIVE COHORT STUDY

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) is an extensive procedure with substantial postoperative morbidity. Incisional hernias (IHs) are one of the most common late complications following laparotomy procedures and its frequency after CRS and HIPEC is not described.
METHODS: -To evaluate the incidence of IHs in the midline laparotomy incision in patients undergoing CRS and HIPEC. We hypothesized the risk to be around 15% at 12 months. Secondary, to investigate the impact of IHs on Health-related Quality of Life (HRQoL). From June 2006 until June 2016, 152 patients consecutively underwent CRS and HIPEC at Aarhus University Hospital, a single national centre. As a routine, patients had a follow-up visit at 3, 6, 12, 24, 36, 48 an 60 months postoperatively. Data was prospectively registred and all IH-event were evaluated at the follow-up visits by a clinical examination performed by the same three surgeons executing CRS and HIPEC. An IH included all postoperative hernias at the laparotomy site in the vertical midline incision. The incidence of IHs was estimated din a competing risk analysis and presented as the cumulative incidence proportion (CIP). HRQoL was assessed at 12 months by the self-administered generic questionnaire Short Form (SF-36)(acute version).
RESULTS: Overall, median follow-up time was 16.6 (0.9-62.0) months, and in this period 14/152 (9.2%) patients developed an IH. The CIP at 1-year was 5.9% (95% CI: 2.9;10.4) (n=8) and at 2-year: 9.2% (95% CI: 5.3;14.5) (n=14). Patients with an IH were significantly older (67(range 48-72) years) compared to patients without an IH (60(range 24-75) years) (P=0.0067). SF-36 showed that patients with an IH reported lower HRQoL with regard to Role-physical (n=9 and n=63, mean difference: -32.9, p=0.02) and Role-emotional (n=9 and n=64, mean difference: -20.2 p=0.04).
CONCLUSIONS: Patients undergoing CRS and HIPEC seem not to have an increased risk of developing an IH compared to other open abdominal surgery. Patients with an IH experienced limitations with

work and daily activities due to their physical and psychological health according to SF-36 (Role-physical and Role-emotional).

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HOSPITAL OF DIAGNOSIS AFFECTS TREATMENT SELECTION AND OVERALL SURVIVAL IN PATIENTS WITH PERITONEAL METASTASES OF COLORECTAL ORIGIN

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BACKGROUND: In the Netherlands, cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) for peritoneal metastases of colorectal cancer (PMCRC) is centralised in high volume centres, whereas the diagnosis is made in all hospitals. The influence of hospital of diagnosis on treatment selection and overall survival is currently unknown.
METHODS: This study assessed whether hospital of diagnosis affects the likelihood of undergoing CRS+HIPEC and overall survival (OS) in patients with PMCRC. Between 2005-2014, patients with synchronous PMCRC without systemic metastases were selected from the Netherlands Cancer Registry. Hospitals were classified as HIPEC-centre (HC) or non-HIPEC centre (NHC). For survival analysis, hospitals were classified based on the likelihood of undergoing CRS+HIPEC as high-probability-centre (HPC, >20% CRS+HIPEC), medium-probability-centre (MPC, 10-20% CRS+HIPEC) or low-probability-centre (LPC, <10% CRS+HIPEC). Logistic regression and Cox regression analysis were used to assess the relationship between hospital of diagnosis and the likelihood of undergoing CRS+HIPEC and OS, respectively.
RESULTS: A total of 2 661 patients, diagnosed in 89 hospitals, were included. At individual hospital level, the percentage of patients receiving CRS+HIPEC ranged from 0% - 53%, and median OS ranged from 3.1 - 28.3 months. Patients diagnosed in an HC were more likely to receive CRS+HIPEC than patients diagnosed in an NHC (OR 3.77 [2.46-5.79]). Median OS was 14.2, 10.1, and 8.2 months for patients diagnosed in an HPC, MPC, and LPC, respectively (p <0.01). In multivariable analysis, hospital of diagnosis was an independent predictor of OS: HR 0.84 [0.74-0.95] for HPC *versus* MPC, HR 1.18 [1.07-1.30] for LPC *versus* MPC.
CONCLUSIONS: The large variation in probability of receiving CRS+HIPEC between hospitals of diagnosis, which is independently associated with survival, indicates undertreatment of PMCRC. Specialised regional Ts with involvement of high-volume centres may improve preoperative staging, treatment selection, and survival of patients with PMCRC.

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THE ROLE OF SYSTEMIC THERAPY AS ADJUNCT TO CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR PERITONEAL METASTASES OF COLORECTAL CANCER: A SYSTEMATIC REVIEW

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BACKGROUND: Palliative systemic therapy and cytoreductive surgery with hyperthermic intraperitoneal chemotherapy (CRS+HIPEC) are increasingly used for peritoneal metastases of colorectal cancer (PMCRC), leading to improved overall survival (OS). However, the value of systemic therapy as adjunct to CRS+HIPEC for PMCRC is unclear. This systematic review aimed to evaluate current evidence.
METHODS: To evaluate all evidence on the influence of perioperative systemic therapy (neoadjuvant, adjuvant, or both) on overall survival in patients receiving CRS+HIPEC for PMCRC. In March 2016, a systematic search was conducted in PubMed/MEDLINE, EMBASE, and Cochrane. Methodological quality was assessed using MINORS criteria. Timing of systemic therapy was classified as neoadjuvant, adjuvant, or perioperative. Systemic therapy regimens were classified as single agent chemotherapy, combination chemotherapy, or combination chemotherapy with targeted therapy. Primary outcome was OS. Secondary outcome was postoperative complications, defined as Clavien-Dindo Grade III-V.
RESULTS: From 1907 search results, 13 observational studies, all of low methodological quality, were included. Five studies reported varying results on neoadjuvant systemic therapy and OS: no survival benefit (n=1), survival benefit (n=2), survival benefit of only combination chemotherapy with targeted therapy (n=1), and superiority of combination chemotherapy with targeted therapy to combination chemotherapy (n=1). Three studies reported varying results on response to neoadjuvant systemic therapy and OS: survival benefit of complete/major pathological response (n=2), and no association between morphological response and survival (n=2). All four studies reporting on adjuvant systemic therapy did not show a significant survival benefit. Two studies reported varying results on perioperative systemic therapy and OS: survival benefit (n=1), and superiority of combination chemotherapy and targeted therapy to single agent chemotherapy (n=1). Five studies reported varying results on neoadjuvant systemic therapy and postoperative complications: no increase in postoperative complications (n=4), and increase of postoperative complications if neoadjuvant systemic therapy contained bevacizumab (n=1).
CONCLUSIONS: Currently available evidence is of low quality, but suggests a role of neoadjuvant combination chemotherapy with targeted therapy in patients undergoing CRS+HIPEC for PMCRC. Prospective trials on the influence of perioperative systemic therapy as adjunct to CRS+HIPEC for PMCRC are warranted. The authors are currently preparing a multicentre, randomised controlled trial (CAIRO-6), which compares two treatment strategies: - CRS+HIPEC; - Neoadjuvant combination chemotherapy with bevacizumab, followed by CRS+HIPEC, followed by adjuvant combination chemotherapy.

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HYPERTHERMIC CHEMOTHERAPY INTRA-ABDOMINAL LAPAROSCOPIC APPROACH: DEVELOPMENT MODEL AND CLINICAL TRANSLATION IN PERITONEAL CARCINOMATOSIS FROM DIFFERENT ORIGIN

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BACKGROUND: Hyperthermic intraperitoneal chemotherapy (HIPEC) is an effective treatment for patients with peritoneal carcinomatosis (PC). Laparoscopic surgery is safety treatment in colorectal and appendiceal cancer, and it is performed in patients with peritoneal carcinomatosis from different sources, which low tumor volume. HIPEC management by laparoscopic approach after cytoreductive surgery completed locoregional treatment of CP, and may be feasible and safe after appropriate patient selection.
METHODS: Development of an experimental model of HIPEC by laparoscopic approach, with CO2 recirculation. Application this

model in two patients with peritoneal carcinomatosis of colorectal origin. Porcine Model consists of 6 mini-pigs (35-38), operated by cytoreductive surgery (pelvic and paraaortic lymphadenectomy) with laparoscopic approach. Laparoscopic CO2 recirculation-HIPEC was performed using laparoscopic access for input and output catheters (Paclitaxel 175mg/m2 for 60 minutes at 42°C was used). The variables analyzed were blood gases, hemodynamic parameters and temperature; they were analyzed at different surgery times: 1.Al start of surgery (T1); 2. During surgery (T2) 3. Pre-HIPEC (T3); 4. Intra-HIPEC (T4); 5. Post-HIPEC (T5). Hipec laparoscopic clinical approach was performed in two patients with peritoneal carcinomatosis of colorectal origin. A 39 years old woman with appendiceal mucinous tumor and ovarian metastasis was diagnosis after a left oophorectomy and appendectomy by infraumbilical laparotomy. Cytoreductive surgery was completed by laparoscopic approach with 4 laparoscopic abdominal ports (12 mm: periumbilical, lower left site, upper left site and upper right site). A right hemicolectomy and omentectomy were performed. The specimen was extraction by a midline abdominal laparotomy. The intestinal section and extracorporeal ileocolic manual anastomosis was performed before HIPEC administration. Input and output HIPEC catheters were placed through laparoscopic ports: input solution catether in upper left site, output solution catether in lower left site, and input CO2 catether in upper right site. All of catheters were placed by hand-assisted through the midline laparotomy performed. The laparotomy was closed and the gas exchange device of our model was placed in the upper point of abdominal cavity.. mitomycin C 35 mg/m2 was administered for 60 minutes at 42.5°C, according to protocol approved by our Hospital.
RESULTS: No statistically significant differences were observated in blood gases, hemodynamic or temperature parameters in the experimental phase. There were no technical complications during HIPEC administration by laparoscopic approach in the clinical phase.
CONCLUSIONS: Cytoreductive surgery and Co2-HIPEC administration by laparoscopic approach is a safe and feasible technique in selected patients, such as patients undergoing surgical presenting high risk factors of carcinomatosis, low volume peritoneal and local tumor recurrence.

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LIMITED SYNCHRONOUS HEPATIC RESECTION DOES NOT COMPROMISE PERI-OPERATIVE OUTCOMES OR SURVIVAL AFTER CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: There is uncertainty about whether hepatic resection (HR) combined with cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS/HIPEC) is effective.
METHODS: Nine hundred and thirty-five consecutive CRS/HIPEC procedures were performed between 1996-2016 of which 132(14%) involved concomitant HR. Peri-operative complications were graded according to the Clavien-Dindo Classification. The association of concomitant HR with 19 peri-operative outcomes and overall survival (OS) was assessed using univariate and multivariate analyses.
RESULTS: Patients undergoing HR had a lower peritoneal disease burden (peritoneal cancer index=17) (29%% *vs* 46%, p<0.001) and underwent a shorter operation (=9 hours) (42% *vs* 53%, p=0.019). After accounting for confounding factors, HR was not associated with in-hospital mortality (Relative Risk [RR], 2.47; 95% Confidence Interval [CI], 0.52-11.77; p=0.577) or grade III/IV morbidity (RR, 1.18; 95% CI, 0.74-1.90; p=0.488). Moreover, HR was not associated with an increased risk of other complications on univariate or multivariate analysis. Median OS for all colorectal cancer patients was 32.3 month with resected HM *versus* 30.5 months without HM (p=0.587). Concomitant HM did not compromise survival outcomes in patients with appendiceal cancer (p=0.266) or pseudomyoma peritonei (p=0.651).
CONCLUSIONS: Given prudent patient selection, concomitant HR does not compromise peri-operative outcomes or survival after CRS/HIPEC.

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TOWARDS REDUCING EMERGENCY READMISSIONS AFTER CRS-HIPEC FOR PERITONEAL DISEASE

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BACKGROUND: Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS-HIPEC) for peritoneal malig-nancy may be associated with significant morbidity and a prolonged period of hospitalization. Reported duration of hospitalization ranges between 12-20 days, and in spite of this, some patients require un-planned readmission shortly after discharge.
METHODS: • Review a high-volume centre's 30-day and 90-day readmissions after CRS-HIPEC. • Identify factors that can predict for emergency (e)-readmissions after CRS-HIPEC.
RESULTS: A total of 206 patients underwent CRS-HIPEC during the study period. E-readmission rates at 30 days and 90 days were 17.0% (n=35) and 24.8% (n=51) respectively. 4 patients required multiple admissions within this time frame. Overall, the median length of stay during the readmission was 6 days (6-188). The most common reasons for e-readmission within 30 days were intra-abdominal collections (n=4), intestinal obstruction secondary to adhesions (n=4), acute kidney injury secondary to vomiting and poor oral intake (n=4) and adhesion colic (n=4). Beyond 30-days and within 90-days, the most common reason for emergency readmission was high stoma output (n=3) and sepsis secondary to urinary tract infection (n=3). Looking at patients who were readmitted within 30 days, 11 patients required invasive interventional procedures, which included percutaneous drainage of abdominal collections (n=4), pleural tap (n=1), laparotomy for non-resolving intestinal obstruction due to adhesions (n=3), gastroscopy for evaluation of epigastric pain(n=1) and examination under anaesthesia for wound infection (n=1). Of note, the median PCI score on analysis was found to be 12 (0-39) and whilst there seemed to be an association between a higher PCI score (>12) and readmission due to intra-abdominal collections at 30 days, it was not statistically significant on univariate analysis. It was deemed important as patients with intra-abdominal collections all required some form of invasive intervention whilst patients who were admitted due to the other reasons could potentially be managed conservatively. Age, gender, primary tumour histology, duration of surgery, intra-operative blood loss, duration of intensive care unit and hospi-talization stays also did not predict e-readmissions at 30 days. Patients with a high Peritoneal Cancer Index (PCI) score (>12) (p<0.05) were more likely to require readmission within 90-days. None of the other de-mographic and clinico-pathological factors were found to be significantly associated with readmission.
CONCLUSIONS: In patients who have undergone CRS-HIPEC, 30-day e-readmissions were associated with abdominal collections, adhesions and renal impairment from dehydration, but at 90-days, more patients were readmitted for stoma related problems and urinary tract infection. Thorough discharge planning by paying more attention to patients with PCI score >12 and giving adequate care-giver training for stoma care may help avoid such readmissions and potential invasive interventions after CRS-HIPEC.

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PLATINUM AGENTS AND MITOMYCIN C SPECIFIC COMPLICATIONS IN CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) have been found to prolong

survival in patients with malignant metastatic peritoneal disease but is associated with high rates of morbidity.
METHODS: To assess the perioperative complications associated with the use of platinum agents (cisplatin or oxaliplatin) or mitomycin C for HIPEC.
RESULTS: There were 214 CRS-HIPEC procedures carried out during the study period, of which 108 procedures used mitomycin C and 95 used a platinum agent for HIPEC. 58 patients suffered low-grade complications (grade I-II), whilst 44 patients suffered high-grade complications (grade III-V). The use of platinum drugs (cisplatin or oxaliplatin) was associated with a higher rate of acute kidney injury (AKI) compared to Mitomycin C (36% and 57% *vs* 4.6% respectively). Grade IV AKI requiring dialysis was only seen in the cisplatin group (5.8%). Rates of other complications (including respiratory, intra-abdominal collections, bleeding and wound infection) did not differ significantly between platinum agent and mitomycin C.
CONCLUSIONS: The overall complication rates associated with CRS-HIPEC do not differ between the use of mitomycin C and platinum based agents. However, acute kidney injury is a significant HIPEC morbidity associated with platinum agents and perioperative protocols should be put in place to reduce its incidence.

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DURATION OF SURGERY AND NEED FOR BLOOD TRANSFUSION PREDICT SICU ADMISSION POST-CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) are increasingly being used to treat peritoneal malignancies. SICU admission is commonly required after surgery and patients should be counselled for this pre-operatively.
METHODS: We aim to evaluate factors predicting requirement for post-operative SICU admission to aid in focussed patient counselling.
RESULTS: A total of 214 CRS-HIPEC were performed, 145 (67%) of which had post-operative SICU admission. Baseline clinical characteristics including patient comorbidities, BMI and stage of disease did not differ between the groups. Requirement for SICU admission was associated with higher median PCI score (14 *vs* 6, p<0.01), longer surgery (9.5 *vs* 5.8 hr, p<0.01), multiple CRS procedures (median 3 *vs* 2, p<0.01) and intra-operative blood loss (1900ml *vs* 680 ml, p<0.01) and transfusion requirement (3 *vs* 1 units, p<0.01). Interestingly a decreased frequency of SICU admission was observed in subsequent cohorts of 50 patients (86%, 76%, 68%, 56%, p<0.01). Duration of peritonectomy >7.5 hours and intraoperative blood transfusion of 2 or more units remained independently prognostic for SICU stay. Patients requiring SICU admission also experienced increased respiratory complications (18% *vs* 4.5%, p=0.032), intra-abdominal collection (13% *vs* 1.5%, p=0.025) and an overall increased serious (Clavien-Dindo III-V) complication rate (29 *vs* 9.1%, p<0.01). OS was higher in patients who did not require SICU admission (median 70 *versus* 47.8 months; p=0.035), but the RFS was conversely higher in this group of patients, although this was insignificant (median 23.2 *versus* 15.7 months; p=0.13).
CONCLUSIONS: The prognostic factors for SICU admission appear to be related to extent of disease and in turn, the extent of surgery. Duration of surgery >7.5 hours or the requirement for intraoperative blood transfusion of 2 or more units predicts need for post-operative SICU admission. There was no association seen with the pre-operative tumour features assessed in this study. Patients should be counselled for SICU stay if pre-operative imaging demonstrate extensive disease predicting a prolonged operation, as this is a much more reliable predictor than patient demographics. This counselling should include patients being at increased risk for associated serious complications.

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SHORT-TERM OUTCOME IN PATIENTS TREATED WITH CYTOREDUCTION AND HIPEC COMPARED TO CONVENTIONAL COLON CANCER SURGERY

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) is an extensive procedure with considerable morbidity. Since only few hospitals perform CRS & HIPEC, this might lead to confounded outcomes between hospitals when audited.
METHODS: The aim of the current study is to assess patient and tumor characteristics, operative details and postoperative outcomes of patients treated with CRS & HIPEC compared to patients undergoing conventional colon surgery in a tertiary referral hospital in the Netherlands. The secondary aim is to determine the impact of CRS & HIPEC on postoperative complications. These results may lead to better insight in how to report on postoperative outcomes in this distinct group of patients undergoing extensive colon surgery.
RESULTS: Consequently, 371 patients underwent surgery, of which 43 (12%) underwent CRS & HIPEC. These patients were younger and healthier than patients undergoing conventional surgery. Tumor characteristics were less favorable and surgery was more extensive in CRS & HIPEC patients. The morbidity rate was higher in CRS & HIPEC patients (70% *vs* 41%, p <.001). CRS & HIPEC was an independent predictor of postoperative complications (odds ratio 6.4), but was not associated with more severe postoperative complications or higher treatment-related mortality.
CONCLUSIONS: Although patients with colonic PM undergoing CRS & HIPEC were younger and healthier, the postoperative outcome was worse. This is most probably due to less favorable tumor characteristics and more extensive surgery. Nevertheless, CRS & HIPEC was not associated with severe complications or increased treatment-related mortality. These results stress the need for adequate case-mix correction in colorectal surgery audits.

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MAJOR INFLUENCE OF POSTOPERATIVE COMPLICATIONS ON COSTS OF CYTOREDUCTIVE SURGERY AND HIPEC IN PATIENTS WITH COLORECTAL PERITONEAL METASTASES

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BACKGROUND: The impact of postoperative complications after cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) on patient outcome remains substantial. Nowadays, health-care costs are a major topic in political debate, increasingly influencing clinical decision-making. Nevertheless, the financial consequences of postoperative complications after CRS & HIPEC has never been extensively described in a European health-care setting.
METHODS: This study aimed to assess the financial consequences of complications on hospital costs after CRS & HIPEC in patients with colorectal peritoneal metastases (PM).
RESULTS: 161 patients were included, of whom 42% experienced NC, 27% MC and 31% SC. Mean hospital costs were € 9.406±2.235 in NC patients, € 12.471±3.893 in MC patients, and € 29.409±22.340 in SC patients. The 31% of patients with severe complications accounted for 56% of all hospital costs after CRS & HIPEC. Hospital admission costs in SC patients were 320% higher compared to NC patients. Costs of complications were estimated to account for 43% of all admission costs.
CONCLUSIONS: Severe postoperative complications have major

influence on total costs of CRS & HIPEC and result in a more than threefold increase of hospital admission costs in affected patients. This finding stresses the need for adequate assessment on the risk of developing severe complications after CRS & HIPEC.

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DEVELOPMENT OF A PROGNOSTIC NOMOGRAM FOR PATIENTS WITH PERITONEALLY METASTASIZED COLORECTAL CANCER TREATED WITH CYTOREDUCTIVE SURGERY AND HIPEC

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BACKGROUND: With the introduction of cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC), long-term survival can be achieved in selected patients with colorectal peritoneal metastases (PM). Patient selection and outcome may be significantly improved with a tool that adequately predicts survival in these patients.
METHODS: The current study aims to externally validate the PSDSS. If performance of the PSDSS is suboptimal, a new prognostic pre-cytoreduction score for overall survival will be developed and internally validated. This may lead to a better prognostic tool in colorectal PM patients treated with CRS+HIPEC, which can be of value for both patient selection and follow-up purposes.
RESULTS: A total of 200 patients underwent CRS+HIPEC. External validation of the PSDSS showed a Harrell's c statistic of 0.62. After analysis, four parameters appeared prognostically relevant factors for overall survival: age, PCI-score, locoregional lymph node status, and signet ring cell histology. The weighted relevance of these parameters was turned into a prognostic nomogram that we termed COMPASS (Colorectal Peritoneal Metastases Prognostic Surgical Score). The COMPASS differentiated well and showed a Harrell's c statistic of 0.72 with a calibration plot showing good agreement.
CONCLUSIONS: This study externally validated the PSDSS and developed a new prognostic score, the COMPASS. This pre-cytoreduction nomogram was more accurate than PSDSS in predicting survival of patients undergoing CRS+HIPEC. It can be used as tool to assist in the decision about continuing cytoreduction and HIPEC and can provide valuable information in the follow-up period after CRS+HIPEC.

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THE EFFECT OF THE LEARNING CURVE ON SURVIVAL AND MORBIDITY OF COLORECTAL PATIENTS UNDERGOING CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY: AN ANALYSIS OF 214 PATIENTS

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BACKGROUND: Cytoreductive surgery (CRS) and Hyperthermic Intra-Peritoneal Chemotherapy (HIPEC) are increasingly being utilised in the management of colorectal peritoneal carcinomatosis (CPC). This combined modality is associated with a significant learning curve, and is often criticised for it's associated morbidity and mortality.
METHODS: •E valuate the impact of the learning curve on CRS & HIPEC. • Show how CRS-HIPEC for CPC has evolved over the years in our institution.
RESULTS: A retrospective review of the institution's prospectively-maintained database of CRS-HIPEC cases was performed. Patients treated for CPC were identified and divided into two groups: Group 1: patients who were treated in our initial 100 cases, and Group 2: patients treated in the subsequent 114 cases. Pre- and post-operative prognostic factors as well as overall- (OS) and disease-free survival (DFS) outcomes were analysed. Due to the longer follow-up time of patients in Group 1, the follow-up interval was truncated at 50 months. Between Feb 2003 to Feb 2016, 63 colorectal cancer patients underwent CRS-HIPEC, of which there were 31 patients (49.2%) in Group 1, and 32 patients (50.8%) in Group 2. Groups 1 and 2 had a median follow-up duration of 50 mths and 21 mths respectively. We found a significant difference in OS in group 1 compared to group 2 (35mths *vs* not reached, p=0.029). However, there was no significant difference in DFS between the groups (13 mths *vs* 14 mths, p=0.951). Fewer patients in Group 2 were found to have higher PCI (=12) intraoperatively compared to patients in Group 1 (57.1% *vs* 25.8%, p=0.023). Post-operatively, the Group 2 patients suffered fewer complications (67.7% *vs* 34.4%, p=0.008), especially high-grade (25.8% *vs* 9.4%, p=0.082) and respiratory complications (32.3% *vs* 3.1%, p=0.002), had a shorter hospitalisation (14 days *vs* 12 days, p=0.044) and SICU stay (1 day *vs* 0 days, p=0.012).
CONCLUSIONS: An improvement of OS and morbidity after CRS-HIPEC for CPC may be partly attributed to overcoming the learning curve, incorporating better patient selection and should continue to improve as peritoneal malignancy units gain more experience in the coming years.

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PATHOLOGICAL RESPONSE OF PREOPERATIVE CHEMOTHERAPY IS RELATED TO SURVIVAL IN CASE OF HIPEC FOR COLON CANCER PERITONEAL METASTASIS

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BACKGROUND: Preoperative systemic chemotherapy (pCT) is currently used before cytoreductive surgery and HIPEC for colon cancer peritoneal metastasis (ccpm). But the efficacy of this pCT is unproven. We know in case of colon cancer liver metastasis that i) complete tumor response is possible and that ii) tumor response is related to survival. Those informations are lacking in case of ccpm. Moreover, the pCT assessment, using CT or MRI, is not accurate enough for imaging a response using RECIST criteria.
METHODS: The aim of this study is to evaluate histological response after pCT in ccpm, using either histological classification (Blazer or tumor regression grade (TRG)) to evaluate interest of pCT, for selected cases. In a prospective data base for all HIPEC performed for ccpm, we selected patient having: colon adenocarcinoma primary-surgical biopsy of a ccpm without surgical resection (to be certain that ccpm is exposed to pCT)-pCT-HIPEC procedure and a follow-up. We compared both ccpm histology, before and after pCT for each patient. Evaluating pathologic response (PR) is defined as an objective measurement of tumor cell viability and fibrosis in nodules of peritoneal carcinomatosis. Blazer classification and TRG were used as described for liver colon metastasis.
RESULTS: 45 cases were selected but 23 meets inclusions criteria. Complete tumor response is reported for 17% of cases treated with FOLFOX. According to Blazer classification, complete, major and minor PR was 17.5%, 52% and 30.5% respectively. According to TRG, PR was considered major, partial and absent in 61%, 9% and 30% respectively. Fibrosis was only detected in the nodules after pCT. Whatever classification is used, the survival of patients with a complete or major response was significantly higher than patients with minor response (median overall survival: 54 months *versus* 21,5 months, p <0.05).
CONCLUSIONS: In conclusion, this study demonstrates that complete histological tumor regression of ccpm can be obtained after pCT, and is a prognostic factor. This pathological response to pCT corresponds to a decrease in the number of viable tumor cells and the formation of fibrous tissue within the nodules. Both Blazzer classification and TRG can be used in clinical practice to evaluate the histological response after chemotherapy. For that comparison with preoperative tumor is not always mandatory.

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EARLY RECURRENCE AFTER CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) are used in the management of selected peritoneal malignancies. While most patients achieve long-term disease free survival, there remains a group of patients with early recurrence.
METHODS: to investigate the clinical factors associated with early recurrence after CRS-HIPEC in an attempt to device a better treatment strategy for these patients.
RESULTS: 142 patients were included in the study, of which 32% were of colorectal, 36% were of ovarian and primary peritoneal, 20% were of appendiceal, 6% were of mesothelioma and 3% were of other origins. 43 patients (30%) suffered early recurrences. Univariate and multivariate analyses revealed that male (p=0.03), and colorectal patients (p=0.02) were more likely to suffer early recurrences, while appendiceal patients were less likely to suffer early recurrences (OR 0.20 (0.063-0.658) p=0.008). All other perioperative factors were not found to be significant. Subgroup analyses of the colorectal group showed that patients who received post CRS-HIPEC adjuvant chemotherapy were less likely to suffer early recurrences (OR 0.16 (0.030-0.832) p=0.03).
CONCLUSIONS: There remains a 30% risk of early recurrences after CRS-HIPEC. Better patient selection and the administration of adjuvant chemotherapy may help to reduce early recurrences

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REPEATED CYTOREDUCTIVE SURGERY WITH HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY IN PATIENTS WITH RECURRENT PERITONEAL CARCINOMATOSIS FROM COLORECTAL CANCER

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BACKGROUND: Although associated with significant morbidity, cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) has gained acceptance as the treatment of peritoneal carcinomatosis from colorectal cancer (PCCR). Conversely, its role for peritoneal recurrence after a first HIPEC is still undefined, as the current data consists of heterogeneous small-sized retrospective series. Our objective is to evaluate the role of repeat CRS and HIPEC after colorectal peritoneal carcinomatosis (PC) recurrence.
METHODS: We retrospectively analyzed the data from 41 consecutive patients undergoing two or more CRS and HIPEC procedures for PCCR performed in three specialized HIPEC centers. Focus was put on early morbidity, disease-free survival and overall survival.
RESULTS: The second CRS and HIPEC procedure implied a significantly higher number of intestinal resections and digestive sutures and was associated with a greater use of Mitomycin C compared to the first procedure. Severe post-operative morbidity (Clavien-Dindo III-IV) was similar after the first and the second procedures (34% *vs* 44% respectively, p=0.50). Postoperative stay (median 16 and 17 days) and reoperation rates (22% and 17%) were not significantly different. Mean disease-free survival was respectively 17 and 16.8 months and mean overall survival, 45 and 40 months.
CONCLUSIONS: Curative intent treatment of peritoneal disease recurrence by repeated CRS and HIPEC leads to a prolonged median five-year survival rate of 40% in selected patients, comparable to that obtained after the first procedure, with acceptable morbidity. Therefore, redo HIPEC procedures should be more systematically considered in selected patients.

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CYTOREDUCTIVE SURGERY PLUS HIPEC IN PERITONEAL CARCINOMATOSIS FROM COLORECTAL CANCER: RESULTS OF PATIENTS SELECTION POLICY

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BACKGROUND: Treatment of peritoneal carcinomatosis (PC) from colorectal cancer (CRC) by standard treatment hystorically bring to poor results. Treatment of PC by cytoreductive surgery (CRS) associated with hyperthermic intraperitoneal chemotherapy (HIPEC) has shown encouraging results.
METHODS: To analyze selection criteria policy, cure rate and patterns of recurrence of cytoreductive surgery (CRS) associated with hyperthermic intraperitoneal chemotherapy (HIPEC) for peritoneal carcinomatosis (PC) of colorectal origin. From a dataset of 408 CRS+HIPEC, we selected 79 consecutive patients treated for colorectal PC. General exclusion criteria were age>70, PS>2, or disease progression during chemotherapy. From 2004, we also excluded patients with both PCI>16 and poor prognostic factors of primary tumor if 2 or more of the following features were present: T4, N2 and G3. Lastly, after 2004, we only proceeded to HIPEC if a CC0-1 cytoreduction was obtained. Prognostic factors for survival and patterns of recurrence were investigated.
RESULTS: Global (79 patients) overall survival (OS) was 29 months, while disease-free survival was 11.7 months. The Overall Morbidity was: 36,7%, with a grade 3-4 (Dindo-Clavien classification) morbidity of: 15,2%. Analizing results before and after June 2004, we registered the following results: - Before 2004 (25 patients): OS of 16.4 months, DFS of 11.7 months, with a grade 3-4 morbidity of 21.1%. - After 2004 (51 patients): OS of 50.57 months, DFS of 12.2 months, with a grade 3-4 morbidity of 3,7%. We registered a treatment-related death before 2004 while no deaths were recorded after 2004. Completeness of cytoreduction, primary tumor histology and time period were independent prognostic factors at multivariate analysis. The selection criteria choosen after 2004 had a statistically significance both on better outcome results and complications rate reduction. The main sites of first relapse was peritoneum in 73% of cases and distant metastases (mainly to liver and lungs) in 37%.
CONCLUSIONS: By a selection policy based on patients features, disease extension and primary tumor factors, a median survival higher than 50 months was recorded. Honestly, we must underline that in spite of excellent results in terms of OS, the DFS (even by strict patient's selection) never changed significantly before and after 2004 (11.7 *versus* 12.2), meaning that in advanced PC from colonic cancer, CRS+HIPEC may not be considered curative. The impact of CRS+HIPEC is surely relevant, but second-look surgery associated to HIPEC (as purposed by authors like D. Elias) after standard treatment may represent a better policy in order to reduce morbidity and have a significant proportion of patients alive and free from disease after 5 years from the procedure.

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REPEAT CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR COLORECTAL CANCER PERITONEAL CARCINOMATOSIS

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BACKGROUND: Treatment failure after initial cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS/HIPEC) for peritoneal carcinomatosis of colorectal cancer (CRCPC) is common. There is, however, a paucity of data on survival or recurrence outcomes after secondary CRS/HIPEC for peritoneal recurrence.

METHODS: 1. Recurrence, and morbidity outcomes after iterative CRS/HIPEC for CRC PC to evaluate survival. 2. Prognostic factors for OS and RFS. 3. Feasibility of repeat CRS/HIPEC in recurrent PC from CRC.
RESULTS: Follow-up was complete in all patients. The median follow-up was 39 months (range, 11-116 months). Grade III/IV morbidity was 25.9% after repeat surgery and there was no in-hospital mortality (0%). The median OS after the initial CRS/HIPEC was 60.3 months with a 5-year survival of 62%. The median OS after repeat CRS/HIPEC was 27.1 months with a 5-year survival of 26%. The median RFS after repeat CRS/HIPEC was 8.6 months with a 2-year RFS of 25%. Only the length of time between initial and repeat CRS/HIPEC <24 months was a poor prognostic factor for OS on multivariate analysis (HR,8; 95% CI, 1.6-40; p=0.012). Only moderate-poor/poor tumour differentiation was prognostic for poorer RFS on multivariate analysis (HR; 4.0; 95% CI, 1.4-11.7 p=0.012).
CONCLUSIONS: Repeat CRS/HIPEC in selected patients with recurrent CRCPC is safe and may allow long-term survival. Strict patient selection criteria incorporating an assessment of tumour burden, dissemination and histopathology will improve outcomes.

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DEDICATED DIFFUSION WEIGHTED MR IMAGING IN PREDICTING PERITONEAL CANCER INDEX IN POTENTIAL CYTOREDUCTION SURGERY CANDIDATES

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BACKGROUND: Cytoreduction surgery (CRS) in peritoneal metastasized ovarian cancer and CRS with hyperthermic intraperitoneal chemotherapy (HIPEC) in colorectal cancer patients results in good overall 5 year survival of 51% and 45%, respectively. The peritoneal cancer index (PCI) is the most frequently used and widely validated quantitative prognostic indicator to assess the extent of peritoneal tumor implants. In patients with a high PCI the potential survival benefit of CRS-HIPEC does not outweigh its complication rate. To prevent unnecessary surgical procedures in these terminally ill patients, careful patient selection based on preoperative imaging is essential. Unfortunately, computed tomography (CT) is not accurate in predicting the PCI. However, new emerging MR techniques like Gadolinium enhanced Diffusion weighted (DW) MRI seem to be able to accurately detect small tumors (<5 mm) in the abdominal cavity.
METHODS: In this ongoing study we compare the accuracy of preoperatively estimated PCI by DW MRI and CT with surgical findings and assess whether DW MRI could be a suitable tool for optimal preoperative patient selection.
RESULTS: In this ongoing study eighteen consecutive patients (March-July 2016, M/F=6/12, mean age 62) were included with histologically proven peritoneal carcinomatosis from either colorectal (n=16) or ovarian (n=2) origin. The patients were scheduled for exploratory laparoscopy or CRS-HIPEC and underwent preoperative contrast enhanced CT and dedicated DW MRI scans of the abdomen. Total MR scan time was 30 minutes. All imaging examinations were prospectively reviewed by two independent radiologists. Tumor affected anatomic sites were documented and PCI was determined. Patients were categorized as low risk (PCI 0-19) *versus* high risk (PCI 20-39); in our center the cut off for operable *versus* non-operable patients. Results were compared with PCI found at surgery. Median PCI at surgery was 12,5 compared with 12,3 for MRI and 7,5 for CT. MRI categorized 17 out of 18 patients (accuracy 94%) correctly, *versus* 12 out of 18 (67%) correctly categorized with CT when compared to surgical findings. None of the patients was overstaged with MRI nor CT. The percentage of understaging was higher when staged with CT (33%) compared to MRI (6%).
CONCLUSIONS: These preliminary data suggest that DW MRI is superior to CT in predicting preoperative PCI and seems to be an accurate selection tool for potential CRS-HIPEC candidates.

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DIAGNOSTIC VALUE OF IMAGING FOR THE DETECTION OF PERITONEAL METASTASES: A META-ANALYSIS

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BACKGROUND: Adequate pre-operative imaging in patients with peritoneal carcinomatosis is important in cancer staging.
METHODS: To determine the diagnostic value of pre-operative imaging in detecting peritoneal carcinomatosis (PC) in staging cancer patients.
RESULTS: A literature search of Ovid, Embase and Pubmed was performed to identify studies reporting on the accuracy of imaging for the detection of PC for colorectal, gastric and gynaecological cancers. Data extraction was performed by two observers in consensus. The sensitivity, specificity, and diagnostic odds ratio (DOR) were calculated using a bivariate random effects model and hierarchical summary operating curves (HSROC) were generated. The search resulted in 4165 articles. 35 relevant studies fulfilled all the required inclusion criteria of >15 patients and surgery/histology/clinical follow-up as reference standard. From these articles 42 datasets could be extracted for analysis; 21 for CT, 5 for MRI, 5 for PET and 11 for CTPET. The pooled sensitivity, specificity, DOR for detection of PC were 73% (CI:60-83%); 90% (CI:84-94%); 25.6 (CI:13.3-49.1) for CT and for MRI 78% (CI:69-85%); 88% (CI:83-92%); 26.6 (CI: 14.7-48.4). For PET these values were 53% (CI: 32-75%); 98% (CI: 94-99%); 55.7 (CI:19.4-159.9) and CTPET: 87% (CI:74-94%); 87% (CI:69-95%); 46.0 (CI: 16.2-130.4).
CONCLUSIONS: This meta-analysis shows that CTPET is the most optimal imaging modality for the detection of PC. CT and MRI demonstrate similar results in detecting PC with a lower pooled sensitivity than CTPET.

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THE DIAGNOSTIC PERFORMANCE OF CT IMAGING IN DETECTING COLORECTAL PERITONEAL METASTASES

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BACKGROUND: Staging of tumor burden is essential in patients with colorectal peritoneal carcinomatosis (PC) who are eligible for cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC).
METHODS: This study aims to compare the extent of PC on CT with the intraoperative findings of PC and long-term survival.
RESULTS: Preoperatieve abdominal CT scans of patients who underwent CRS-HIPEC, performed between January 2005 and September 2015, were evaluated by two experienced radiologists. The extent of PC according to the Dutch region count was scored, in which the abdominal cavity is divided into seven regions. When five or less abdominal regions were affected CRS-HIPEC was considered useful and thus executed. Intraoperative region count was the reference standard. Diagnostic performance of CT was calculated and survival analyses were performed. Two hundred thirty-two patients were included. The accuracy for selecting patients with limited peritoneal disease with CT imaging was 87%, based on a region count of five or less. In 192 of the 232 (83%) patients the region count was underestimated on CT imaging. Sixty-four scans were evaluated by two radiologist and inter-observer variability for a continuous region count was calculated (k=0.139). Patients with 0-2 affected abdominal regions on CT imaging (median 43.1 months; IQR 25.0-112.9) showed significant better overall survival than patients with 3-5 affected regions (median 27.9 months; IQR 15.5-52.0) or 6-7 affected abdominal regions (median 9.3 months; IQR 6.0-18.7) (P <0.001).
CONCLUSIONS: The extent of peritoneal disease is underestimated on CT imaging. Survival rates significantly decreased when more abdominal regions on CT were affected.

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TIMING OF SYSTEMIC CHEMOTHERAPY IN PATIENTS WITH COLORECTAL PERITONEAL CARCINOMATOSIS TREATED WITH CYTOREDUCTIVE SURGERY AND HIPEC

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BACKGROUND: Timing of systemic chemotherapy in patients with colorectal peritoneal carcinomatosis (PC) treated with cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) is controversial. Neoadjuvant systemic chemotherapy may offer benefits, including selection of patients with early progressive disease and an increase of the rate of patients treated with multimodal therapy.
METHODS: The aim of this study was to evaluate the effect of neoadjuvant systemic chemotherapy on survival.
RESULTS: Data of patients undergoing CRS-HIPEC in a tertiary referral center from January 2004 until June 2015 were registered. The influence of patient-related, tumor-related and treatment-related factors on disease free survival (DFS) and overall survival (OS) were investigated using Cox regression models. Timing and number of cycles of systemic chemotherapy were included in the multivariate model. Main outcome was OS. Two hundred eighty consecutive patients underwent CRS-HIPEC. In group A 78 patients (28%) were treated with neoadjuvant or perioperative chemotherapy and CRS-HIPEC. In group B 169 patients (60%) were intentionally treated with CRS-HIPEC and adjuvant chemotherapy. In group C 33 patients (12%) had received their chemotherapy before PC was diagnosed. Median follow-up time was 29.8 months (IQR 17.4-52.5). Median disease free survival was 20.3 months (IQR 13.3-40.4) and did not significantly differ between the treatment groups (P=0.29). Median OS was 36.9 months (IQR 20.6-79.7) in group A, 43.1 months (IQR 25.7-95.9) in group B and 34.0 months (IQR 20.0-53.7) in group C (P=0.19). Extent of PC (region count of 3-5 (HR 1.58 (95% CI 1.02-2.45)) and 6-7 (HR 3.34 (95% CI 1.66-6.72)) *vs* 1-2 regions), a higher lymph node ratio (HR 7.96 (95% CI 2.16-29.31) and cycles of systemic chemotherapy (0 cycles (HR 2.52 (95% CI 1.48-4.29) and partial chemotherapy (HR 2.15 (95% CI 1.27-3.65) *vs* complete chemotherapy) were associated with poorer OS.
CONCLUSIONS: Timing of systemic chemotherapy does not appear to have impact on survival in patients with colorectal PC undergoing CRS-HIPEC.

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RADICAL SURGERY - HIPEC AND LIVER RESECTION FOR SYNCHRONOUS COLORECTAL CANCER PERITONEAL AND HEPATIC METASTASIS

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BACKGROUND: Metastasis from colorectal cancer occurs in 35-55% of cases with the liver being the most common site, followed by peritoneum. Synchronous peritoneal metastasis (PM) and liver metastasis (LM) was previously thought of as palliative and inoperable with median survival of less than 1 year. Recently, several reports have shown the feasibility and survival benefit of aggressive treatment of synchronous LM and PM with radical surgery and hyperthermic intraperitoneal chemotherapy (RS-HIPEC) for PM combined with curative resection or *in situ* ablation of limited LM. The aim of our study was to report our long-term results for treatment of PM with or without synchronous LM from colorectal cancer in a specialized centre.
METHODS: To perform a retrospective cohort analysis of a prospectively maintained database created at the Peritoneal Malignancy Service of Ninewells Hospital, Dundee, UK. All patients treated for colorectal cancer peritoneal metastases (CCPM) between August 2009 and June 2016 were included. Peritoneal metastasis of other origins were excluded. Intention-to-treat criteria was applied. Primary endpoints were short-term postoperative morbidity, 30-day mortality, disease free survival (DFS) and overall survival (OS) according to Kaplan-Meier.
RESULTS: Thirty-eight patients received RS-HIPEC for CCPM. Mean (±SD) age was 58.5yrs (±14.1). Seventeen patients were ASA I, 21 were ASA II. Mean (±SD) PCI was 11.1 (±9.1). Complete cytoreduction (CC-0) was achieved in 37 patients (97%), with 1 CC-1 due to significant small bowel peritoneal deposits treated with extensive vaporization. Liver surgery was performed at the same time as RS-HIPEC in 8 patients. An additional three patients underwent LM treatment first and proceeded to RS-HIPEC for PM with an average delay of 3±1.73 months. Eight patients had curative treatment for 1 liver lesion, one patient had 2 lesions, one had 3 lesions and one patient had >3 liver lesions. All patients had complete resection of their liver lesions. No patient received neo-adjuvant or adjuvant chemotherapy. Average (±SD) hospital stay was 29.2 days (±17.7). Clavien-Dindo Grade III and IV adverse events developed in 13 patients (34%). 30-day mortality was nil. Mean (±SD) follow-up was 22.6 months (±17). 61% (23/38) had a recurrence at an average of 11.2 months, (±9.3). DFS for patients with PM and LM was 65%, 30% and 0% at 12, 24 and 36 months. OS for patients with PM and LM was 80%, 46% and 0% at 12, 24 and 36 months. OS for patients with PCI >15 without LM was 78%, 10% and 0% at 12, 24 and 36 months. OS for patients with PCI <15 without LM was 100%, 52%, 52% and 28% at 12, 24, 36 and 60 months.
CONCLUSIONS: RS-HIPEC and liver resection/ablation for synchronous peritoneal and liver metastasis from a colorectal origin, is safe and feasible. When compared with results using systemic chemotherapy alone without the addition of radical surgery this multimodal strategy offers an improvement in survival in carefully selected patients.

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EXPERIENCE AND STANDARDIZED-CARE PATHWAY SIGNIFICANTLY IMPROVE THE QUALITY OF CYTOREDUCTIVE SURGERY FOR PERITONEAL CARCINOMATOSIS

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BACKGROUND: Morbidity and mortality remain high after CRS for PC. Several factors have been reported to be associated with morbidity and mortality, but few measures have been described to prevent post-operative complication rate and improve survival.
METHODS: To determine measures improving outcomes after CRS for PC.
RESULTS: Among 881 CRS for PC, 90-day morbidity and mortality were 51% and 2.7%, respectively. Over time, morbidity rate remained stable, but mortality significantly decreased, and dropped drastically after the implementation of the standardized clinical pathway. Overall survival was 37.98 months, 70.10 months and not reach, for three period 2004-2007, 2008-2011 and 2012-2015, respectively ($p<0.001$).
CONCLUSIONS: For patients with PC treated by CRS, the standardization of clinical practice and center's experience contribute to decrease postoperative mortality and improve overall survival.

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NINETY-DAY POSTOPERATIVE MORBIDITY AND MORTALITY USING THE NATIONAL CANCER INSTITUTE'S COMMON TERMINOLOGY CRITERIA FOR ADVERSE EVENTS BETTER DESCRIBE POST-OPERATIVE OUTCOME AFTER CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: The postoperative morbidity and mortality after CRS-HIPEC has been widely evaluate. However, there is a major discrepancy between rates reported due to different metrics and time of analysis used.
METHODS: To evaluate the legitimacy of 90-day morbidity and mortality based on NCI-CTCAE classification as quality criteria of cytoreductive surgery combined with hyperthermic intraperitoneal chemotherapy (CRS-HIPEC).
RESULTS: Among 881 patients, the 90-day major complication rate based on NCI CTCAE classification and Dindo's classification were 51% (n=447 patients) and 25% (n=222 patients), respectively. Among patients who presented with a 90-day complication after based on NCI CTCAE classification, 50% (n=225 patients) presented a medical complication not reported by Dindo's classification. After surgery, 24 patients (2.7%) died of postoperative complications, for only 10 (42%) of them the death occurred within 30-day after surgery. Occurrence of major complication based on either NCI CTCAE classification, or Dindo's classification, or medical complication not reported by Dindo's classification negatively impacts the overall survival.
CONCLUSIONS: Among commonly reported morbidity's classification, 90-day morbidity based on NCI-CTCAE classification represents a legitimate metric of CRS-HIPEC quality. Postoperative morbidity after CRS-HIPEC should be reported using 90-day NCI-NTCAE classification.

P269

THE ROLE OF NEO-ADJUVANT AND ADJUVANT SYSTEMIC CHEMOTHERAPY WITH CYTOREDUCTIVE SURGERY AND HEATED INTRAPERITONEAL CHEMOTHERAPY FOR COLORECTAL PERITONEAL METASTASES – A SYSTEMATIC REVIEW

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intra-peritoneal chemotherapy (HIPEC) is an effective treatment for Colorectal Peritoneal Metastases (CPM), increasing overall survival in selected patients. The aim of this systematic review was to assess the effect of neo-adjuvant and adjuvant systemic chemotherapy on overall survival in patients with CPM undergoing CRS and HIPEC, compared to those who receive CRS and HIPEC alone.
METHODS: A systematic literature review was performed by searching PubMed. The PRISMA guidelines informed the structure of the review. Data was collected and tabulated regarding publication details, study design, treatments received, follow up periods, overall survival, safety data and study quality was assessed using the MINORS score for non-randomised studies.
RESULTS: Of 288 studies, 16 met the inclusion criteria. Seven publications related to the role of neo-adjuvant chemotherapy. There was no strong evidence for the efficacy of neoadjuvant chemo therapy. Of note, one study observed worse survival outcomes when neo-adjuvant therapy was used. Fourteen studies investigated the role of adjuvant chemotherapy. There is limited evidence that adjuvant systemic chemotherapy improves survival following CRS and HIPEC.
CONCLUSIONS: Systemic adjuvant chemotherapy may be associated with improved overall survival. The role of systemic neo-adjuvant chemotherapy cannot be determined by the currently available evidence. The delivery of a combination of the two modes of systemic chemotherapy has not been investigated in a randomised control trial to date. Further research designed to investigate the role of these modalities in the patient's treatment is required.

P270

THE INCIDENCE OF METACHRONOUS COLORECTAL PERITONEAL METASTASIS AS THE SOLE LOCATION OF DISEASE AFTER CURATIVE RESECTION FOR T3 AND T4 COLORECTAL ADENOCARCINOMA

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BACKGROUND: Two thirds of UK patients with colorectal cancer undergo surgical resection. Metachronous Colorectal Peritoneal Metastases (CPM) occurs in 4-19% of patients, with a median onset of 18 months. Its true incidence may be higher than this due to difficulties in radiological detection. In approximately half of patients with metachronous CPM, the peritoneal cavity represents the sole location of metastatic disease. Locally advanced colorectal malignancies are thought to have an increased risk of developing CPM and therefore some advocate prophylactic HIPEC immediately after primary resection to reduce the risk of metachronous CPM. The aim of this study was to determine the incidence of metachronous CPM as the sole location of metastatic disease in T3 and T4 colorectal primary malignancies.
METHODS: A retrospective cohort study was undertaken in a single NHS trust, across two hospital sites. Patients undergoing surgical resection with curative intent for primary colorectal cancer from 1st April 2013 to 31st March 2015 were included. Exclusion criteria were: T1 or T2 disease on pathology report, palliative procedures and evidence of synchronous metastasis at time of surgery. Data on patient demographics, surgery, adjuvant and neoadjuvant therapies and follow up were collected. The primary endpoint was diagnosis of peritoneal metastasis.
RESULTS: Six hundred and twenty two patients underwent colorectal cancer surgery during the study period. Three hundred and sixty three patients met the inclusion criteria. There were 164 females (45%) and 199 males (55%). The median age was 71 years (range 29-92 years). The median ASA was 2. The colon was the primary tumour location in 75% (272/363) with rectal cancers constituting the remaining 25% (91/363). Approximately two thirds of patients had T3 tumours at pathological examination (246/363). One third of patients had a T4 tumour (T4a: 84/363, 23.%; T4b: 33/363, 9.%). Adjuvant chemotherapy was given to 36% of patients (130/363). Seven patients were lost to

follow up post-operatively. There were 43 deaths in the follow up period, 7 of which occurred in the 90 days post-resection, giving a 90-day mortality of 2%. The median follow up period was 18 months. 21/363 patients developed metachronous peritoneal metastases (5.8%). Eleven of these patients had no evidence of distant metastases (3.%). 8/84 of T4a tumours developed metachronous sole CPM (9.5%) compared with 1/246 (0.40%) for T3 and 2/33 for T4b (6.1%). On univariate Chi-Square analysis this was significant ($p<0.05$).
CONCLUSIONS: This study suggests that T4 tumours have a significantly higher risk of developing metachronous CPM than T3 tumours, with approximately 10% T4a tumours developing CPM. The real risk of developing CPM from T4 is likely to be higher with longer follow-up, better techniques of detection of peritoneal disease and the inclusion of synchronous CPM. It is likely that a large proportion of patients with T4 colorectal tumours could benefit from the early detection and treatment of CPM.

P271

DIAGNOSTIC LAPAROSCOPY, A SAFE AND USEFUL TOOL IN THE PREOPERATIVE SCREENING OF PATIENTS CONSIDERED FOR CYTOREDUCTIVE SURGERY+HIPEC

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BACKGROUND: No standard pre-operative workup exists in patients with peritoneal carcinomatosis (PC). Previous literature describes underdiagnosing PC on imaging up to 10%. An usefool tool might be diagnostic laparoscopy (DL) and could help managing patients expectations. This study reviews the value of a DL in patients considered eligible for cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS+HIPEC).
METHODS: This single-center, retrospective cohort study examines all patients who underwent laparotomy for peritoneal carcinomatosis of colorectal disease in the period of January from 2005 until June 2016. Data of tumor characteristics, peroperative and postoperative reports were collected.
RESULTS: A total of 452 patients undergoing explorative laparotomy were included. Fifty-four patients underwent DL in the preoperative screening for CRS and HIPEC. In one patient the DL was unsuccessful because the inability to create a pneumoperitoneum due to dense adhesions. All remaining 53 procedures were performed in daycare surgery. Complications were recorded in one patient (2%). A serosal tear at the trocar site was sutured directly without further sequelae.
Ninety out of 452 patients (20%) were excluded for CRS and HIPEC at laparotomy because of extensive tumor dissemination: 3 out of 56 patients (5%) undergoing a preoperative DL and 87 out of 305 (22%) patients undergoing primary exploratory laparotomy (p-value <0,001).
CONCLUSIONS: Diagnostic laparoscopy is a safe and useful tool in the preoperative screening of patients considered for cytoreductive surgery and HIPEC. DL may prevent unnecessary exploratory laparotomies and it may contribute to better preoperative patient counselling and management of patients expectations.

P272

PERITONEAL CANCER INDEX AS A PREDICTOR OF RECURRENCE AFTER CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: The extent of peritoneal disease as scored by Sugarbaker's Peritoneal Cancer Index (PCI) represents a reliable and reproducible method of assessing patients with peritoneal carcinomatosis from various primaries. In addition, PCI serves as an important prognostic factor for survival after cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC), though few studies have evaluated its relationship with the risk of recurrence. Furthermore, attempts made at setting PCI cutoff values above which CRS and HIPEC may not be beneficial in light of high rates of recurrence, have failed to take into account natural biologies of the various primary tumors.
METHODS: Our study aims to examine the relationship between PCI and recurrence in patients after complete CRS and HIPEC, and determine how its utility may differ amongst patients with various primaries.
RESULTS: A total of 204 patients underwent CRS and HIPEC during the study duration. There were 60 (28%) patients with colorectal primaries, 45 (22%) appendiceal, 65 (32%) ovarian, 25 (18%) others. Overall median PCI score was 12 (range 0 to 39); it ws 9 in colorectal tumors, 8 in ovarian and 18 in appendiceal tumors. Optimal cytoreduction was achieved in 99% of patients. 1, 3 and 5- year disease-free survivals (DFS) were 70.3%, 31.6%, 24.7% respectively. A high PCI was found to be significantly associated with recurrence of disease ($p=0.04$) regardless of the primary tumour involved. PCI cutoff values above which CRS and HIPEC did not result in survival benefit was 8, 12 and 16 for ovarian, colorectal and appendiceal primaries respectively
CONCLUSIONS: PCI is useful a useful tool for predicting recurrence after optimal CRS and HIPEC. Different PCI cutoff values should be adopted to predict the benefit of surgery based on the type of primary tumor involved.

P273

SURGICAL MANAGEMENT OF METASTATIC COLORECTAL CANCER: SURVIVAL OUTCOMES OF PULMONARY RESECTION *VS* CYTOREDUCTIVE SURGERY AND HIPEC

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BACKGROUND: Metastaectomy is accepted as standard of care for selected patients with colorectal pulmonary metastases (CLM), however the role of cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) for colorectal peritoneal metastases (CPM) is not universally accepted.
METHODS: We aim to compare overall survival (OS) and disease-free survival (DFS) of patients with CLM and CPM after pulmonary resection and CRS-HIPEC respectively. A retrospective review of 49 CLM patients who underwent pulmonary resection and 52 CPM patients who underwent CRS-HIPEC in a single institution from January 2003 to March 2015 was performed.
RESULTS: The 5-year OS for CLM patients and CPM patients were 59.6% and 40.5% respectively ($p=0.100$), while the 5-year DFS were 24.0% and 14.2% respectively ($p=0.173$). CPM patients had longer median operative time (8.38 *vs* 1.75 hrs, $p<0.001$), median hospital stay (13 *vs* 5 days, $p<0.001$), a higher rate of intensive care unit (ICU) admissions (67.3% *vs* 8.2%, $p<0.001$) and a higher rate of high-grade complications (17.3% *vs* 4.1%, $p<0.001$). Multivariate analysis demonstrated that recurrent lung metastasis after metastatectomy was an independent prognostic factor for OS of CLM patients (OR=0.045, 95% CL 0.003-0.622, $p=0.021$). There were no independent prognostic factors for OS in CPM patients by multivariate analysis. There were no independent prognostic factors for DFS in CLM patients by multivariate analysis, but peritoneal cancer index score, bladder involvement and higher nodal stage at presentation of the initial malignancy were independent prognostic factors for DFS in CPM patients.
CONCLUSIONS: OS and DFS for CPM patients after CRS and HIPEC are comparable to CLM patients after lung resection, although

morbidity appears higher. The prognostic factors affecting survival after surgery are different between CPM and CLM patients and must be considered when selecting patients for metastatectomy.

P274

FEASIBILITY AND SAFETY OF NEOADJUVANT INTRAVENOUS AND INTRAPERITONEAL CHEMOTHERAPY FOR COLORECTAL PERITONEAL METASTASIS

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BACKGROUND: Intraperitoneal administration of Paclitaxel (PTX) is known to enhance antitumour activity against peritoneal metastasis by maintaining a high drug concentration in the peritoneal cavity over a long period in various types of cancer. Neoadjuvant intraperitoneal and systemic chemotherapy (NIPS) may be useful to facilitate cytoreductive surgery (CRS) combined with hyperthermic intraperitoneal chemotherapy (HIPEC) for colorectal peritoneal metastasis (CPM).
METHODS: The aim of this study was to evaluate the feasibility and safety of NIPS for CPM. Between 2013 and 2016, 24 patients with colorectal or appendiceal peritoneal metastasis were enrolled in this prospective single-centre study. Patients with pseudomyxoma peritoneai were excluded from this study. Diagnostic laparoscopy was performed in all patients to a) confirm the pathology, b) establish the Peritoneal Cancer Index (PCI) score, c) predict the likelihood of complete cytoreduction and d) place an intraperitoneal port. NIPS was given according to the predetermined regimen for three to six months and a further laparoscopy was performed. The primary endpoint was feasibility. The secondary endpoints included rate of response in PCI score, rate of complete cytoreduction and overall survival.
RESULTS: There were 8 appendiceal and 16 colonic primaries. Completion rate of NIPS was 92%. Severe adverse events (CTCAE v.4.0 Grade3/4) were noted in 9 (38%). Following NIPS, the median PCI score dropped from 14 (range, 3-26) to 10 (range, 1-26). The response rate in PCI score was 42% with 10 PR, 8 SD and 5 PD. CRS+HIPEC was achieved in 21 patients (88%). The 1-year overall survival rate was 76%.
CONCLUSIONS: NIPS might be a promising treatment modality in the management of CPM.

AO101

CYTOREDUCTIVE SURGERY AND HIPEC IN PATIENTS WITH COLORECTAL CANCER: MITOMYCIN OR OXALIPLATIN?

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BACKGROUND: In patients with peritoneal metastases of colorectal cancer, cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS+HIPEC) is regarded as standard therapy. Currently, literature is conflicting whether mitomycin or oxaliplatin should be used as selected chemotherapeutic drug.
METHODS: This study aims to investigate whether, on safety aspects, mitomycin or oxaliplatin is preferable. A single center retrospective cohort study was performed in patients undergoing HIPEC for peritoneal metastases of colorectal cancer. In the year 2015 our center switched from the usage of mitomycin to oxaliplatin, which gives the unique opportunity to compare these groups. Patients in the first cohort 2004-2014 (mitomycin) were comparted to patients in the later cohort 2015-2016 (oxaliplatin).
RESULTS: A total 176 patients were eligible for analysis, 148 patients underwent CRS+HIPEC with mitomycin and 28 with oxaliplatin (84 *vs* 16%, respectively). Apart from the extent of peritoneal spread the baseline characteristics were not different between both patient groups. The extent of peritoneal spread was significantly lower in patients undergoing HIPEC with oxaliplatin (simplified peritoneal cancer index, median 4 *vs* 3, P=0.02). The operation duration was significantly lower in patients undergoing HIPEC with oxaliplatin (median 420 *vs* 275 minutes, P <0.001). Severe complications (clavien-dindo=3) occurred in 58 patients (33%). The rate of severe complications was not significantly different between the patients undergoing mitomycin or oxaliplatin HIPEC (32 *vs* 36%, respectively, P=0.74). The duration of hospital admission was comparable between both groups (median 11 *vs* 9 days, P=0.45).
CONCLUSIONS: In this single center analysis, oxaliplatin HIPEC appears to results in comparable rates of postoperative complications and duration of hospital stay with mitomycin. However, the operation duration appears to be significantly shorter compared to mitomycin. The results of this study support the use of oxaliplatin usage in HIPEC for patients with colorectal cancer and peritoneal metastases. Comparison of long-term results is warranted to give a definitive answer whether oxaliplatin or mitomycin is the preferential chemotherapeutic drug in HIPEC for colorectal peritoneal metastases.

AO102

BENEFITS OF LAPAROSCOPIC DIAGNOSIS BEFORE CRS AND HIPEC

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BACKGROUND: Preoperative evaluation of intraperitoneal carcinomatosis was difficult and image scan was still the main method for it. Laparoscopic diagnosis before cytoreduction surgery was still controversal.
METHODS: Between May 2016 and July 2016, patients with colorectal cancer and peritoneal metastais were included. Exclusion criteris was PCI >19 and ECOG >=2. All cases recepted laparoscopic diagnosis before cytoreduction and recored the amount of gas pneumoperitoneum and accound the real PCI form the laparoscopic vision.
RESULTS: During this period, 11 patients were included in our study and found real PCI score was 4.2 points more than clinical PCI in average. Gas amount from infusor for pneumoperitoneum can assist the decision of fluid amount for HIPEC.
CONCLUSIONS: LAparoscopic diagnosis before CRS and HIPEC can facilitate the following procedure and evaluating the benefit og HIPEC.

AO103

"SECOND LOOK SURGERY: AN INDISPENSABLE WEAPON FOR THE TREATMENT OF COLORECTAL CANCER"

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BACKGROUND: The loco-regional recurrence of colorectal cancer and the perception that this is likely to be prevented or treated at an early stage in patients at high risk is an issue that concerns surgeons for many years. Waagensten was one of the pioneers in performing second-look laparotomy for asymptomatic patients (1962) followed by Gunderson in the 80s. Despite the meso-rectal and meso-colic complete excision, resection with safety margins and extensive lymphadenectomy, recurrence as peritoneal carcinomatosis, was a pending issue to resolve. The identification of patients at risk of developing peritoneal carcinomatosis from the work of Ch. Honore *et al.*, allowed to classify as high-risk patients to patients with peritoneal nodules present at the first surgery (70% probability of developing peritoneal carcinomatosis) ovarian metastases (60%), perforated tumors or tumor intraoperative perforation (50%). Positive cytology (at the beginning or end of the surgical resection), the imprint on positive tumor, T3 T4 tumors and mucinous have a 30-40% risk. In fact, metachronous peritoneal carcinomatosis of colorectal origin is so predictable that Dr.

Segelman developed an individualized prediction model, available online to estimate the risk of each patient. All this led logically to raise second-look surgery for patients at risk of developing peritoneal carcinomatosis as a way to anticipate to clinical or radiological relapse and to treat carcinomatosis in its early stages, the results of second-look plus HIPEC in the series of D. Elias show an overall survival at 5 years of 90% and disease-free survival at 5 years of 44-50% and the review from P. H. Sugarbaker allowed to define appropiate candidates and establish a treatment algorithm used worldwide. The aim of this study is to show the initial results of a newborn program of Second-Look in colorectal cancer.

METHODS: In May 2015 in our hospital it was approved the protocol to offer Second-look surgery to patients at high risk of developing carcinomatosis of colorectal origin. Candidates patients are perforated tumors, evidence of low PCI peritoneal carcinomatosis or ovarian metastases, positive cytology, elevated tumor markers without radiological correlation and pT4. The aim of this study is to show the initial results of a newborn program of Second-Look in colorectal cancer.

RESULTS: Since May 2015 to July 2016 nine patients have been treated according to our second-look protocol. All patients had completed adjuvant therapy after radical surgery of the primary tumor and had negative extension study. In five of the nine patients peritoneal disease was found (55.5%), with an average PCI of 3 and in all cases citoreductive surgery (CCR-0) was completed and HIPEC was administered intraperitoneal with oxaliplatin (460 mg/m2) and intravenous 5-FU. Three patients had complications solved with medical management: one mild hemoperitoneum, one rectus muscle hematoma, 18% of the patients present mild thrombocytopenia. Postoperative reoperation and mortality was 0%.

CONCLUSIONS: Identifying patients who are at risk of peritoneal carcinomatosis in colo rectal cancer requires with evidence available today, to offer a second look surgery or prophylactic HIPEC with surgery of the primary tumor. We can not hide our patients what their risk of developing peritoneal carcinomatosis is and the possibilities of treatment or prevention currently available.

AO104

PRIMARY SQUAMOUS CELL CARCINOMA OF TRANSVERSE COLON (REPORT OF A CASE)

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BACKGROUND: It is very rare that squamous cell carcinoma (SCC) arises from from colorectal epithelium. A34 years old male pt Filipino man was treated with with chief complaints of anorexia, abdominal pain, and vomiting. The histological examination diagnose a primary SCC of the colon by a biopsy taken during a colonoscopy. We diagnose a primary SCC after exclusion of any malignant lesion by systemic computed tomography. Surgical complete excision was performed. The prognosis of this disease seems to be worse than that of adenocarcinoma.

METHODS: A34 years old male pt underwent a surgical operation for transverse colon cancer in 2014. Histopathological features was moderately differentiated SCC. He was presented to Saudi-German hospital Jeddah, Abdominal examination revealed a mass in the upper abdomen. A colonoscopy revealed stenosis and ulceration and a biopsy was taken. CT abdomen revealed thickness and stenosis of transverse colon and LN enlargement.

RESULTS: In 1919 the first case of pure SCC of colon and rectum. Certain criteria should be satisfied before a diagnosis of primary SCC of colonis made frost metastasis from other sites must be ruled out, second a squamous lined fistula s must be ruled out,third SCC of anal canal with proximal extension, fourth SCC should be confirmed by histopathological examination.

CONCLUSIONS: Advanced colorectal SCC with invasion to adjacent organs and metastatic LN had a poor prognosis.

AO109

THE FACTORS EFFECTING THE MORBIDITY AND MORTALITY IN PATIENTS HAVING CRC+HIPEC: ANALYSIS OF A SINGLE CENTER 5-YEAR FOLLOW-UP RESULTS

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BACKGROUND: Peritoneal carcinomatosis (PC), developped as a result of different types of tumors, has been widely accepted as a noncurable condition till the last decades. But, with the introduction of cytoreductive surgery (CRS) and hipertermic intraperitoneal chemotherapy(HIPEC), the treatment of PC have been changed and hopefull results were obtained from different centers. Besides the encauraging results of CRS and HIPEC, increased morbidity and mortality due to long-standing surgery and side effects of chemotherapy are inevitable. In this study, we aimed to analyse the results of patients who got CRS+HIPEC therapy in our tertiary center and we aimed to evaluate the risk factors associated with increased morbidity and mortality rates.

METHODS: Retrospective data of 33 patients who had the CRS+HIPEC therapy (due to PC) between 2011 and 2015 were analysed. PCI was used to score the PC. The distrubition of the causes of PC was as follows: ovarian gynecological malignancy (n=12, % 36,4), colorectal cancer (n=10, % 30.3), gastric cancer (n=4, % 12,1), malign mesotelioma (n=4, % 12,1), and appendiceal neoplasms (n=3, % 9,1). Cisplatin was the main(in 14 patients) chemotherapeutic agent and it was used at a degree of 42C0 for at least 60 minutes. Factors effecting the morbidity and mortality were evaluated with cox regression analysis.

RESULTS: 19 of 33 patients were female and the mean age, BMI and ASA scores of the patients were 56.5±25.8 year-old, 25.8±1.8 and ASA II, retrospectively. While the radiologic PCI (with the CT of abdomen) score was 6 (1-18), intraoperative findings revealed a mean PCI score of 9(2-25). The mean operation time was 8.8±2.2 hours. The scores of completeness of surgery (CS) was calculated as zero in 36,4 percent and as 1 in 42,42 percent of the patients. The overall postoperative complication rate was 54%, and the mortality rate was 42,4%. The mean survival was 40.12 months and 87 percent of the patiens survived at least one year after treatment, but four-year survival was calculated as 41%. While patients' characteristics were not found statistically significant for predicting the complication rates, the presence of anostomosis (p=0,013), the increased PCI score (p=0,015), postoperative complications (p=0,013) and the high scores of (3) completeness of surgery (p=0,044) were found predictive factors for developping complications.

CONCLUSIONS: The detailed evaluation of patients who will benefit from CRS+ HIPEC has a critical role, and in addition, completeness of surgery is one of the most important factor for decreasing the morbidity and mortality rates. But further trials with high volume are mandatory to support our results.

AO115

OVERALL AND DISEASE-FREE SURVIVAL IN PATIENTS TREATED WITH CRS PLUS HIPEC FOR PERITONEAL CARCINOMATOSIS FROM COLORECTAL AND APPENDICEAL CANCER: AN UPDATE OF OUR EXPERIENCE

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BACKGROUND: We reviewed our experience regarding cytoreductive surgery (CRS) and hyperthermic chemotherapy (HIPEC) in patients with peritoneal carcinomatosis from colorectal cancer (CRC) and appendiceal cancer (AC) in terms of overall and disease-free survival (OS and DFS).

METHODS: A retrospective statistical analysis of collected data was conducted: data regarding patients who underwent to CRS and HIPEC

from February 2011 to August 2016 were analyzed. Patients and tumor characteristics, pre and post-operative data were collected. The outcomes were overall survival and disease-free survival in the two groups.
RESULTS: A total of 25 cases were reported. Mean follow up was 24 months (SD±28). Twenty patients (80%) had CRC and five (20%) had AC. In CRC group seven patients (35%) had synchronous carcinomatosis (SC) and thirteen patients (65%) had metachronous carcinomatosis (MC). Mean total PCI was 11,5 (SD±10,8). Mean PCI was 8,7 (SD±8,2) for CRC group and 17,1 (SD±13,9) for AC (p=0,007). HIPEC regimen was cisplatin plus mitomycin-C for nineteen patients (76%), mitomycin-C alone for five (20%) and cisplatin alone for one patients (4%). Median OS was 55 months and 82 months respectively in patients with CRC and AC (p=0.61). Median DFS was 20 months and 30 months respectively in the two groups (p=0.69). Patients with SC have an improved DFS compared patients with MC (mean DFS: 48 *vs* 19 months in SC group) (p=0.027). Seven patients (35%) had postoperative major complications (CTCAE=2) in CRC group and three patients (60%) in AC group.
CONCLUSIONS: Comparing with conventional chemotherapic regimens CRS and HIPEC for carcinomatosis from CRC and AC may obtain a better disease control particularly in AC and in CRC with SC. The combined treatment can have a potential curative intent.

AO117

SURVIVAL PROGNOSTIC FACTORS IN PATIENTS WITH COLORECTAL PERITONEAL CARCINOMATOSIS TREATED WITH CYTOREDUCTIVE SURGERY AND INTRAOPERATIVE HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY: A SINLGE INSTITUTION EXPERIENCE

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BACKGROUND: The aim of this research was to examine overall (OS) and disease free survival (DFS) in patients with colorectal peritoneal carcinomatosis (CRC-PC), treated with cytoreductive surgery (CRS) and intraoperative hyperthermic intraperitoneal chemotherapy (HIPEC), as well as to analyze factors of prognostic significance.
METHODS: We included 61 patients with pathological/CT confirmation of CRC-PC, treated with CRS+HIPEC from 2005 to 2012. Peritoneal Cancer Index (PCI) score was used for quantitative assessment of the CRC-PC extent. We performed CRS following Sugarbaker's principles in all patients with PCI=20 and only 3/61 (4.92%) patients with PCI>20. HIPEC (41°C Oxaliplatin in 2000mL isotonic solution) was performed using perfusion system during 30-60minutes. Cox proportional hazard regression was used to determine significant factors for OS and DFS.
RESULTS: Follow-up period was 1-83 months. Median OS was 51 (>22) months. Median DFS for patients without residual disease (57/61, 93.44%) was 23 (>16) months. One-, two- and six-years OS (DFS) were 78.6% (68.3%), 58.7% (46.7%) and 50.5% (38.1%), respectively. By the end of the research, 55.74% of patients are still alive. Cox multivariate analysis indicated PCI-score as parameter of prognostic significance for patients treated with CRS+HIPEC. Patients with PCI<13 (*vs* PCI=13) have longer OS and DFS, also confirmed for PCI-subcategories (PCI<7 *vs* 7=PCI<13 *vs* PCI=13). All patients with PCI<7 are still alive.
CONCLUSIONS: Our research indicates that CRS+HIPEC significantly improves the survival of CRC-PC patients. This treatment modality should be considered as the most suitable in well-selected patients with this disease.

AO120

MANAGEMENT OF ABDOMINAL WALL IN PATIENTS WITH ONCOLOGICAL PATHOLOGY

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BACKGROUND: The abdominal wall is often compromised by some kind of either primary or secondary neoplastic disease, the reconstruction of this is complex and it is essential to preserve the physiology and the mechanical function of the abdominal wall.
METHODS: See the experience in the management of abdominal wall in patients with oncological pathology in a hospital of bogota, colombia.
RESULTS: Show the experience in the management of abdominal wall in patients with oncological pathology in a hospital of Bogota, Colombia.
CONCLUSIONS: Standardize techniques used in the management of complex abdominal wall in patients oncological pathology of the abdominal wall.

AO122

CYTOREDUCTIVE SURGERY WITH HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY AND PERITONEAL CARCINOMATOSIS INDEX FROM COLORECTAL CANCER PEARLS AND PITFALLS IN ESTIMATING PCI ON THE BASIS OF PREOPERATIVE RADIOLOGICAL IMAGING

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BACKGROUND: CRS with HIPEC has been recognized as an effective treatment in selected patients with peritoneal carcinomatosis (PC) from primary or recurrent CRC. CRS with HIPEC, however, has a relatively high morbidity (30-40%) and mortality (2-3%), which are comparable to major surgical procedures. The key to success in CRS with HIPEC deeply depends on an appropriate patient selection. Quantitative prognostic indicators, such as PCI score on the basis of preoperative radiological imaging, play a critically important roll to select patients, who will benefit from CRS and HIPEC.
Besides knowledge of PCI scoring system, the basic but extensive knowledge about tumor spreading patterns from various primary tumors other than CRC as well as the knowledge about various tumor mimicking lesions help to improve diagnostic accuracy.
METHODS: In this presentation, the basic concept about CRS with HIPEC and PCI score, as well as pearls and pitfalls in the evaluation of peritoneal lesions will be illustrated. Furthermore, limitations of current diagnostic imaging and future prospects will be discussed.
(A part of this poster presentation was presented at the annual meeting of Radiological Society of North America, RSNA 2015, Chicago, IL)
RESULTS: N/A.
CONCLUSIONS: Evaluation of PC is difficult and requires great experience and knowledge from the radiologist. A multidisciplinary approach with engaged radiologist, surgeon and medical oncologist is necessary for appropriate selection of patients.

AO127

RETROPERITONEAL LOW-GRADE MUCINOUS NEOPLASM ARISING FROM A RETROPERITONEAL COLONIC DUPLICATION CYST

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BACKGROUND: Duplications of the digestive tract are uncommon congenital lesions. More than 80% of the cases are recognized before

the age of two and they are rarely observed in adults. These can occur in any portion of the gastrointestinal tract, but the retroperitoneum is a very unusual location. Malignant change is an unusual complication of alimentary tract duplications and the precise incidence is unknown. We describe a rare case of a retroperitoneal mucinous neoplasia originated from a colonic duplication cyst. A 26 year-old woman with history of polycystic ovarian syndrome complained of occasional cramps. Follow up ultrasound revealed a retroperitoneal mass. CT and MRI showed a cystic mass adjacent to sacral region and unrelated to adnexa. She underwent diagnostic laparoscopic where a retroperitoneal cystic-solid tumor without communication to the alimentary tract was found and completely resected.

METHODS: The specimen consisted of a cystic mass measuring 7 cm in greatest dimension. The surface was lobulated and focally had a small rupture of the surface that leaked thick mucin. Sectioning revealed a unilocular cyst filled with mucin. The wall was firm and calcified. Light microscopy showed a colonic type lining and a wall that resemble the gastrointestinal tract with a concentric layer of smooth muscle (muscularis propria) however the submucosa displayed glands. The colonic mucosa showed only a focal area of bizarre architecture and hyperplastic changes somewhat reminiscent of a serrated polyp. The majority of the mucosa was denuded. The lesion was submitted entirely and the rest of the wall was hyalinized with intramural dystrophic calcification, ossification and mucin extravasation. These findings were consistent with the diagnosis of low-grade mucinous neoplasm originated from retroperitoneal colonic duplication cyst. Subsequently, an appendectomy and peritoneal biopsies were performed the findings ruled out neoplasia in these locations.

RESULTS: Malignant change in duplication cyst is an extremely rare complication. According to prior reports, these neoplasms usually arise in duplications of the large intestine and the most common histologic type is adenocarcinoma. Regarding mucinous neoplasm arising from enteric duplication cysts, only 6 cases have been reported: 4 of these cases showed malignancies from duplications of the small intestine, one from the appendix and one from the colon. We describe the first case of low-grade mucinous tumor in a retroperitoneal duplication of the colon.

CONCLUSIONS: Malignant transformation from enteric duplication cyst is extremely rare. We reported the first case of low-grade mucinous neoplasm originated in a colonic duplication cyst located at the retroperitoneum. It is recommended to perform complete surgical removal and histological examination in order to exclude the presence of malignant component and avoid complications.

Peritoneal Mesothelioma

P301

SEVERE AND PERSISTENT ASCITES DUE TO A COMBINATION OF PERITONEAL MESOTHELIOMA AND ENDOMETRIOSIS MANAGED BY LONG TERM TREATMENT WITH GNRHA

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BACKGROUND: WD Mesothelioma of the peritoneum is a rare subtype of peritoneal epithelioid mesothelioma which typically has low malignant potential. A combination with endometriosis is even rarer and present both a management challenge and opportunity.

METHODS: We present a very rare case of prolonged follow up and treatment of a young patient treated for severe and prolonged ascites due to this combination.

RESULTS: A 30y old Caucasian lady G2P2LC2 who initially presented with pelvic ascites on December 2001, with Normal US and tumor markers. On 2003 she was undergoing fertility workout and US on Feb 2004 showed severe ascites and a 3 cm right ovarian cyst, these findings were corroborated with CT of the chest, abdomen and pelvis with no other abnormalities. She underwent a workout which included fluid removal with microbiologic and cytologic examinations which were without abnormalities. April 2004 a diagnostic laparoscopy with multiple peritoneal biopsies was performed. No significant abnormalities were seen and the cytology showed hyperplastic mesothelial cells, w/o malignant cells. A repeat CT with fluid removal was done on July 2004 with reactive cells and no other abnormalities. A normal liver biopsy on Dec 2010, MRI of the ovaries on Feb 2005 Pet-CT june 2005 w/o abnormalities. During these years the patient underwent recurrent pleural and abdominal removal of 1500- 2000 ml of fluid. Recurrent tumor markers were w.n.l. On Aug 2007 a repeat laparoscopy was done w/o abnormal findings, fluid cytology showed Reactive mesothelial hyperplasia with foci suspicious for mesothelioma and findings that may suggest atypical endometriosis. The specimen was reviewed by Dr. kolbi at the Mayo clinic with the result of "suspicious mesothelioma". Dr. Oliva from Boston also reviewed the slides and was not sure it is mesothelioma. The pt was now undergoing removal of 5 liters of ascites every 2 weeks and started to show symptoms of fatigue and dizziness. A multidisciplinary meeting on Sept 2007 concluded to start an empiric treatment of GnRHa. On Jan 2008 the Pt underwent in Brensburg Germany, Visceralsparing peritonectomy, HIPEC: Cisplatin & Doxorubicin, Intrathoratic cytostatic therapy Cisplatin, Normothermic postoperative chemotherapy Taxol 3X 20mg/sqm (5-543.40), Histology Well differentiated papillary pleural & peritoneal mesothelioma with focal invasion (douglas pouch). With some areas of endometriosis. On discharge from the hospital an accumulation of peritoneal and pleural fluid was demonstrated. After consultationa "wait and see" policy was recommended. On March 2008 the ascites resumed with removal of 4 liters of fluids. repeat I.P. chemotherapy. The treating team decided to continue with GnRH a since April 2008 the ascites resolved. The pt continued with GnRHa with very mild ascites and normal functioning. She was treated for BO on June and Dec 2011 and April 2015 with conservative management.

CONCLUSIONS: This case is presented for consultation regarding further treatment options for the patient.

P302

INGUINAL LYMPHNODE METASTASIS OF A PRIMARY, SEROUS PAPILLARY CARCINOMA OF THE PERITONEUM ONE YEAR AFTER CRS AND HIPEC. PRESENTATION OF A RARE CASE

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BACKGROUND: Primary, peritoneal serous papillary Carcinoma (PPSPC) is a rare malignant epithelial tumor found predominantly in elderly and post-menopausal women. PPSPC originates from a single or multicentric focus of the peritoneum involving the peritoneum of the abdomen and pelvis. We present a rare case of inguinal lymphnode metastasis of PPSPC one year after cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC).
METHODS: We report on a 63-year old female patient with PPSPC who foremost took a good clinical course after CRS and HIPEC in the first year. Primary resection included infragastric omentectomy, appendectomy, pelvic peritonectomy, peritonectomy of the abdominal wall and mesentery of the small bowel with an initial Peritoneal Cancer Index of 12 in January 2015.HIPEC was conducted through a closed circulation system with 132.8 mg cisplatin and 26.6 mg doxorubicin over 60 minutes.
RESULTS: CT-scan six months after CRS and HIPEC excluded tumor recurrence, whilst CT-scan at the one year follow up presented a suspect inguinal lymphnode. Resection of the inguinal lymphnode has been carried out in February 2016. Histological finding confirmed the origin of primary, peritoneal serous papillary carcinoma. The clinical course of the patient was uneventful, presenting without further tumor recurrence 1.5 years after CRS and HIPEC in June 2016. The interdisciplinary tumor conference decided a watch and wait strategy without indication of systemic chemotherapy.
CONCLUSIONS: The aim of this case report is to raise awareness towards potentially unexpected presentation of extraperitoneal metastasis and highlights the importance of patient follow up including clinical examination and CT-scans of thorax/abdomen/pelvis following a systematic schedule.

P303

LAPAROSCOPIC HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY AND INTRAPERITONEAL/INTRAVENOUS CHEMOTHERAPY IN NEOADJUVANT SETTING PRIOR TO CYTOREDUCTIVE SURGERY AND HIPEC IN A PATIENT WITH EPITHELOID DIFFUSE MALIGNANT PERITONEAL MESOTHELIOMA

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BACKGROUND: Diffuse malignant peritoneal mesothelioma (DMPM) arising from mesothelial cells lining of the peritoneal cavity. Traditional management approach consists of systemic chemotherapy. Recently, cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (HIPEC) has been introduced as an optimal management option to prolong survival in these patients.
METHODS: We report the case of a 59 year old male patient with intractable ascites due to epitheloid DMPM that has managed with laparoscopic HIPEC and bidirectional systemic/intraperitoneal chemotherapy in neoadjuvant setting prior to CRS and HIPEC.
RESULTS: Laparascopic HIPEC was performed with nano-doxorubicin (Caelyx)15mg/m2 and Cisplatin 15mg/m2 and intraperitoneal/intravenous (bidirectional) chemotherapy was performed with pemetrexed 500mg/m2 intraperitoneally and cisplatin 50mg/m2 intravenously given simultaneously on day 1 of every21 day cycle for four cycles. The most common toxicities were nausea, abdominal pain, and fatigue. The patient had a clinical response for 6 months and then, he has a relapse of ascites in six months. He had a systemic chemotherapy for three cycles with Pemetrexed and no response was noted. He underwent cytoreductive surgery (CRS) and hyperthermic intraoperative intraperitoneal chemotherapy (HIPEC). Peroperative PCI was 39. No peroperative complication and Grade III/IV postoperative complication were occurred. Early outcome data showed that he tolerated CRS and HIPEC well.
CONCLUSIONS: We conclude that the ascite and disease control can be obtained with laparoscopic HIPEC and intraperitoneal/intravenous bidirectional HIPEC in neoadjuvant setting prior to CRS and HIPEC in DMPM.

P304

BI-DIRECTIONAL CHEMOTHERAPY FOR TREATMENT OF MALIGNANT PERITONEAL MESOTHELIOMA: RESULTS AND SECONDARY RESECTION

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BACKGROUND: Cytoreductive surgery (CRS) followed by hyperthermic intraperitoneal chemotherapy (HIPEC) represents the optimal treatment of localized malignant peritoneal mesothelioma (MPM). However resectability rate remains poor in reason of local extension of disease, general status and extension of surgery required.
METHODS: The purpose of this study is to report preliminary data concerning response rate, secondary resectability and early results of bi-directional chemotherapy for initially unresectalbe MPM.
RESULTS: From January 2013 until January 2016, 20 consecutive patients treated for histologically proven diffuse MPM underwent bi-directional chemotherapy associating intraperitoneal (IP) chemotherapy and systemic (IV) chemotherapy, were selected from a prospective database. Resectability and eligibility to CRS plus HIPEC were defined according to patient's general status and extent of the peritoneal disease. When an up-front resection was initially excluded and in absence of extraperitoneal metastases, unresectability was confirmed by a staging laparoscopy with intraoperative assessment of peritoneal cancer index (PCI) and a IP catheter was placed during the same procedure. Two different drugs were administered: IP pemetrexed (500 mg/m²)+IV cisplatin (75 mg/m²) and IP oxaliplatine (100 mg/m²)+IV gemcitabine (1000 mg/m²). Results: During the study, 20 patients (median age: 58 range: 28-77 years; ECOG 0/1/2:12/7/1) received bi-directional chemotherapy for a diffuse MPM. At diagnosis, ascites was present in 17 (85%) patients. Median PCI at staging laparoscopy was 28 (15-39). Previous systemic chemotherapy was performed in 70% of cases (median number of 4 cycles). A median number of 5 IP cycles (1-15) was performed without specific adverse event due to the IP catheter. Concerning tolerance, 85% of patients had no or mild pain during IP administration. Clinical response defined as ascites resolution or pain disappearance was observed in 12 patients (60%) after a median number of 3 cycles. At laparoscopy re-evaluation, median decrease of the PCI was 8.2 (0-28) and a secondary resection was considered in 10 patients (50%). A complete CRS was achieved in 9 patients and was followed by HIPEC. Major complications (grade III-IV) occurred in 4 (3 intra-abdominal hemorrhages and 1 ARDS) and no post-operative occurred in the study period. Mean hospital stay was 28 days (15-60). Among the 10 resected patients, after a mean follow-up of 23 months, 8 patients were alive without recurrence (median overall survival 11 months) and 2 patients were alive with recurrence developed at 22 and 26 months. Among the 10 non-resected patients, clinical objective response was obtained in 5 cases (50%). Death was observed in 3 patients due to progression disease.
CONCLUSIONS: Bidirectional chemotherapy represents a promis-

ing, well-tolerated treatment able to increase resection rate of diffuse MPM in selected patients initially considered as unresectable or border-line resectable. In definitively unresectable patients, bi-directional chemotherapy achieves a high clinical response rate.

P305

PERITONEAL MESOTHELIOMAS: EVALUATION OF CHEMOTHERAPEUTIC AGENTS USED FOR HIPEC THROUGH THE RENAPE DATABASE

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BACKGROUND: Peritoneal mesothelioma (PM) is a rare and rapidly fatal neoplasm with an estimated survival of one year. The introduction of cytoreductive surgery with hyperthermic intraperitonal chemotherapy (CRS+HIPEC) has greatly improved overall survival rates. Many chemotherapeutic agents have been used in HIPEC therapy but nonetheless without difference in terms of patient survival. The aim of the study was to evaluate the prognostic impact of the different cytotoxic agents used in HIPEC to treat PM.
METHODS: from 1989 to 2014, 260 patients with PM were treated with CRS+HIPEC in 20 tertiary French centers and prospectively included in the RENAPE database. Inclusion criteria were age=80, performance status=2, no significant comorbidities and no extraperitoneal metastases.
RESULTS: 5 cytotoxic agents (CA) were used for HIPEC (Cisplatin (C), Doxorubicin (D), Mitomycin (M), oxaliplatin (O), irinotecan(I)) including 6 combination regimens (C, C+D, C+M, M, O, O+I). No difference was found according to major complications (Grade=3) between the 2 groups. The 2 groups were comparable according to median age, gender, neoadjuvant chemotherapy, asbestos exposure, CC0 resection, follow up, histologic subtypes. But median PCI was higher in 1 CA group (15) than in 2 CA group (19), P=0.006. CA regimen did not influence postoperative survival. Regimen with 2 CA (C+D, C+M, O+I) improve overall survival compared to regimen with 1 CA (C, M, O). No survival difference within the 2 CA group; CA regimen did not influence postoperative morbidity; 2 CA regimen improve OS in CC0 +/- epithelioid patients; 2 CA regimen tends to improve PFS in CC0 +/- epithelioid patients. When comparing Q1 (PCI<10) *vs* Q3 (PCI>23), 2 CA regimen improve overall survival.
CONCLUSIONS: CRS+HIPEC using 2 CA drugs seems to improve overall survival in patients with peritoneal mesothelioma, especially in case of high PCI. No difference was found in term of disease free survival or postoperative complication between HIPEC using 2 CA *versus* 1 CA. According to these results, a prospective randomised trial should be performed in order to be allowed to recommend 2 CA regimen in CRS+HIPEC for peritoneal mesotheliomas.

P306

OUTCOMES OF CYTOREDUCTIVE SURGERY WITH HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR PERITONEAL MESOTHELIOMA: EXPERIENCE OF A UK NATIONAL REFERRAL CENTRE

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BACKGROUND: Cytoreductive surgery (CRS) with hyperthermic intraperitoneal chemotherapy (HIPEC) benefits selected patients with peritoneal mesothelioma. We present the outcomes of this treatment strategy in a UK peritoneal malignancy national referral centre.
METHODS: • Observational retrospective analysis of data prospectively collected in a dedicated peritoneal malignancy database between March 1998 and January 2016. • Identification of patients treated for peritoneal malignancy. • Extraction of data relating to histological classification of operative specimens. • Extraction of data relating to completeness of cytoreduction at laparotomy. • Extraction of follow-up data and survival rates. • Identification of independent predictors of survival in patients with peritoneal mesothelioma.
RESULTS: Of 1200 patients treated for peritoneal malignancy, 77 underwent surgery for peritoneal mesothelioma. Median age was 49 years (range 27-70 years). 35 patients (45.5%) were female. Of the 77 patients treated for peritoneal mesothelioma, 1 had a postoperative histological diagnosis of primary serous carcinoma of the peritoneum. Of the remaining 76 patients, most had either multicystic (28 patients; 36.4%) or epithelioid mesothelioma (30 patients; 39.0%), the remainder having biphasic or well-differentiated papillary disease (7 and 11 patients, respectively). Complete cytoreduction was achieved in 52 patients (67.5%) and maximal tumour debulking (MTD) was performed in 21 patients (27.3%); the remaining 4 patients (5.2%) underwent a laparotomy or laparoscopy with biopsy only. HIPEC was administered in 67 patients (87.0%). Overall (OS) and disease-free (DFS) survival rates differed significantly between multicystic and epithelioid mesothelioma patients; mean OS was 170.8 months (95% CI: 156.9-184.6) and 42.4 months (95% CI: 28.8-56.1), respectively (P=0.000) with mean DFS of 96.4 months (95% CI: 79.3-113.4) and 36.1 months (20.6-51.7), respectively (P=0.000). Also, complete cytoreduction was associated with higher OS than MTD (mean 147.0 months, 95% CI 127.1-166.9 and 46.5 months, 95% CI 22.9-70.0, respectively) (P=0.000). In multivariate analysis, complete cytoreduction, multicystic histology and administration of HIPEC were independent predictors of increased OS; multicystic histology was an independent predictor of increased DFS.
CONCLUSIONS: With adequate patient selection (guided by histological classification) and complete cytoreduction and HIPEC, excellent long-term survival rates can be achieved in patients with peritoneal mesothelioma.

P307

EPIDEMIOLOGY OF MALIGNANT PERITONEAL MESOTHELIOMA IN FINLAND DURING YEARS 2000 - 2012

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BACKGROUND: Malignant peritoneal mesothelioma (MPM) is a rare cancer, which is mainly caused by exposure to asbestos. There has not been a recent population-based analysis from Europe, with implementation of laparoscopic surgery and computed tomography as diagnostic methods. The Finnish Cancer Registry has a reporting coverage of over 99% for solid tumors. In this population based cohort study of 5,44 million, we describe the epidemiology of MPM in a Northern European country with mandatory occupation-related insurance coverage and high-quality universal healthcare coverage.
METHODS: The aim of the study was to find out the epidemiology and expression of MPM in Finland during 1.1.2000-31.12.2012. The data consisted of cancer registry and death notices of malignant

mesothelioma patients in the Finnish Cancer Registry and Statistics Finland. The files of all mesothelioma patients were manually evaluated for finding the primary site of the mesothelioma. Additional information was gathered from Finnish Population Registry and Finnish Workers' Compensation Center, which gathers all work-related insurance decisions within Finland.

RESULTS: Between 1.1.2000 to 31.12.2012, a total of 94 new cases of MPM were diagnosed in Finland. The median annual incidence of MPM was 4 new cases per year (range: 1-18 annually). Thus the median incidence was 0,74 new cases per million per year. In 25.5% of the cases the disease was connected to an occupational disease and in 3.2% of the cases the disease was evaluated without compensation. Median survival was 4 months after the diagnosis (range: 0-18 months). 29.8% of the patients were alive after 1 year and the 5-year survival was 12.8%.

CONCLUSIONS: Our study reveals that in Finland MPM is a rare disease with a dismal prognosis. Patients should be referred to a national unit, which takes care also of other peritoneal malignancies. It is possible that the patients are poorly informed about their rights to be evaluated for workers insurance compensation.

P308

LONG-TERM COMBINED INTRAPERITONEAL AND SYSTEMIC CHEMOTHERAPY FOR PATIENTS WITH MALIGNANT PERITONEAL MESOTHELIOMA RESULTS IN IMPROVED SURVIVAL

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BACKGROUND: Malignant peritoneal mesothelioma (MPM) is a rare disease with about 300 new cases per year in the USA. Its natural history is described as local progression within the peritoneal space in the absence of liver metastases or systemic disease. Large variations in the aggressiveness of the disease can usually be estimated by the histology obtained prior to definitive treatment.

METHODS: Cytoreductive surgery (CRS) is a series of peritonectomy procedures and visceral resections with a goal of complete removal of all visible disease from the abdomen and pelvis. Over 20 years, three protocols investigating increasing efficacy of additional chemotherapy treatments added to CRS have been initiated. Initially, hyperthermic perioperative chemotherapy (HIPEC) with doxorubicin and cisplatin was used in the operating room. Then, early postoperative intraperitoneal chemotherapy (EPIC) with paclitaxel was added for the first 5 days after CRS. The third protocol employed HIPEC, then EPIC, and then long-term intraperitoneal (IP) pemetrexed plus intravenous (IV) cisplatin as a bidirectional adjuvant normothermic chemotherapy (BANC).

RESULTS: The projected overall survival at 10 years of 42 patients treated with CRS and HIPEC was 25%, for 59 patients treated with EPIC and HIPEC was 37% and 29 patients who received HIPEC, EPIC, and BANC was 64% (p=0.0405). Prognostic variables of age, gender, treatment administered, extent of prior surgery, peritoneal cancer index (PCI) and completeness of cytoreduction, and lymph node status were assessed by univariate and multivariate analysis.

CONCLUSIONS: Long-term BANC using both IP and IV chemotherapy was associated with improved survival in patients with MPM. In this rare disease, prospective and randomized trials may be impossible. Additional phase 2 investigations with HIPEC, EPIC, and BANC at other institutions are suggested.

P309

THE UTILITY OF RADIOLOGICAL IMAGING IN SELECTING PATIENTS WITH PERITONEAL MESOTHELIOMA FOR CYTOREDUCTIVE SURGERY WITH HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Cytoreductive surgery (CRS) with hyperthermic intraperitoneal chemotherapy (HIPEC) prolongs survival and can palliate symptoms in selected patients with peritoneal mesothelioma. Radiological imaging aids selection of patients most likely to benefit and can help identify characteristic features suggestive of different histological subtypes.

METHODS: - This was an observational retrospective analysis of data and the associated radiological studies prospectively collected in a dedicated peritoneal malignancy database between March 1998 and January 2016.

- Representative images were chosen to illustrate characteristic features of different subtypes of peritoneal mesothelioma.
- Survival was estimated by the Kaplan-Meier method and survival rates were compared using the log-rank test. Cox regression was used for multivariate analysis.

RESULTS: Of 1200 patients treated for peritoneal malignancy, 76 underwent surgery for peritoneal mesothelioma. Median age was 49 years (range 27-70 years). 35 patients (45.5%) were female. 28 patients with cystic mesothelioma had a mean overall survival of 170.8 months following complete CRS and HIPEC. The appearances of epithelioid mesothelioma (30 patients) are distinct radiologically and mean overall survival was 42.4 months following complete CRS and HIPEC.

CONCLUSIONS: Radiological imaging is an effective tool in selecting patients with peritoneal mesothelioma for cytoreductive surgery and HIPEC. The 2 major subtypes, namely cystic mesothelioma and epithelioid mesothelioma, often have characteristic appearances on imaging. The imaging plays a key role in planning surgical management. Excellent long-term survival can be achieved in cystic peritoneal mesothelioma. Those with epithelioid subtype can benefit if small bowel involvement is absent. In the presence of a large omental cake and ascites, major tumour debulking to palliate symptoms can also play a role.

Ovarian Cancer

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CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY IN RECURRENT OVARIAN CANCER: 101 CONSECUTIVES PATIENTS. CATALONIAN PERITONEAL CARCINOMATOSIS PROGRAM, SPAIN

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BACKGROUND: Currently, about 75% of patients treated from an epithelial ovarian cancer relapse from their disease. Most of the recurrences will present on the peritoneum and these patients usually die despite the therapeutic protocol applied. Conventional treatments for recurrent ovarian cancer, systemic chemotherapy or chemotherapy and surgery, have shown a mean overall survival between 12 and 24 months. The use of CRS+HIPEC in these patients achieves overall survival rates of 30-60 months, and mortality rates around 0-10%. We present the clinical data and the results of the patients with recurrent ovarian carcinoma treated with CRS+HIPEC in a Peritoneal Carcinomatosis Program.
METHODS: September06/April16: 653 patients with PM from different types of Peritoneal Surface Malignancies have been treated by 729 CRS+HIPEC procedures. 101 patients were included in this series (99 recurrent ovarian carcinomas, and 2 fallopian tube carcinomas), performing a total of 112 procedures. Average age was 54.7±11 years. Ascites was present in 16.8%. Mean PCI was 11/39. 3 or more peritonectomy procedures were performed in 59.4%. Visceral involvement was found in 48.5%. Small bowel mesentery involvement in 47.5%. Small bowel serosa involvement in 38.6%. At least an anastomosis was performed in 45.5% (total of 65 anastomosis). Diaphragm opening in 4 patients (only 1 thoracic tube placed). Complete cytorreduction was 95%. HIPEC (coliseum) with CDDP 80 mg/m2+Doxorrubicin 15 mg/m2 at 42.5°C during 60 m. Mean surgical time was 345 minutes.
RESULTS: The results showed in this series have been subjected to an external audit. Overall morbidity: 30.7%. No anastomotic dehiscence. Mortality: 0%. Median ICU stay: 2 days. Mean hospital stay: 13.2 days. Readmission after hospital discharge: 6.9%. Mean follow up: 29.6 months. One-year survival rate: 93.1%, Three-year survival rate: 65.8%, Five-year survival rate: 36.4%. Median survival: 51.5 months. Median survival by PCI: 0-10: 58.8 m, 11-20: 44.7 m and 21-39: 37.7 m.
CONCLUSIONS: CRS+HIPEC in the treatment of recurrent ovarian cancer has a low evidence level and It may only be concluded that it is a feasible treatment and a therapeutic option for a carefully selected group of patients, which can be treated with a very acceptable morbidity/mortality rate. The patients have a good quality of life, and the disease free period and overall survival rate are higher than the ones reached with other standard treatments. Randomized controlled trials are suggested to confirm these conclusions.

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CYTOREDUCTIVE SURGERY PLUS HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR TREATMENT OF ADVANCED OVARIAN CANCER: REPORTING THE FIRST CASES OF A PIONEERING CLINICAL TRIAL IN BRAZIL

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BACKGROUND: HIPEC is a promising therapeutic option for treatment of advanced ovarian cancer.
METHODS: To describe the first cases of a pioneering clinical trial in Brazil exploring the safety and efficacy of a short-term HIPEC protocol for treatment of advanced ovarian cancer patients.
RESULTS: This is an early report of our single-arm, open-label, phase II clinical trial recruiting patients from the Brazilian public health system (*i.e.*, SUS/PE). Shortly, our HIPEC protocol was performed according to the closed-abdomen technique, using cisplatin (25 mg/m²/L) in 4-6L of dextrose perfusate for 30min, at 41-43°C. The Performer HT device (RAND Srl, Medolla, MO, Italy) was used for extracorporeal circulation of hyperthermic fluids. Details of study design are available at https://clinicaltrials.gov/ct2/show/NCT02249013?term=HIPEC+AND+ovarian+cancer&rank=4. The study was reviewed by the CONEP (National Research Ethics Committee) (CAAE: 04016212.5.0000.5201) and registered at ClinicalTrial.gov (NCT02249013). Funding sources were from Decit/SCTIE/ - CNPq/FACEPE/SES-PE (APQ:0187-4.01/13) and FAPE/IMIP. In these settings, seven patients with stage IIIB (n=1) or IIIC (n=6) epithelial ovarian carcinoma were enrolled into our trial up to July, 31. The median (range) age of the patients was 43 years (19-63), with preoperative serum CA125 levels of 1474.8U/mL (223.7-6550). The median number of preoperative cycles of i.v. chemotherapy was 3 (2-4), resulting in PCI scores of 9 (3-18) at the time of CRS/HIPEC – developed after 29 days (26-43) from the last neoadjuvant cycle. Time to restarts i.v. chemotherapy was 36 days (33-50). Six patients completed all the six cycles of i.v. chemotherapy as planned, while the last enrolled patient is currently under adjuvant therapy. Median operation time was 395 minutes (235-625), and all patients left the ICU at the morning after procedure. Three patients required bowel resection as rectosigmoidectomy (n=2) or partial colectomy (n=1). Length of hospital stay was 4 days (3-10). Two patients experienced no postoperative complications, whereas 2/7 suffered minor G1/G2 complications, and 3/7 suffered major G3 complications. The most common complications were G1 vomiting (n=2) and G3 anemia (n=2). Only one patients experienced reoperation at the fourth postoperative day because of G3 postoperative hemorrhage, whereas no deaths were recorded. In regard of our experience with the Performe HT device, its touch-screen displays real-time information about critical elements of the procedure and the dynamic "user-friendly" interface allowed us to handle and set all the key parameters. This system needs minimum training and appears adequate even to less skilled operators.
CONCLUSIONS: Our protocol seems to be feasible and safe, with low rates of manageable short- and middle-term complications. This is a pioneering clinical trial in Brazil and also the very first to use the Performer HT device.

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ANALYSIS OF SPECIFIC PLATINUM - DNA ADDUCTS AFTER CLINICAL INTRAOPERATIVE INTRAPERITONEAL CHEMOPERFUSION OF OVARIAN CANCER PATIENTS

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BACKGROUND: Cytoreductive surgery (CRS) followed by intraperitoneal chemoperfusion (IPEC) with platinum (Pt) – based drugs benefits selected patients with peritoneal carcinomatosis (PC). Nevertheless, despite the initially successful response to the chemotherapy, 80% of women will eventually develop recurrent peritoneal disease, which can only arise from minimal residual disease left after primary CRS, and resistant tumor cells. However, little is known about the amount and distribution of cisplatin-DNA adducts and the influence of combined hyperthermia. Therefore, we want to analyze the relative contribution of structurally defined cisplatin-DNA adducts.
METHODS: Tumor tissue samples were obtained from patients with PC from primary or recurrent serous epithelial ovarian cancer (OC), who underwent CRS immediately followed by 90 min. of chemoperfusion. Concerning the chemoperfusion, patients were randomized into 4 different groups: IPEC (37-38°C) or hyperthermic IPEC (40-41°C;

HIPEC) treatment with a cisplatin dose of 120 or 75 mg/m². Tumor nodules were removed from each patient after (H)IPEC and snap-frozen in liquid nitrogen. Tumor tissue sections of 5 µm were cut and stained with the monoclonal antibody R-C18 to investigate the amount and distribution of 1, 2 Pt– guanine, guanine adducts (1, 2 Pt-[GpG]) in the nuclear DNA of individual cells.
RESULTS: First analyses showed detectable levels of 1, 2 Pt-[GpG] adducts in the DNA of tumor tissues from patients with primary or recurrent OC removed before and after (H)IPEC for 90 min. with 75 or 120 mg/m² cisplatin using the immuno-cytological assay (ICA) staining. In general, immuno-fluorescence (IF) images showed that 1, 2 Pt-[GpG] adducts are absent before (H)IPEC, while they are heterogeneously distributed after (H)IPEC. Furthermore, regions of higher and lower DNA platination can be observed within clusters of tumor cells indicating distinct intercellular differences in drug uptake and/or DNA repair capacity.
CONCLUSIONS: The used ICA protocol is a highly sensitive and specific staining, which made it possible to visualize and quantify the 1, 2 Pt-[GG] adducts in human tumor tissues after (H)IPEC. Additionally, these data will be correlated to histological images stained with specific tumor markers and to clinical outcome of OC patients, which may be of particular interest when investigating the influence of *e.g.* transport mechanisms in the acquisition of Pt resistance.

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CYTOREDUCTIVE SURGERY AND HYPERTHEMIC INTRAPERITONEAL CHEMOTHERAPY: A TREATMENT OPTION FOR PATIENTS WITH RECURENT OVARIAN CANCER WITH PERITONEAL CARCINOMATOSIS

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BACKGROUND: Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy for peritoneal carcinomatosis from ovarian cancer, have been shown to have a role in recurrent ovarian cancer, but are still not considered standard therapy.
METHODS: From March 2005 to July 2013, 41 patients who underwent 44 CRS and HIPEC for peritoneal carcinomatosis in recurrent ovarian cancer were included in this study. Details were obtained from a prospectively maintained database. Our aim was to report our 3-year overall and disease free survivals, as well as prognostic factors for survival.
RESULTS: Median age was 50 years old (range 23-73). The median duration of surgery was 510 minutes (range 230-840) and the median peritoneal carcinomatosis index (PCI) score was 9.5 (range 0-31). 92.7% of the patients had completeness of cytoreduction (CC) scores of 0 or 1. Median follow- up was 43.9 months (range 0.7-108.9). There were no mortalities and the high- grade morbidity rate was 31.8%. Median overall survival was 42.8months (range 28.6 -99.9) 3-year overall and disease-free survivals were 61.4% and 18.8% respectively. (The 5 year OS is 49.3 and the DFS is 7.5pretty dismal so I'll leave it out ya) On multivariate analysis, histology and CC score were significantly associated with overall survival while histology and disease-free interval were associated with disease free survival. The odds of developing a high- grade complication more than doubled for each additional surgical procedure performed (p=0.01).
CONCLUSIONS: Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy attain prolonged survival in selected patients with peritoneal carcinomatosis in recurrent ovarian cancer and should be considered as one of the treatment options for patients with peritoneal disease from recurrent ovarian cancer.

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CLINICAL FEATURES OF PATIENTS WITH PERITONEAL CARCINOMATOSIS OF OVARIAN ORIGIN, TREATED WITH CYTOREDUCTIVE SURGERY AND INTRAPERITONEAL HYPERTHERMIC CHEMOTHERAPY

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BACKGROUND: This research is an observational, descriptive, retrospective and cross-sectional study. 21 patient records were reviewed with peritoneal carcinomatosis of ovarian origin you deal with cytoreductive surgery and hyperthermic intraperitoneal chemotherapy and then the data were analyzed by applying descriptive statistics.
METHODS: To identify the clinical characteristics of patients with peritoneal carcinomatosis of ovarian origin treated with cytoreductive surgery and hyperthermic intraperitoneal chemotherapy.
RESULTS: The average age of patients in the series was 50 years, 61% of patients had serous histological type, most patients (66%) with stage III. The main clinical manifestation of ovarian cancer was diffuse abdominal pain since 80% of patients presented it. The carbohydrate antigen 125 was raised in 61% of cases. The best imaging study to visualize the tumor was ovarian tomography, 61% of patients had ascites at diagnosis. 86% of patients received prior chemotherapy prior treatment with HIPEC, of which 77% were between 1 and 3 chemotherapy regimens. The average time of disease was 0 months and that 66% of patients had recurrence in this period. No patient had clinical recurrence as effective monitoring was sufficient to detect recurrence before the presence of symptoms. 100% were diagnosed by visible tumor imaging study (CT or PET), while 78% elevate CA125. The characteristics of the process were: the mean duration of surgery was 7.5 hours (range, 4 to 11 hours), the mean volume of intraoperative blood loss was 1000ml. In all patients the chemotherapy cisplatin used was calculated dose based on body surface area (range; 110mg to 180mg); administered intraperitoneally with hypertonic solution at an average temperature of 42.2°C, divided into two doses with a total infusion duration of 60 to 90 minutes. The application technique in all cases was closed. Intraoperative morbidity was 0%. 100% of patients were admititditas in the intensive care unit with an average length of stay of 5 days (range: 1 to 14 days) later were taken to area hospital where they stayed an average of 10 days (range, 3 to 36 days). The postoperative morbidity (30 days after surgery) was 52%. Intraoperative mortality was 0%.Postoperative pathological results reported that 57% of the samples were sent free margins injury, while the rest had microscopic disease. Subsequently, 90% (n=19) received systemic chemotherapy within 6 months after treatment.
CONCLUSIONS: 1. Clinical manifestations of ovarian cancer are nonspecific confused in most cases with gastrointestinal syndromes, diffuse abdominal pain being the main demonstration and obtaining a diagnosis seven months after the onset of symptoms. 2. Most of the patients were diagnosed where there is presence of extraovarian disease late clinical stages (EC III) and therefore less chance of survival two years after diagnosis and reduced quality of life due to the via Favored dissemination this cancer, peritoneal carcinomatosis trascelomica produced. 3. The disease-free time after diagnosis and initial treatment of ovarian cancer was on average 12 months, no case of recurrence were the presence of clinical manifestations reported by patients, the CA 125 did not rise in all cases. The best method for diagnosis of recurrence are imaging tests (CT or PET). 4. Postoperative morbidity of the procedure with cytoreductive surgery and hyperthermic intraperitoneal chemotherapy was 52%, the most common: eventration, hypovolemic shock and sepsis

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IS POSITIVE PERITONEAL CYTOLOGY A RISK FACTOR FOR OVARIAN CANCER RELAPSE IN NEOADJUVANT SETTING?

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BACKGROUND: In neoadjuvant setting of advanced epithelial ovarian cancer, the absence of macroscopic residual tumor in the peritoneal cavity after interval debulking surgery (IDS) is currently the best known negative predictor of tumor recurrence. Although other prog-

nostic factors such as the CA125 level prior to surgery, high tumor stage, performance status, integration of bevacizumab in post-operative therapy, tumor sub-types and grade, and sensitivity to carboplatin have also been identified. However, their predictive power of tumor recurrence remains unclear and additional studies are needed to confirm their utility to improve survival and treatment outcomes. Peritoneal washings are routinely performed during IDS or during laparoscopy assessing the IDS feasibility. This non-invasive examination allows for cytological screening of tumor cells released into peritoneal liquid. It was previously found that positive cytology is a risk factor for disease relapse.

METHODS: We hypothesize that the positive peritoneal cytology (PPC) performed at IDS could have a prognostic value. In order to test this hypothesis we analyzed retrospectively a cohort of 57 patients diagnosed with high grade serous or undifferentiated ovarian carcinoma who underwent an optimal IDS after a neoadjuvant platinum-based chemotherapy (CC-0). Our cohort contained subjects with PPC and negative peritoneal cytology (NPC) with IDS followed by post-chemotherapy histopathological evaluation (PCHE). Clinical outcomes and treatment characteristics were statistically evaluated.

RESULTS: The median disease free survival (DFS) was statistically improved in NPC group, 21.1 months (IC95%=5.3-36.9) compared to PPC which was 12.2 months (IC95%=10.5-13.9) (p=0.027). Interestingly, the mean DFS was different according to the absence or presence of tumor in PCHE. The DFS was respectively 63.9 months (IC95%=37.8-90.0) for negative PCHE and 15.8 months (IC95%=13.0-18.6) (p=0.01) for positive PCHE. The univariate analysis revealed that PPC subjects were significantly associated with relapse, HR=2.003 (IC95%=1.07-3.75). In multivariate analysis, two risk factors appeared to be significantly associated with relapse: positive PCHE (HR=7.04; p=0.0001) and undifferentiated sub-type of tumor (HR=2.56; p=0.019). There was no significant difference in outcomes between PPC and NPC groups after PCHE status was included in the statistical model. Yet, for PPC subjects the tendency for relapse remained positive (HR=1.76; p=0.133).The PPC group was also associated with a higher rate of relapse (58.1%) compared to NPC (37.2%) for patients with positive PCHE. Among two patients with negative PCHE one was PPC the other one was NPC.

CONCLUSIONS: Results of our work indicate that optimally debulked patients with PPC and with positive PCHE have worse disease free survival comparing to those with no tumor cells in peritoneal liquid. Screening results of peritoneal cytology associated with residual tumor during laparoscopic pre-IDS assessment could potentially lead to a better stratification of patients prior to IDS. Patients with positive cytology and residual tumor diagnosed on final histopathological examination of laparoscopic biopsies could benefit from innovative surgical procedures leading to improved post-operative treatment and potentially improved time to relapse. A prospective study on a larger cohort is needed to strengthen our hypothesis.

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EN BLOC TOTAL PARIETAL PERITONECTOMY FOR RESECTION OF ADVANCED EPITHELIAL OVARIAN CANCER WITH PERITONEAL CARCINOMATOSIS

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BACKGROUND: Total parietal peritonectomy has been introduced for treating peritoneal metastases from colorectal cancer since 1995. However, its role is still controversial for treating advanced-stage epithelial ovarian cancer.

METHODS: The aim of this study was to investigate the feasibility, associated morbidity, and efficacy of en bloc total parietal peritonectomy among patients with advanced epithelial ovarian, fallopian tube, and primary peritoneal cancer with peritoneal carcinomatosis.

RESULTS: Sixty-one patients undergoing en bloc total parietal peritonectomy with multi-organ resection as part of a maximal surgical cytoreduction for primary or recurrent ovarian, fallopian tube, and primary peritoneal cancer with extensive peritoneal carcinomatosis were prospectively collected from November 2010 through August 2015. The surgical technique, associated morbidity, and clinical outcomes are described. The median age was 53 years (range, 29-80 years). There were 50 primary (82%) and 11 recurrent (18%) cancers. All primary ovarian cancer patients had advanced-stage disease: 3 stage IIIB (4.9%), 37 stage IIIC (60.7%), and 21 stage IV (34.4%). Median operating time was 441 minutes (range 225 to 1,080 minutes), and the median estimated blood loss was 900 mL (range 300 to 3,100 mL), with 49 (80%) patients requiring blood transfusion. All patients had extensive peritoneal carcinomatosis and underwent en bloc total parietal peritonectomy with multiple visceral resections. Major upper abdominal procedures other than omentectomy were performed in all patients. Fifty-three patients (87%) underwent a bowel resection and 20 (33%) patients underwent multiple bowel resections. There were three (4.9%) anastomotic breakdown requiring diverting ileostomy. Only 18% of patients were left with residual disease=1 cm and 82% were visibly disease free. There were no postoperative deaths, but major and minor postoperative morbidity occurred in 20% and 33% of patients, respectively. All patients received systemic intravenous chemotherapy, with a median overall survival time of 48 months for primary ovarian cancer patients and 32 months for patients with recurrent disease, respectively.

CONCLUSIONS: En bloc total parietal peritonectomy is an effective technique for resection of advanced ovarian cancer with peritoneal carcinomatosis and contributes significantly to a maximal cytoreductive surgical effort. The associated morbidity is acceptable, and surgical outcomes appear favorable.

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CRS AND HIPEC FOR FAR ADVANCED OVARIAN CANCER. UPDATE OF OUR RESULTS

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BACKGROUND: At the 8th Congress on Peritoneal Surface Malignancies in Berlin we presented our results treating locally far advanced ovarian cancer and primary peritoneal carcinomatosis by CRS and HIPEC. For two subgroup of our 82 patients we found promising results: for group B, patients in a neoadjuvant setting, and for group D, patients with late chemosensitive peritoneal recurrences.. From 2012 on we focused on these two groups of patients.

METHODS: Up to now 128 patients with far advanced ovarian cancer (FIGOIIIc) or primary peritoneal carcinomatosis are registerd in our database. Group B (neoadjuvant chtx) contains 31 patients, Group D (late platinsensitive recurrence) 37 patients. All patients received CRS and HIPEC with curative intention. “Closed HIPEC” was performed mostly using CDDP 75 mg/m2 incombination with doxorubicin 15 mg/m2 at 41°C.

RESULTS: The recent analysis confirmed our results from 2011/12. In Group B and D completeness of cytoreduction CSS 0-1 was achieved in more than 90%. 5 years survival just failed 60% in Group B and was 40% in Group D. Analysis in detail will be presented at the conference.

CONCLUSIONS: We were able to maintain our good results especially in far advanced ovarian cancer patients after neoadjuvant systemic chemotherapy and patients with chemosensitive peritoneal recurrences. Despite all discussions CRS and HIPEC should be considered as an effective treatment option.for these groups of patients.

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CYTOREDUCTIVE SURGERY WITH HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR EPITHELIAL OVARIAN CARCINOMA: PRELIMINARY RESULTS

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BACKGROUND: Cytoreductive surgery (CRS) with hyperthermic intraperitoneal chemotherapy (HIPEC) has been used in the treatment of ovarian cancer since 1999. Even though many studies have shown encouraging survival results for patients with primary and recurrent epithelial ovarian carcinoma (EOC), there is still no consensus on the role of HIPEC in treatment of ovarian cancer. The aim of this study was to present preliminary results in terms of morbidity and survival of this treatment for advanced EOC in a tertiary care center in Canada
METHODS: Patients treated for primary or recurrent EOC with CRS+HIPEC between March 2011 and February 2016 were included. All patients received perioperative platinum and/or taxane-based systemic chemotherapy. Postoperative morbidity and mortality was assessed with the Dindo-Clavien classification, and were categorized as minor (grade I and II) or severe (grade III and IV). Overall and disease-free survival calculations started at the end of adjuvant chemotherapy after CRS+HIPEC.
RESULTS: Twenty-one patients with FIGO stage IIIB or C epithelial ovarian cancer were identified, including one with a mixed tumor. 86% of patients (18/21) had primary EOC and 14% (3/21) had recurrent disease. The mean age at time of HIPEC was 57.8±8.2 years. The agents used for HIPEC were Oxaliplatin (9, 43%), Carboplatin (9, 43%) and Cisplatin (3, 14%). CRS was complete (CC-O) in 86% (18/21) of patients and optimal (CC-1) in 14% (3/21) of patients. Median PCI was 12 (range 5-31), median blood loss was 1100cc (range 200-3700cc), and median duration of surgery was 7,5 hours (range 4h15-11h40). The median length of postoperative hospital stay was 19.5 days and there was no mortality at 60 days. Nine patients (42.9%) had severe complications, 11 patients (52.4%) had minor complications and one patient (4.8%) had no complication. One patient was lost to follow up for geographical reasons. At a median follow-up of 23 months (range 3-39 months), 3 patients have died of their disease, 11 were disease-free and 9 were alive with disease. The median disease free interval post adjuvant chemotherapy after HIPEC was 13 months.
CONCLUSIONS: This therapeutic approach seems both feasible and safe in select patients. Preliminary survival results are encouraging but prospective studies are needed.

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RISK FACTORS ASSOCIATED WITH ADVERSE OUTCOMES IN PATIENTS WITH METASTATIC OVARY TUMORS: MULTI-CENTER STUDY

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BACKGROUND: Metastatic ovary tumors originate from the gastrointestinal tract, breast and gynecologic origins and represent 5 to 30% of all ovarian cancer. The incidence rate of metastatic ovary tumors is relatively higher in Asia compared to Western countries.
METHODS: To investigate the clinical risk factors associated with adverse outcomes in cases of metastatic ovary tumors during a recent 20-year periods.
RESULTS: The hepatobiliary tract as primary tumor sites were found to be the most significant risk factor in patients with metastatic ovary tumors (p=0.001). The 2-year survival rate of hepatobiliary cancer group was 23% which was significantly shorter than gynecologic cancer group (p=0.002). In multivariate analysis, ovarian metastases from non-gynecologic cancer groups and preoperative lymph node positivity in imaging modality were significant unfavorable prognostic factors, respectively (HR=5.420/p<0.001, HR=1.675/p=0.013). Interestingly, the level of CA19-9 in hepatobiliary cancer group was much higher than the other groups (gynecologic, colorectal, stomach cancer groups). Median value of CA19-9 in hepatobiliary cancer group was 830.5 and 88% of those increased more than 35U/mL. Multi-loculation of ovary mass was more frequently observed in non-gynecologic cancer group than gynecologic cancer group and there was a significant difference of ovarian tumor size between non-gynecologic cancer group and gynecologic cancer group (10.4±5.5cm *vs* 3.4±3.5 cm, p <0.001).
CONCLUSIONS: Hepatobiliary cancer group is the most significant risk factor related with poor outcomes in metastatic ovary tumors. Furthermore, CA19-9 may be used to detect hepatobiliary cancer group as an original tumor site among metastatic ovary.

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MUCINOUS CYSTADENOMA ARISING IN A MATURE CYSTIC TERATOMA ASSOCIATED WITH PERITONEAL PSEUDOMYXOMA WITH TREATMENT BASED ON HIPEC

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BACKGROUND: Mucinous epithelial neoplasms associated with mature teratomas are well-documented in the literature and their occurrence has led to longstanding theories suggesting a teratomatous histogenesis for ovarian mucinous tumors in at least some cases. Most information regarding these teratoma-associated mucinous tumors, however, is based on individual case reports or small number of cases described within larger series of otherwise typical intestinal type mucinous tumors of low malignant potential. Most recent studies of pseudomyxoma peritonei (PMP) have addressed appendiceal mucinous epithelial neoplasms, which are now known to spread intraabdominally to involve the peritoneum and ovaries only secondarily. However, some studies reported a subset of mucinous epithelial tumors arising in mature teratomas of the ovary with an immunophenotype more suggestive of gastrointestinal lineage than ovarian surface epithelial origin, and emphasized an association with the clinical syndrome of PMP in some cases. The risk of intra-abdominal recurrence attached to mucinous tumors arising in ovarian teratomas, particularly those with associated PMP, is not known. We present a case of a patient of 19 years with a mucinous cystadenoma originated from a mature cystic teratoma with ovarii struma with capsular rupture which was resected outside our institution in 2013. Three months later the patient presented with mucinous ascites which demonstrate adenomatous cells without atypia, which was listed as peritoneal disseminated mucinosis (peritoneal mucinous neoplasm of low grade), which was operated in April 2014 with debulking laparotomy with appendectomy, contralateral oophorectomy and HIPEC. Carcinomatosis index was 6. mitomycin C was used 1.5mg/m2 per liter and CDDP 25 mg/m2 in three liters of solution. The patient until July 2016 is alive, in good general condition and no evidence of tumor activity.
METHODS: N/A.
RESULTS: N/A.
CONCLUSIONS: Mucinous tumors are present in 2-11% of mature cystic teratomas of the ovary, and 3-8% of ovarian mucinous tumors are associated with teratomas. We conclude that the term should be reserved exclusively PMP to define the clinical situation characterized by the massive presence of mucin in the peritoneal cavity, regardless of tumor origin. We can distinguish three types according to histological classification of Ronnet: diffuse peritoneal adenomucinosis, disseminated mucinous peritoneal carcinomatosis and intermediate or hybrid forms. Numerous studies and consensus support the complete cytoreductive surgery combined with perioperative intraperitoneal chemotherapy as the treatment of choice for these patients.

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TREATMENT OF ADVANCED EPITHELIAL OVARIAN CANCER WITH PRIMARY OR SECONDARY CYTOREDUCTIVE SURGERY PLUS HIPEC. A SINGLE-CENTER EXPERIENCE

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BACKGROUND: Peritoneal dissemination is the most common route of spread of epithelial ovarian cancer (EOC). Cytoreductive surgery (CRS) followed by platinum-based systemic chemotherapy is the current standard treatment in advanced stages, with suboptimal results.
METHODS: The aim of this study is to analyze the outcome of advanced EOC treated with CRS plus HIPEC, combined with systemic chemotherapy.
RESULTS: From 2007 to 2015 we performed 73 CRS with HIPEC procedures, 39 cases as primary treatment and 34 as secondary treatment (recurrences). Median peritoneal carcinomatosis index (PCI) was 10 (range 0-31); the cytoreduction was optimal (tumoral residue lesser than 2.5 mm) in 96% of the procedures. Severe morbidity (Grade III-IV of Clavien-Dindo classification) was 28.8%, without mortality. Median follow-up was 24 months and median disease-free survival (DFS) was 14 months (14 in primary surgery group and 17 in recurrence group, p=0.47). Median overall survival (OS) was 57 months; in primary surgery group, OS was 94.6% at 1-year, and 54.1% at 5-year, and median OS was not reached; OS in recurrence group was 90.3% at 1-year and 47.7% at 5-year, and median OS was 57 months.
CONCLUSIONS: CRS with HIPEC is a treatment option for advanced EOC with good results in terms of morbidity and survival, in experienced centers.

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VALIDATION OF DIAGNOSIS METHODS USED IN PERITONEAL CARCINOMATOSIS SECONDARY TO OVARIAN CANCER. A SINGLE-CENTER EXPERIENCE

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BACKGROUND: Peritoneal carcinomatosis from ovarian cancer is presented, frequently, at diagnosis (stage IIIC) or when the relapse is developed. Cytoreductive surgery (with platinum-based chemotherapy) is the only way for a curative treatment. Therefore, know the extent and location of peritoneal disease is essential in order to decide the resecability. Our aim is to compare the radiologic findings with the surgical findings.
METHODS: Our aim is to compare the radiologic findings with the surgical findings.
RESULTS: From 2007 to 2015, 73 cytoreductive surgeries with HIPEC (for women diagnosed of peritoneal carcinomatosis secondary to ovarian cancer) have been retrospectively analyzed. Findings of CT, PET-CT and diagnostic laparoscopy have been compared with the findings of the surgical exploration (gold standard). Sensitivity and specificity have been calculated in the conflictive areas (mesentery and small bowel); intraclass correlation coefficient (ICC) has been obtained in order to know the concordance in both (radiologic and surgical) PCI (peritoneal carcinomatosis index). Median surgical PCI was 10 (range 0-31). Median PCI obtained by CT was 5 (range 0-11); in this group (women studied by CT), median surgical PCI was 11.5 (range 0-31). Intraclass correlation coefficient (ICC) was 0.35 (poor concordance). Median PCI obtained by PET-CT was 4 (range 0-11); in this group (patients studied by PET-CT), median surgical PCI was 10 (range 0-31); intraclass correlation coefficient (ICC) was 0.52 (fair concordance). Sensitivity and specificity in conflictive areas (9-12) by PET-CT was better tan by CT (CT sensitivity 37.5% and specificity 75%, *versus* PET sensitivity 50% and specificity 89.5%). Median laparoscopic PCI was 14.5 (range 0-39), and median surgical PCI was 9.5 (range 0-31), with ICC of 0.23 (por concordance). However, neoadjuvant chemotherapy was administrated in 26 women (from 30 laparoscopies performed).
CONCLUSIONS: Radiologic tests underestimate surgical findings
Sensitivity and specificity are low in conflictive areas (9-12), being better in PET-CT compared to CT. Improve the radiologic tests is necessary in order to detect unresectable patients and avoid unnecessary surgeries.

P414

SURVIVAL OF PATIENTS WITH PERITONEAL CARCINOMATOSIS OF OVARIAN ORIGIN, TREATED WITH CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: This research is an observational, descriptive, retrospective and cross-sectional study. 21 patient records were reviewed with peritoneal carcinomatosis of ovarian origin you deal with cytoreductive surgery and hyperthermic intraperitoneal chemotherapy and then the data were analyzed by Kaplan - Meier estimator for survival analysis.
METHODS: Know the survival of patients with peritoneal carcinomatosis of ovarian origin, treated with cytoreductive surgery and hyperthermic intraperitoneal chemotherapy.
RESULTS: Survival in relation to PCI score is greater when the index was found below 10 points. It was observed that when the surgeon reported absence of macroscopic activity (CC0) in 71% of cases pathology also reported absence of microscopic tumor. After the procedure with HIPEC 61% of patients had a disease -free period less than 24 months. The median survival of patients after the procedure with cytoreductive surgery and hyperthermic intraperitoneal chemotherapy was 37 months with a cumulative survival of 52.3 months.
CONCLUSIONS: The median survival of patients after the procedure with cytoreductive surgery and hyperthermic intraperitoneal chemotherapy was 37 months, which is higher than the average survival with other treatments reported in the literature.

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EXPLORATORY ANALYSIS OF EXTENT AND PATTERN OF PERITONEAL INVOLVEMENT AND ITS RELATION TO LYMPH NODAL METASTASES IN STAGE IIIC EPITHELIAL OVARIAN CANCER

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BACKGROUND: The extent of peritoneal involvement in stage IIIC epithelial ovarian cancer (EOC) has been shown to be of prognostic value. However, the correlation of peritoneal involvement and pelvic and retroperitoneal lymph nodal metastases has not been adequately studied.
METHODS: • To explore the possibility of a correlation between the extent and pattern of peritoneal involvement with lymph nodal metastases. • To define a group of patients that would benefit the most with a lymph nodal dissection.
RESULTS: Between Jan 2012 and May 2016, 81 consecutive cases (51 primary, 30 recurrent) of epithelial ovarian cancer who underwent complete cytoreduction with lymph nodal dissection at two Indian referral centres were included in the study. The median age was 50 years in primary and recurrent groups. The median PCI was 14 in the primary and 13 in the recurrent group. There was no significant difference in the quadrants involved by carcinomatosis between the two groups. 32 patients had lymph nodal metastases; 19 (37.2%) in primary, 13 (43.3%) in recurrent. We studied histology, PCI (divided into 3 groups for analysis – PCI <10, 10-20 and more than 20), peritoneal region involvement, presentation (primary *vs* recurrent) and visceral resections done to analyze if any of these were associated with lymph nodal metastases. Whenever a visceral resection was performed as a part of the cytoreduction, a careful pathological analysis was performed to assess the involvement of the adjacent draining lymph nodes as well. Pelvic lymph nodes were significantly more involved in recurrent Ca ovary compared to primary presentation (24% *vs* 11%, p=0.02); there was no significant difference in the involvement of retroperitoneal and visceral nodes between the two groups. Involvement of the pelvic peritoneum with deposits more than 5cm in size or confluent deposits (involvement of areas 5/6/7 with LS3 as per the PCI classification) was associated with a significantly higher incidence of pelvic lymph nodal metastases (p=0.001).

No correlation was found with other lymph node sites. No other factor was significantly associated with lymph nodal involvement. Incidentally, of the 64 patients who had a visceral resection, 20 (31.2%) had visceral lymph nodal involvement.
CONCLUSIONS: Presence of LS3 deposits on the pelvic peritoneum and recurrent EOC had a higher incidence of pelvic lymph nodal metastases. Involvement of gastrointestinal tract in carcinomatosis is associated with a 30% incidence of involvement of local draining lymph nodes, stressing the need to perform anatomical resections in this situation. These findings can help guide decision making regarding lymphadenectomy during cytoreductive surgery for EOC.

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PREVENTION OF PROLONGED PARALYTIC ILEUS AFTER TREATMENT OF ADVANCED OVARIAN CANCER WITH CYTOREDUCTIVE SURGERY AND HIPEC

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BACKGROUND: The duration of paralytic ileus following major abdominal surgery is quite variable, but prolonged paralytic ileus is a well-known complication to cytoreductive surgery (CRS) combined with hypertherm intraperitoneal chemotherapy (HIPEC). Lack of bowel function more than 14 days after surgery for advanced stages of ovarian cancer becomes an important clinical problem since adequate bowel function is required for the adjuvant treatment regime with systemic chemotherapy.
METHODS: Aim: To report on our experience with use of a standard postoperative treatment regime designed to prevent prolonged paralytic ileus after CRS and HIPEC used in treatment of primary advanced (FIGO stage III - IV) epithelial ovarian, tubal and primary peritoneal cancer. From January 2016 until July 2016 12 patients with primary advanced (FIGO stage III-IV) epithelial ovarian, tubal and primary peritoneal cancer were treated with CRS and HIPEC with carboplatin 800 mg/m2 at 41-42 degrees Celcius for 90 minutes with open abdominal technique. Nine patients had up-front surgery and three patients had interval surgery. Patients with stage IV disease all had surgical resectable disease (n=7). All patients received the same standard postoperative regimen consisting of: 1) Enteral feeding in gastro duodenal feeding tube from the day of surgery combined with intravenously parenteral nutrition. 2) Daily administration of chewing gum. 3) Sodium picosulfate administrated in feeding tube unless the patient had a bowel anastomosis. 4) Paraffin oil administrated in feeding tube and stoma. 5) Active mobilization of the patient from day one. To decrease the postoperative inflammatory response 16 mg of dexamethasone was administrated intravenously to all patients the first two postoperative days. Recovery of bowel function was defined as first postoperative episode of defecation or solid output in stoma.
RESULTS: Median peritoneal cancer index (PCI) was 7.5 (5-32), and complete cytoreduction (CC-0) was achieved for all patients. Five patients had no or minor bowel surgery, two patients had a bowel resection with primary bowel anastomosis, and five patients had a colostomy after en-bloc pelvic peritonectomy procedure. Four patients had extensive surgery with total abdominal peritonectomy. Median time for recovery of bowel function was 5.5 days (3-15 days). One patient had prolonged paralytic ileus with recovery of bowel function after 15 days. Postoperative intraabdominal abscesses were diagnosed at CT scan. The patient recovered after drainage. Median length of hospital stay was 14 days (8-32 days) and there were no reoperations or perioperative deaths.
CONCLUSIONS: In this small series of 12 patients we found that use of a standardized approach with intensive stimulation of the paralytic bowel system after CRS and HIPEC was safe and accelerates the recovery of bowel function. The regimen should be evaluated in larger series.

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EFFECTIVENESS OF A FILTER SYSTEM DURING RECIRCULATION OF THE DRUG IN A CLOSED CO2 RECIRCULATION HIPEC TO ISOLATE CANCER STEM CELLS IN OVARIAN CANCER. PRELIMINARY RESULTS

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BACKGROUND: Ovarian cancer recurrence ocurr in more than 70% of patients. Tumor stem cells, CSC, are extremely resistant to chemotherapy.These cells, in contact, with drugs, do not proliferate, remaining in a dormant state and after finishing intrabdominal chemotherapy, they return to their proliferative activity.In our hypothesis,disease recurrence after treatment with cytoreductive surgery and HIPEC in ovarian cancer could be because of CSC are not resected, and they are resistant to mechanical and chemical treatment involving intra-abdominal chemohyperthermia. These cells have the ability to survive to the solution recirculation flow and the chemotherapeutic effect, and later they can become like tumor-initiating cells, TICs.
METHODS: To determine effectiveness of a filtration system during drug recirculation in our CO2 recirculation HIPEC system for isolating cancer stem cells, to prevent recurrence, characterize these cells and make individualized therapy. Clinical pilot study that included 22 ovarian cancer patients,stages II-IV, which are treated by cytoreductive surgery and HIPEC with paclitaxel during 60'. - Filter device with a synthetic, hydrophobic, biocompatible and high permeability membrane that was used during drug recirculation. - Cell culture: Filtered recirculating fluid culture after HIPEC, with DMEM: F12 1:1, supplemented with 10% of bovin fetal serum and 1% of penicilin/estreptomicin, at 37°C, with 5% of CO2, during 72-96 hours. After floatting cells appear in the culture, we transfered pellets to a polyestiren flask,"ultra-low attachment surface", with stem cells medium. Flasks were incubated at 37°, with 5% of CO2, with humidified air. Cells were controled every two or three3 days to identify spheroids growth, and adding CSC medium. - Caracterización of CSC. - Immunofluorescence: AntiCD133. - Immunohistochemistry: Papanicolau staining to show characteristics of malignancy. Rest of fluid is introduced in cytolyt solution. Epithelial markers: Citoqueratin 7, Citoqueratina 20 and Ber Ep4. Molecular profile of cancer cells: CK7 +, BerEp4+, CK20. Mesothelian marker: Calretinina, D2-40 -. Macrophage marker: CD68 -.
RESULTS: - There was a growth of cancer spheroids after using a filter for isolation and culture of tumor stem cells in 10 patients with neoadjuvant treatment and 12 patients without neoadjuvant treatment. These cells proliferated during 21 days. Later they did not proliferate. - These CSC were CD133- cells. It could be due to to the fragility of this antigen to surgical trauma and hyperthermic chemotherapy. - The ability of these isolated cells to initiate neoplasms are supported by creating tumoral spheroids with cytologic features of malignancy with the expression of epithelial markers (CK7 and BerEP4 +. CK20-), and negative features for macrophage markers (CD68) and mesothelial markers (Mesothelium, calretinin and D2-40). The control group that included borderline tumors treated with HIPEC, presented benign characteristics CK7-, BerEp4-, CK20-, CD68 +, calretinin +.
CONCLUSIONS: Using a filter device during HIPEC recirculation can isolate cancer stem cells, with capacity of originate *in vitro* cancer spheroids and can be the cause of ovarian caner recurrence.These cells have a CD133- phenotype, perhaps for the surgical trauma or/and

locoregional chemotherapy. We can create targeting therapy to these cells and molecular profile for knowing individual tumorigenesis

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3-YEAR RESULTS OF CRS AND HIPEC WITH DIFFERENT CHEMO-DRUGS BY OVARIAN CANCER

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BACKGROUND: CytoRedictive Surgery (CRS) and Hyperthermic Intraperitoneal Chemotherapy (HIPEC) have shown good safety in patients with advanced gynecologic cancers, including primary and recurrent ones.
METHODS: Combination of CRC-HIPEC in treatment by ovarian cancer has started in our center since 2012. We used "closed" HIPEC techinque, with 3 inflow and 3 outflow catheters, RAND HT performer and 7 liters of saline solution with 200 mg cisplatunum or 100 mg/m2 taxans were used. The time of perfusion was 90 minute and perfusion flow was a liter per minute. Now we have an experience of treatment and follow-up 37 patients (21 locally advanced primary and 16 recurrent cases). Two groups were formed with different chemo-drugs (24 patients with cisplatin and 13 with taxans). Patients of cisplatin group (CISP-group) have peritoneal carcinomatosis index (PCI) level ranged between 3 and 10. CRS in CISP-group was performed till level CC-0 in 14 cases (PCI=3-10), with CC-1 – in 9 cases (PCI=8-18). Subtotal peritoneumectomy was performed in 19 cases and partial peritoneumectomy in 5 cases. Visceral resection included 24 hysteroophrectomy with omentumectomy. In some of this cases were added appendectomy (3 patients), cholecystectomy (1 patient), bladder resection (3 patients), partial mesotransversal resection and small intestinum resection (1 patient) and obstructive recto-sigmoid resection (1 patients). Members of taxan group (TAX-group) have PCI no more then 10. CRS in all cases this group was CC-0. Visceral resection included 13 hysteroophrectomy with omentumectomy, partial peritoneumectomy was added in 3 cases.
RESULTS: CISP-group had 0% mortality in early postoperative period, but 71% morbidity (17 patients of 24). Temporary elevation of creatinin level was noted in 17 cases and a temporary pleural effusion, estimated at 250 ml – in 2 case, no punction demanded. Only 2 recurrent cases were found during 3-year follow-up (DFS=91,6%). Now this 2 patient are alive and receive taxan-based regimen of chemotherapy (OS=100%). TAX-group had 0% postoperative mortality and 46% (6 of 13) morbidity. No recurrent cases were found during 1-year follow-up.
CONCLUSIONS: We continue to collect and analyze clinical data of cisplatin- and taxan-based regimen of CRS-HIPEC in ovarian cancer. We cannot directly compare results in both groups because difference between PCI- and CC-level and also between follow-up time. But we can notice the trend of slightly good endurance of treatment in TAX-group.

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COMPLETE CYTOREDUCTION SURGERY AND HIPEC IN PERITONEAL SURFACE MALIGNANCIES-AN AUDIT OF INITIAL EXPERIENCE FROM A TERTIARY CARE CENTRE IN NORTH INDIA

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BACKGROUND: Peritoneal carcinomatosis has for long been considered alea iacta est (terminal stage) for cancer patients. Intuitive surgical forays into debulking surgery over 100 years ago have evolved through meticulous scientific enquiry into a concerted thrust for cytoreductive surgery with hyperthermic intra-peritoneal chemotherapy (CRS-HIPEC).
METHODS: In a multi-disciplinary oncology clinic setting patient selection was based on performance status, disease burden on cross sectional imaging and prior treatment exposure. 25 patients underwent CRS-HIPEC by modified open coliseum method using Cisplatin (60mg/m2) and Adryamycin (60mg/m2) from April 2014 to May 2016. Computerized data system prospectively maintained by same surgical team was used to retrieve individual patient details.
RESULTS: Total number of patients was 25. Seventeen patients had epithelial ovarian cancer (13 Interval cytoreduction, 4 secondary cytoreduction), 3 Colo-Rectal cancers, 2 pseudomyxoma peritonei, 1 peritoneal mesothelioma and 2 endometrial stromal sarcoma. Median age of patients was 45.4 years (range 19-67 years). Mean PCI index was 8.9 and multi-visceral resection was required in 5 patients to achieve complete cytoreduction (CC) score of 0-1 (1 small bowel, 1 Colon, 2 rectum, 1 bladder resection). Mean duration of surgery was 272 minutes and mean intra operative blood transfusion requirement was 700ml. Prolonged ileus was the most common perioperative complication observed (14/25). Other complications observed were as follows. 4 patients developed intra-abdominal collection managed with guided pigtail drainage. Chylous ascites was documented in 2 patients, successfully managed conservatively with fat restricted diet. Four patients developed deranged renal function in the immediate post operative period managed with fluid and electrolyte management not requiring dialysis. Persistent leukopenia and post-operative delirium were observed in 1 patient each. Fecal fistula developed in one diabetic patient which was managed conservatively in view of low output and no intra-abdominal contamination/collection. 2 patients amongst the initial 15 had to be re-explored for fecal peritonitis and diversion stoma was made. Mean post-operative hospital stay after surgery was 9.2 days. Six patients were re-admitted for complaints ranging from poor tolerance of oral feeds to sub-acute intestinal obstruction. We observed two immediate post operative mortalities (<30 days) in our initial 15 patients. One was mortality within 6 hours post surgery in which definitive cause could not be ascertained and another in POD 10 where patient was re-explored on POD 8 and found to have ischemia of distal sigmoid, upper third rectum lower third ureter bilaterally and part of urinary bladder.
CONCLUSIONS: This Preliminary report of our initial experience at a tertiary cancer care centre in North India highlights the learning curve associated with CRS-HIPEC and underscores importance of a multimodality approach ab initio for optimizing outcomes. Building on accumulating evidence and our experience, an institutional protocol was developed after first 15 patients, which has enabled us to safely perform CRS-HIPEC in our patient population.

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INTRAPERITONEAL CHEMOTHERAPY HYPERTHERMIA FOR PERITONEAL CARCINOMATOSIS FROM OVARIAN CANCER BY CO2 RECIRCULATION CLOSED-ABDOMEN TECHNIQUE (COMBAT PRS-1.0). CLINICAL PILOT STUDY

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BACKGROUND: This work reports 21 patients with peritoneal carcinomatosis from ovarian cancer that underwent cytoreductive surgery and HIPEC by means of CombatPRS-1.0. This is a new model for closed-abdomen HIPEC aimed at improving the fluid distribution with assistance from a CO2 recirculation system. This new technology has been previously shown to be successful in an experimental study (pig model) performed by our group, and has been approved for use in our hospital. This study has been published in Int Jour Hyperth, 2016;32(5):488-498. Complete cytoreductive surgery and intraperitoneal chemotherapy improved overall survival and disease-free survival in women with advanced ovarian cancer. The association of intra-abdominal hyperthermia with chemotherapy (HIPEC) increased the

therapeutic benefit. We present a new closed-abdomen HIPEC with CO2 recirculation system that provides homogeneous temperature and fluid distribution into the abdominal cavity, compared with classic closed or open abdomen HIPEC, demonstrated in a first experimental study. This new was used in a pilot study of patients with peritoneal carcinomatosis of ovarian cancer origin, treated by cytoreductive surgery and intraperitoneal chemohyperthermia by a closed technique that combines fluid and CO2 recirculation (PRS-1.0 Combat®).
METHODS: To describe a new closed-abdomen HIPEC technique with CO2 recirculation system (PRS-1.0 Combat®) administrated in a pilot study of patients with peritoneal carcinomatosis from ovarian cancer origin.
RESULTS: Between November 2011 and March 2014, a total of 21 patients with epithelial ovarian cancer (FIGO II-IV) were included in the study. During the procedure, there were no significant hemodynamic or analytical disturbances. The complication rates were 38.1% and 57.14% for grade III/IV and minor (grade I/II) complications, respectively. Postoperative mortality was 4.76% (one patient).
CONCLUSIONS: Closed-abdomen intraperitoneal chemohyperthermia by a fluid and CO2 recirculation system (PRS-1.0 Combat®) is a safe and feasible model for the treatment of peritoneal carcinomatosis of ovarian cancer origin.

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BIPHASIC LEARNING CURVE OF CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY: TECHNICAL COMPETENCE AND REFINEMENT OF PATIENT SELECTION

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BACKGROUND: Cytoreductive surgery (CRS) with hyperthermic intraperitoneal chemotherapy (HIPEC) have been used to treat selected patients with peritoneal carcinomatoses, but can be associated with prolonged hospital stay, significant morbidity and potential mortality.
METHODS: Our objective was to evaluate the learning curve of CRS/HIPEC in our institution, representing the largest Asian cohort to date.
RESULTS: Overall median age was 53 years (10-76). There was no significant difference in age, sex, or primary histological type across cohorts. Duration required to accumulate each cohort decreased over the study period (8.9, 2.3, 1.4, 1.6 years). Overall rates of incomplete cytoreduction (2%), severe morbidity (25%), and 60-day mortality (1.6%) were comparable to previously reported data. Decreases in rates of serious morbidity, (36%, 32%, 10%, 16% $p<0.01$), durations of ICU stay (2, 1, 1, 0.5 days, $p=0.36$) and total hospital stay (14, 16, 13, 12 days, $p=0.037$) were seen across consecutive cohorts. A significant decrease in duration of CRS/HIPEC occurred after the first cohort (10.3, 8, 7.8, 7.3 hours, $p<0.01$). Rate of incomplete cytoreduction also decreased (4.7%, 2.1%, 0%, 2% $p=0.49$) despite an increase in average PCI score after the first cohort (10, 14, 12, 13, 0.38).
CONCLUSIONS: Whilst 50 cases were adequate for familiarity with the procedure and decreased average operation time, significant improvement in the rate of serious morbidity was only observed after 100 operations. This may reflect an initial period of training in which technical competence is achieved, followed by a subsequent period characterised by increasingly complex cases (higher PCI score) and finally, a refinement of patient selection.

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CA-125: AN INACCURATE SURVEILLANCE TOOL IMMEDIATELY AFTER CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAOPERATIVE CHEMOTHERAPY (CRS-HIPEC)?

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BACKGROUND: Raised pre-operative and persistently raised post-operative tumour markers are thought to be associated with poorer prognosis. We previously reported on the measurement and use of tumour markers after cytoreductive surgery and hyperthermic intraoperative chemotherapy (CRS-HIPEC). CA-125 was noted to be raised in many of our patients after CRS-HIPEC, and hypothesize that HIPEC has an effect on the peritoneum resulting in a reactive rise in CA-125 in the immediate post-operative period.
METHODS: This study seeks to evaluate the values of pre and post-operative ca125 in patients with complete cytoreduction and HIPEC, and understand the time frame before normalisation of these values, that would allow for CA-125 to be used as a surveillance tool again.
RESULTS: Of 94 patients with documented pre-operative CA-125, 63 (67%) had a normal pre-operative CA-125, and of these, 57 (90%) had at least one post-operative reading within 30 days. The average change in CA-125 to peak post-operative value was an increase of 28.6 U/ml (range -17.1 to +193) in patients with normal pre-operative CA-125, and -277 U/ml (range -5573 to 91.6) in patients with raised pre-operative CA-125. Of patients with normal pre-operative CA-125, 22 (35%) had raised post-operative CA-125, and consisted of patients with colorectal (n=8), appendiceal (n=6), ovarian (n=4) or other (n=4) cancers. The average peak CA-125 was 80 U/ml (average increase of +63 U/ml) in these patients. The peak value of the raised post-operative Ca125 was noted to be at a median 10 post-operative day (POD) (range 7-30). This increase was seen in patients with appendiceal (67%), ovarian (36%), colorectal (35%) and other (mesothelioma and primary peritoneal) primary cancers (27%). Of these 22 patients, 3 (14%) had raised CA-125 persisting beyond 30 days that normalised by POD 59, 75 and 92 respectively. Other patients had normalised by the next CA-125 reading on median POD 49 (range POD 28-115), or had no further CA-125 readings (n=8, 35%). The median day of normalisation for patients with normal pre-operative CA-125 and raised post-operative CA-125 was 57 (range 28-115). The median day of normalisation for patients with raised pre-operative CA-125 was POD 41 (range 1-114). Notably 10 patients had an initial normalisation of CA-125 (median POD 1, range 1-6), followed by a subsequent raised value (median POD 10, range 5-40) and then re- normalisation (median POD 44, range 19-104).
CONCLUSIONS: A significant proportion of patients (27-67%) will have raised post-operative CA-125 up to a month after CRS-HIPEC despite a normal pre-operative value. For patients with raised pre-operative CA-125 an immediate post-operative CA-125 within 3 days may be useful to assess normalisation following surgery as normalisation occurs by POD1 (range 1-6), before subsequent increases seen by POD10 (range 5-30). In view of the non-specific increase in CA-125 after CRS-HIPEC, use of this tumour marker for surveillance can resume two months after surgery (median POD 44-49 days).

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FEASABILITY OF REPEAT CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) are increasingly being used to treat peritoneal malignancies.
METHODS: This paper evaluates our institution's experience with repeat CRS-HIPEC and aims to evaluate and compare the incidence of perioperative complications in the first repeat CRS-HIPEC procedures.
RESULTS: A total of 201 patients underwent CRS-HIPEC during the study period, of which 13 patients underwent a second CRS-HIPEC. The repeat CRS-HIPEC were performed for appendiceal (n=3, 23%),

colorectal (N=3, 23%), ovarian (n=5, 38%), primary peritoneal (n=1, 7%) and mesothelioma (n=1, 7%) primaries. Comparing patients who underwent repeat CRS-HIPEC and patients who had only one CRS-HIPEC, the median PCI score was 7 (range: 3-14) *vs* 13 (range: 5-17) (p-value: 0.72), operation time was 460 mins (range: 290-530) *vs* 500 mins (range: 330-670) (p-value: 0.66), blood loss was 1000ml (range: 500-1800) *vs* 1100ml (range: 440-1600) (p-value: 0.61), time to feeds was 6 days (range: 5-8) *vs* 4 days (range: 4-5) (p-value: 0.32), total hospital stay was 13 days (range: 10-23) *vs* 14 days (range: 11-17) (p-value: 0.61).There was no difference in median length of postoperative ICU stay which was one day in both groups (range 0-2) (p-value: 0.66). The overall and high-grade post-operative complications in the repeat CRS-HIPEC and the single CRS-HIPEC groups were 31% and 15.5% in the former and 35% and 25% in the latter respectively, which was not statistically significant (p-value: 0.32). There were no 30- day mortalities in both groups.

CONCLUSIONS: Similar peri-operative outcomes to the first CRS-HIPEC can be obtained in repeat CRS-HIPEC but tend to be performed in a selected group with lower volumes of disease (lower PCI).

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CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY IN A CHILD WITH OVARIAN GERM CELL TUMOR

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) have been used in adults with epitelial ovarian carcinoma proving overall survival benefit large series. Diffuse peritoneal disease from pediatric type ovarian tumors is rare. Recently Andrea Hayes- Jordan published a clinical serie with 4 patients with ovarian germ cell tumor treated with CRS and HIPEC with good outcomes. We reported a single case of a child of 11 years old with second recurrence after debulking surgery. She was very symptomatic with tenesmo and rectal pain secondary to mass in the Douglas pouch. She was tretaed with complete cytoreduction (CC0) and HIPEC with cisplatin 100 mg/m2 during 60 min.

METHODS: - Safe and effectiveness of CRS and HIPEC in a child with ovarian germ cell tumor.

RESULTS: We had not complications after procedure and she was discharged at 14th postoperative day.

CONCLUSIONS: CRS and HIPEC is a safe and effective procedure in child with ovarian germ cell tumors.

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CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR OVARIAN PERITONEAL CARCINOMATOSIS IN THE ELDERLY - A CASE-CONTROLLED, MULTICENTER STUDY

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BACKGROUND: Even though ovarian cancer is not the most frequent gynecological malignancy, it predominantly affects elderly women. Its prognosis remains bleak, especially for the advanced stages of the disease such as peritoneal carcinomatosis. Despite an adequate initial management, about 85% of patients with advanced disease will relapse. CRS and HIPEC could offer potential curative therapy, but the risks inherent to this patient population have called its benefit into question.

METHODS: Our aim was to evaluate the morbidity, mortality and survival rate associated with combined cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (HIPEC) in the treatment of recurrent ovarian cancer for patients aged 70 years and older.

RESULTS: Out of 2328 patients, 52 patients with recurrence PC from ovarian cancer over 70 were matched with 199 younger patients. There was no difference in overall 90-day morbidity (=70: 32.7% *vs* <70: 44.7; p=0.665), however patients over 70 had significantly more renal complication needs hemodialysis (3.8% *vs* 1%, p=0.0478). Differences between the older and younger cohorts failed to reach significance for 90-day mortality (3.8% and 1%, respectively; p=0.069), In multivariate analysis, HIPEC duration (p=0.024) was independent factor associated with morbidity in elderly patients. The median overall survival was 34.5 months (range 23.3-46.1). The median disease-free survival was 12.5 months (range 9.4-17.8). In multivariate analysis, PCI<18 (95%IC: 3.13-121.0, p=0.001) and completeness of cytoreduction, CC score 0 (95%IC: 1.32-13.4, p=0.001) were independent factors associated with overall survival and disease-free survival respectively in elderly patients.

CONCLUSIONS: CRS and HIPEC can achieve comparable perioperative outcomes in well selected patients previously thought too old to undergo these procedures. Because ovarian cancer among older women represents a challenging medical problem, randomized trials to evaluate the impact of the combined surgery and HIPEC are called for.

Gastric Cancer

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WHIPPLE PANCREATICODUODENECTOMY WITH HIPEC

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BACKGROUND: Cytoreductive surgery & HIPEC is a well known treatment modality for peritoneal carcinomatosis. The morbidity of this procedure is related to aggressive surgical procedure, hyperthermia and locoregional chemotherapy. The incidence of digestive fistulas is significantly more than that of conventional digestive surgery. The data from different studies suggest that CRS & HIPEC is a reasonably safe treatment for selected patients with peritoneal carcinomatosis in centers of excellence with higher but acceptable digestive morbidity, compared to that of Whipple's procedure, D2 gastrectomy, or multivisceral resections. The rate of anastotic leakage has shown being increasing as the anastomosis site is close to the ampulla of Vater. On the other hand, a considerable ratio of the complications after Whipple's procedure is due to the high risk multiple anastomosis made to restore the pancreatic and biliary drainage to the gut and disruption of any of them is associated with significant mortality outcome. Combining the two procedure of CRS,Whipple's procedure and HIPEC is theoretically challenging in term of surgical magnitude of the operation and the anticipated complication severity, putting in mind that HIPEC could endanger the already high risk anastomosis made around the residual pancreas.
Methods: Safety of doing biliary and pancreatico-enteric anastomosis after hipec exposure and its effect in terms of early and late complication like disruptions and strictures.
RESULTS: A challenging case of 64 year old male patient with pyloric gastric cancer which was presented in a tumour board and the decision was made for pyloric stenting and to go for neoadjuvant chemotherapy as the tumour shown radiologically to involve 1st,2nd parts of duodenum, segment 2,3 of liver and head of pancreas. reevaluation of the case after chemo showed good response and laparoscopy showed limited peritoneal carcinomatosis (PCI of 5). The patient was taken for CRS which mandated resection of head of pancreas in a Whipple's procedure and HIPEC in an open method were all anastomoses are made after the HIPEC delivery. The pancreaticojejunal anastomosis was done duct to mucosa and the hepaticojejunal and jejunjejunal anastomoses were done as the usual ones of roux en y technique. Observing for early and late post operative complications related to pancreatic and biliary anastomoses, the patient is surviving for 27 months now without any significant ones.
CONCLUSIONS: Whipple's procedure can be performed safely when done as part of cytoreduction surgery and HIPEC in terms of early and late post operative complications known to be related to the pancreatic and biliary enteric anastomoses.

P502

PERITONEAL METASTASIS FROM GASTRIC ORIGIN. 31 CONSECUTIVE PATIENTS TREATED WITHR RADICAL SURGERY PLUS HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY. RESULTS FROM THE CATALONIAN PERITONEAL CARCINOMATOSIS PROGRAM, SPAIN

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BACKGROUND: PM from gastric origin is a rather frequent presentation. It is diagnosed at the time of initial surgical treatment in 15-50% of patients with gastric serosal involvement. Once it is present, it is associated with poor survival, with mean survivals from 3 to 9 months, and 0% survival at 5y. PM is the most common cause of therapeutic failure during curative treatments of gastric cancer. Systemic chemotherapy offers little benefit in symptoms control and survival. CRS+HIPEC has a beneficial impact in selected patients with gastric PM, with significant statistically benefit in overall survival. We present the results of patients with Peritoneal Carcinomatosis (PC) from gastric origin treated with CRS+HIPEC, at a highly specialized PC program.
METHODS: September06/April16: 653 patients with PC from different types of Peritoneal Surface Malignancies have been treated by 729 CRS+HIPEC procedures. Of those, 31 pt had gastric PM. We performed the multidisciplinary treatment on patients who showed either disease stability or response to systemic neoadjuvant chemotherapy assessed by laparoscopy F:22, M:9. Mean age: 48.4 y. 25 pt had synchronous PM, and in 6 pt PM presented as recurrent disease. 31 pt received prior systemic chemotherapy (up to 3 lines). Positive cytology was the indication in 5 patients. Histology: 10 pt diffuse, 20 pt intestinal and 1 pt mucinous. 6pt linitis and 17 pt signet ring cell. Mean PCI 7/39. CRS: CC0 in 27 pt and CC1 in 4. 22 pt total gastrectomy and 3 pt subtotal gastrectomy. Reconstruction: 15 Henley Longmire, 7 Y Roux, 5 Billrtoth II. HIPEC: CDDP 80 mg/m2+Doxorrubicin 15 mg/m2, at 42.1ºC (median), 60 min. Mean operative time 6h 43min (ED 1h 22min). ICU and Hospital stay: 2 and 14 days. Adjuvant chemotherapy: 54.8%.
RESULTS: The results showed in this series have been subjected to an external audit Median follow up: 12.5 months (1.9-85.7 months) Overall morbidity: 19.4%. No anastomotic dehiscence. 1 reoperation for intestinal occlusion. Mortality: 0%. One-year survival rate: 61.1%. Three-year survival rate: 22%. Five-year survival rate: 13.2%. Mean/ Median survival: 26.2/ 16.3 m. Median survival PCI=10 *vs* >10 was 27.1 m *vs* 7.5 m Median survival signet ring cell *vs* absence: 8.1 *vs* 31.5m.
CONCLUSIONS: CRS+HIPEC it is highly recommended for PC from gastric carcinoma, in a very selected group of patients. Good response to prior systemic therapies, low PCI (=10/39), complete cytoreduction surgery and favorable histological grade are prognostic factors used for patient selection at our Program. Based on our results we propose to discard patients with signet ring cells. Although published survival results are poor compared to other PM's, they are far better when compared to systemic therapies. It is especially important to refer these patients early on to specialized centers.

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CRS AND HIPEC FOR PATIENTS WITH PERITONEAL METASTASES OF GASTRIC CANCER

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BACKGROUND: Patients with peritoneal metastases of gastric cancer have poor prognosis with a median survival time of 7 months. Cytoreductive surgery (CRS) in combination with hyperthermic intraperitoneal chemotherapy (HIPEC) showed major improvement in survival in a selected group of patients. The aim of this study was to investigate the impact of CRS and HIPEC on morbidity and survival.
METHODS: This retrospective analysis of prospectively collected data includes all patients with peritoneal metastases of gastric cancer treated with CRS followed by HIPEC (60min, mean temperature 41°C) at our center between 01/2008 and 03/2015 (n=41). The mean age was 55.1 (SD 10.2) years with a mean BMI of 25.5 (SD 5.1). 40 (97%) patients received preoperative systemic chemotherapy.
RESULTS: Overall morbidity was 29% and one patient died within

the hospital stay (mortality: 2%). 7 patients (17%) developed surgical complications as anastomotic leakage (n=2), burst abdomen (n=2), wound healing disorder (n=5), fistula of the pancreas (n=2) intraabdominal abscess (n=2) and postoperative hemorrhage (n=1). The mean operation time was 371 (SD 138) minutes with a mean blood loss of 679 (SD 488) ml. Mean follow up was 12 months, median survival of the patients was 11 months. Our study confirmed PCI <13 (13 *vs* 7 months; p=0.03) and CCR0 (16 *vs* 7 months; p=0.04) as relevant predictive factors of higher patient survival.
CONCLUSIONS: CRS and HIPEC showed positive results in selected patients with peritoneal metastases of gastric cancer. The rate of severe complications and in hospital mortality was acceptable. The impact of HIPEC in addition to cytoreductive surgery will be evaluated by the ongoing GASTRIPEC study.

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LAPAROSCOPIC HIPEC IN PATIENTS WITH PERITONEAL AND LIVER METASTASIS OF GASTRIC CANCER

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BACKGROUND: Peritoneal metastasis (PM) of gastric cancer (GC) is challenging disease with limited survival. We report the direct effects of hyperthermic intraperitoneal chemotherapy (HIPEC) in PM of GC patients.
METHODS: We report the direct effects of hyperthermic intraperitoneal chemotherapy (HIPEC) in PM of GC patients. Five cases with PM of GC were treated with neoadjuvant laparoscopic HIPEC. Laparoscopic HIPEC was performed at 43 degrees for 90 minutes with 20mg/m2 Taxotere and 20mg/m2 cisplatin then intraperitoneal/ intravenous (bi-directional) chemotherapy was performed for 2-6 cycles. Ascites volume and cytology for peritoneal free cancer cells (PFCC) and peritoneal cancer index (PCI) were evaluated.
RESULTS: Peroperative morbidity and mortality have no experienced in these patients. Two out of 5 (40%) cases were with liver metastases. Ascites were diminished and PFCC were not detected in patient with peritoneal and liver metastases after laparoscopic HIPEC. Ascites and PFCC was completely disappeared in two of three (66%) patients. PCI was diminished in 2 of 3 cases (100%) after laparoscopic HIPEC and bidirectional chemotherapy in patients with PM of GC.
CONCLUSIONS: Laparoscopic HIPEC is safe and feasible to control ascites and peritoneal free cancer cells. PCI can also diminish with laparoscopic and bidirectional HIPEC in patients with PM of GC. This method has a limited effect in the presence of ascites due to liver metastasis.

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EARLY AND LONG-TERM OUTCOMES OF R0 RESECTION AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR GASTRIC CANCER PATIENTS - RESULTS OF A SINGLE CANCER CENTER

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BACKGROUND: Treatment with HIPEC for gastric cancer has been described both as part of cytoreductive surgery in patients with peritoneal metastasis and in the adjuvant setting for high-risk subjects.
METHODS: The aim of this study is to describe a single cancer center experience in the treatment of gastric cancer with radical surgery and HIPEC and to analyze prognostic factors of morbidity and survival. This is a retrospective study that investigated gastric cancer patients treated with curative intent in a single center between 2008 and 2015. Multimodality treatment included at least three cycles of preoperative chemotherapy, surgery with gastrectomy and D2-lymphadenectomy and HIPEC, followed by postoperative chemotherapy. Between 2008 and 2015, 38 consecutive patients received this treatment regimen, 24 of them with M0 disease and high-risk tumors (cT3-4, cN+ and diffuse type) and 14 with peritoneal metastasis. Morbidity and survival univariate analyses were performed, followed by the development of multiple regression models.
RESULTS: Median age of all 38 individuals was 52 years old and no gender predominance was identified. Most were classified as ASA 2 (84%) and 65% had prior history of weight loss. A total gastrectomy was performed in 30 patients and all subjects had a D2-lymphadenectomy. Median operative time was 630 minutes and blood transfusion was needed for 11 patients. An associated cytoreductive procedure was needed for 14 individuals with peritoneal metastasis and their PCI varied between 4 and 16. The HIPEC regimen included Mytomicin C for the first 29 cases, while the last 9 were treated with a platin-based regimen. Overall 60-day morbidity of all patients was 47.4%, although only 8 of them had the modified Clavien Grade III and IV complications (20.8%). No 90-day postoperative death was observed. Pathology reports identified T4a tumors in 63% of the cases and N3 disease in half of the patients. Age and serosa invasion were prognostic factors for morbidity, while serosa invasion, operative time and number of preoperative chemotherapy cycles influenced the ocurrence of major complications. Patients with M0 disease had median follow-up of 28 months. Their median survival had not been reached and their 3-year overall survival was 68%. Those with peritoneal metastases had median follow-up of 12 months and median survival of 28 months. The presence of N3 lymph node disease was associated with significantly worse overall survival both in M0 and M1 patients, with the latter having median survival of only 14 months.
CONCLUSIONS: R0 resection followed by HIPEC provides good early and long-term outcomes for nonmetastatic gastric patients with high-risk disease and also for selected subjects with limited peritoneal metastasis. It may not be effective in cases with advanced lymph node disease.

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DOES HIPEC IMPROVE OVERALL SURVIVAL IN PERITONEAL CARCINOMATOSIS FROM GASTRIC ORIGIN? A MONOCENTRIC RETROSPECTIVE AND COMPARATIVE STUDY

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BACKGROUND: Treating peritoneal carcinomatosis from gastric origin (PCG) is a challenge and is still associated with poor prognosis. For selected patients, complete cytoreduction (CRS) combined with hyperthermic intraperitoneal chemotherapy (HIPEC) can achieved prolonged survival.
METHODS: The aim of this study is to evaluate our practice to select and treat PCG and evaluate survival rate in our expert center. Between 2007 and 2014, all patients treated for PCG in our center were included. Fortuitous peroperative discovery of PCG were excluded for analysis. We evaluated survival from the diagnosis of PCG. After the first consultation, 3 ways of treatment were proposed: non suitable for surgery, laparoscopy to evaluate PCG and laparotomy in order to realized complete CRS and HIPEC. Therefore, we defined 3 populations to evaluate the survival: recused after consultation (CONSULT group), recused after laparoscopy (LS group), recused after laparotomoy (LM group) and HIPEC group.
RESULTS: Fifty-five patients were included for analysis. Median age at PCG diagnosis was 50 years (IQR 44-56.5), 82% had a synchronous disease (n=45), 75% had a signet cell ring carcinoma (n=41). Five

patients (9%) were recused at consultation, 29 (53%) had LS and 21 (38%) had a LM at once. During LS, 15 had an extensive PCG and were therefore recused for HIPEC and 14 were addressed to LM. Therefore, 35 patients had a LM in order to have CRS and HIPEC. Complete CRS and HIPEC was realized for 15 patients. Median Peritoneal Carcinomatosis Index (PCI) was 4 (IQR: 7). 26% had severe complications and 50% had adjuvant chemotherapy. Mean follow-up was 24 months (IQR: 10). At the end of the follow-up, in the HIPEC group 20% were alive without recurrence and 7% were alive with recurrence. Survival was prolonged in the HIPEC group *versus* LS group (HR: 4.38 CI95% 1.63-11.72, p=0.03) and LM group (HR: 2.90 CI95% 1.12-7.49, p=0.003). We also compared HIPEC *versus* all patients recused and survival was as much better (HR: 3.17 CI95% 1.82-7.62, p=0.01)

CONCLUSIONS: This therapeutic strategy selects patients who have limited PCG and are suitable for treatment. Complete CRS and HIPEC achieved prolonged survival in selected patient. The challenge is therefore to detect precociously those patients who can benefit from this strategy.

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SELF-CROSSLINKED HYALURONIC ACID GEL INHIBITS METASTASIS AND GROWTH OF GASTRIC CANCER CELLS: *IN VITRO* AND *IN VIVO* STUDIES

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BACKGROUND: Peritoneal metastasis (PS) of intra-abdominal malignancies is a significant clinical issue. The PS could be caused by invasion and migration of cancer cells directly from the primary cancer or could originate from the dispersed cancer cells during tumorectomy. The cancer cells can adhere to the peritoneal mesothelium, proliferate, and invade adjacent organs and tissues. Therefore, inhibition of cancer cell adherence, migration, invasion and growth is critical for preventing PS. Hyaluronic acid (HA) is a non-sulfated glycosaminoglycan presenting in body ECM. HA with high molecular weight or crosslinked HA has been shown to inhibit invasion and growth of cancer cells.

METHODS: In present study, a novel self-crosslinked HA gel (CHAG) was evaluated for its potential inhibition on invasion, migration and growth of gastric cancer cells, through *in vitro* and *in vivo* experiments.

RESULTS: Materials Human gastric cancer cell lines AGS and SGC-7901 were from Institute of Cell Biology (Shanghai, China). CHAG (HyaRegen® gel) was provided by BioRegen Biomedical Co., Ltd, (Changzhou, China). Panel of antibodies was from Cell Signaling Technology (Danvers, MA, USA). Transwell plates (8-μm pore size) were from Corning Inc. (Tewksbury, USA). Methods 1. Cancer cell migration and invasion assays were performed using a standard transwell plate model. 2. "Pull-down" analysis was applied to detect active small G protein RhoA and Racl. 3. Cell transfection and A interference: Transfection of cells with siA was performed using Lipofectamin 2000. The inhibition of protein expression was detected by Western blotting. Influence of CHAG on the interactions between epidermal growth factors (EGFs) and its cell surface receptors was analyzed by applying Alexa Fluor 647-conjugated EGF and flow cytometry. 4. To observe prevention of tumor cell attachment/colonization in peritoneal cavity by CHAG, 1×107 SGC-7901 cancer cells suspended in 400 μl PBS containing CHAG (500 μg/ml) were injected into peritoneal cavity of nude mouse. The mice were euthanized 25 days after inoculation of the cancer cells. To inhibit the early growth of transplanted tumor cells, same amount cells were injected into the peritoneal cavity first and then 400μl PBS containing CHAG (500μg/ml) was injected into the peritoneal cavity at the 2nd hour after cancer cell injection. To inhibit the mid-term growth of transplanted tumor cells, CHAG was injected at the 7th day after cancer cell peritoneal implantation and tumor mass formed; and the injection was repeated once a week for seven weeks. The mice were normally fed for 56 days. Tumor formation was evaluated by weighing tumor masses.

CONCLUSIONS: CHAG has inhibitory effects on the invasion and migration of gastric cancer cells in an *in vitro* study. Tumor colonization on peritoneal mesothelium and growth of cancer tissue in peritoneal cavity were also attenuated by CHAG application *in vivo* experiment. Those inhibitory effects could have been achieved through covering cell surface and blocking the interaction between extracellular stimulating factors and their receptors. Therefore, CHAG can be used after tumorectomy, alone or as a carrier for chemotherapy drugs, to prevent peritoneal tumor metastasis.

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GASTRIC CANCER AND HIPEC

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BACKGROUND: Gastric cancer is 4th most common cancer in the word. It is second leading cause of death between patients with malignant disease. Unfortunately in western countries are usually diagnosed in advanced stages and curative treatment is very limited. Peritoneal carcinomatosis is most frequent type of dissemination and recurrence too. HIPEC is promising treatment but proper position in treatment algorithm is still unknown.

METHODS: We analyse articles dealing with HIPEC in gastric cancer treatment published since end of 2013 (after Coccolini metaanalysis was published). We searched various databases with key words "gastric cancer" and "HIPEC". We included only original articles not reviews and metaanalyses.

RESULTS: We have found 22 studies most of them retrospective and nonrandomised dealing with advanced gastric cancer and HIPEC. In these studies were treated more than 1500 patients.

HIPEC is indicated in three clinical situations: - Prophylactic HIPEC. - Treatment of peritoneal disease. - Palliative treatment of malignant ascites. Results favourable HIPEC in treatment patients with peritoneal metastases of gastric cancer origin in overall survival and disease free survival. The results depend on PCI and CCS.

CONCLUSIONS: HIPEC is safe method in the treatment of gastric cancer and results are promising. Probably the best option is prophylactic indication but clinical data are infrequent yet.

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INITIAL EXPERIENCE OF LAPAROSCOPIC HIPEC WITH BIDIRECTDIONAL CHEMOTHERAPY FOR ADVANCED GASTRIC CANCER

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BACKGROUND: Advanced gastric cancer may also present with peritoneal seeding and was considered as inoperable. Systemic chemotherapy did not provide a satisfied outcome. Intraperitoneal chemotherapy as well as systemic chemotherapy was considered as a reasonable treatment method.

METHODS: Gastric cancer patient with peritoneal seeding was diagnosed by laparoscopy, and was judged as inoperable. Patients met the criteria were enrolled for initial hyperthermic intraperitoneal chemotherapy (HIPEC), implant of intraperitoneal catheter. Then intraperitoneal chemotherapy with docetaxel, cisplatin and concomitant systemic 5-FU were given on the 1st and the 8th day, and repeated every 21 days. After three cycles of chemotherapy, CT scan was performed for re-evaluation. Cytoreduction surgery with peritonectomy and HIPEC were performed if it was suitable for operation, otherwise,

patients will receive another three courses of bidirectional chemotherapy. After operation, adjuvant chemotherapy will be given to a full 6 courses.
RESULTS: A total of 8 patients received bidirectional chemotherapy. There was no mortality during the treatment course. One patient suffered from intestinal thermal injury during the laparoscopic HIPEC and could not complete the treatment. Leukopenia and neutropenia was the main side effect, but no one experienced neutropenic sepsis. Disease progression was observed in one patient and stationary in another patient. The other 5 patients received cytoreduction surgery and HIPEC, and continue the rest courses of chemotherapy. These 5 patients all survived, with the longest survival exceeded 30 months, though two were recorded as recurrence/metastasis.
CONCLUSIONS: Laparoscopic HIPEC with bidirectional chemotherapy was feasible in advanced gastric cancer patients. It may provide as an alternative method of "neoadjuvant" treatment. We need a large scale of clinical trial for further evaluations.

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LAPAROSCOPIC HIPEC FOR PALLIATION OF PERITONEAL CARCINOMATOSIS WITH ASCITES FROM GASTRIC CANCER; A CASE REPORT

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BACKGROUND: Peritoneal carcinomatosis of gastric cancer is well known for its dismal prognosis. Recent population based report from Netherlands showed median survival was 3.3 ~ 4.6 months after diagnosis. Numerous efforts have made to improve the outcome of treatment for peritoneal carcinomatosis of gastric cancer. One of the most promising treatment for peritoneal carcinomatosis of gastric cancer is HIPEC. But in fact, the outcome of HIPEC for peritoneal carcinomatosis of gastric cancer was not as good as HIPEC for peritoneal carcinomatosis from other malignancies, such as ovarian cancer, pseudomixoma peritonei, malignant mesothelioma. Therefore, supplementary modification of HIPEC is suggested to be combined with systemic chemotherapy such as preoperative bidirectional chemotherapy or HIPEC as a prophylactic measure. Notwithstanding unsatisfactory outcome for the cure of peritoneal carcinomatosis from gastric cancer yet, the possibility of palliation for malignant ascites has been suggested.
METHODS: We experienced a patient in whom malignant ascites from gastric cancer have been controlled effectively with palliative laparoscopic HIPEC.
RESULTS: A 51-year-old male presented with generalized weakness, weight loss, and abdominal distention for several months. Esophagogastroduodenoscopy and PET/CT scan showed Borrmann type IV gastric cancer with massive ascites and peritoneal carcinomatosis. Pathological confirmation was performed by endoscopic biopsy and proved to be poorly cohesive carcinoma of the stomach. Initial staging laparoscopy revealed diffuse peritoneal carcinomatosis involving all quadrants with massive ascites and 4,000 ml of ascites was aspirated. Palliative laparoscopic HIPEC was performed through 6 trocars (2 for inflow, 2 for out flow, and 2 for thermometers) with the Belmont® Hyperthermia Pump (Belmont Instrument Corporation, Billerica, MA). The procedures consisted of priming and warming of normal saline for 30 minutes, mixing of 60 mg of mitomycin C with saline warmed to 43°C, and intraperitoneal perfusion for 120 minutes with the inflow temperature of 43°C. There was no postoperative complication. After discharge the patients had good physical activity without recurrence of abdominal distention and he gained body weight of 4.7kg during 3 months. He underwent second staging laparoscopy and HIPEC after three months. There was 500 ml of ascites and partial response of peritoneal carcinomatosis. But peritoneal cytology was positive with signet ring cells. He underwent HIPEC again with the same procedures. No postoperative complication occurred. The patient have maintained good physical activity during 8 months after the first diagnosis of peritoneal carcinomatosis.
CONCLUSIONS: This case showed a possibility of palliative laparoscopic HIPEC in effective control of malignant ascites and improvement of quality of life in patient with peritoneal carcinomatosis from gastric cancer. Therefore, a prospective multicenter study is needed to confirm the definite role of palliative laparoscopic HIPEC in patient with peritoneal carcinomatosis from gastric cancer.

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CURRENT STATUS AND FUTURE PROSPECTS FOR CLINICAL TRIALS IN GASTRIC CANCER PERITONEAL CARCINOMATOSIS

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BACKGROUND: Peritoneal carcinomatosis (PC) is the number one route among the three major forms of gastric cancer (GC) metastasis: blood-route metastasis, lymphatic metastasis, and seeding metastasis. Both institution-based and population-based clinical studies demonstrated a median overall survival (OS) of about 5 months for such patients. Currently, no standard treatment guidelines are available for this important problem. As a results, high-level clinical trials are in urgent need in order to develop optimal treatment strategies for this problem.
METHODS: This study is to review the currently available clinical trials on CRS+HIPEC for GC PC, published since 1991. These studies covers institution- and population-based studies on the epidemiology of GC PC, retrospective studies on CRS+HIPEC, and prospective studies on CRS+HIPEC. Survival and safety profiles are the key considerations in this review.
RESULTS: The median OS of GC PC was 3.1 months in a large-sample institutional study, and 4.6 months in a population-based study. CRS+HIPEC could improve the survival of such patients. In three retrospective studies on PC, the median OS for 300 GC PC patients was about 13.0 months after CRS+HIPEC. In five prospective studies on 256 GC PC patients, the median OS was about 11.0 months *vs* about 5.0 months for CRS+HIPEC *vs* control. In retrospective studies on 1374 patients with GC PC, the median OS was about 11.3 months. CRS+HIPEC could double the OS in selected patients with GC PC. There is no statistically significant increase in serious adverse events directly attributed to CRS+HIPEC.
CONCLUSIONS: Adequate clinical evidence is now available to support the advantages of CRS+HIPEC over traditional treatments for GC PC. CRS+HIPEC should be advocated as the treatment of choice for selected patients with GC PC, in experienced treatment centers.

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MULTIMODALITY TREATMENT OF ADVANCED GASTRIC CANCER WITH PERITONEAL CARCINOMATOSIS. A SINGLE-CENTER EXPERIENCE

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BACKGROUND: Peritoneal carcinomatosis (PC) is the most common way of dissemination in gastric cancer and carries an extremely poor prognosis. The use of an aggressive treatment, based on perioperative systemic chemotherapy (SCT) accompanied by a complete cytoreductive surgery (CRS) and hyperthermic intraoperative intraperitoneal chemotherapy (HIPEC), seems to improve prognosis and survival in selected patients.
METHODS: The aim of this study is to analyze morbidity and survival of the patients with PC from gastric cancer origin in our reference center.

RESULTS: From June 2006 to December 2015, 36 patients were included for multimodal treatment of gastric cancer with peritoneal dissemination. Exploratory laparoscopy was performed as part of the diagnostic process to objectify macroscopic peritoneal disease (assessed by the Sugarbaker's peritoneal cancer index or PCI), positive cytology or both. When CRS and HIPEC was indicated, this technique was carried out following Sugarbaker's open (coliseum) technique with Doxorubicin and Cisplatin for 90 minutes at 42°C, along with perioperative SCT. Median age of patients was 54 years (range 28-75). Median tumor marker value at diagnosis was 1.7 (range 0.2-18.4) for the CEA and 26.1 (range 1-7000) for the CA 19.9. Exploratory laparoscopy was performed in 32 of the 36 patients, with a median PCI of 4 (range 0-20). During exploratory laparoscopy 9 patients had macroscopic peritoneal disease, 6 had positive cytology, and 16 had both. Thirty three patients were treated with CRS and HIPEC. In 78.8% (26/33) of patients a complete cytoreduction (CC-0) was achieved, with a median intraoperative PCI of 6 (range 0-30) and a median surgical time of 410 minutes (range 185-680). Three patients did not undergo surgery due to disease progression during neoadjuvant treatment. The median ICU stay was 3 days (range 0-9) and the median hospital stay was 16 days (range 4-93). Morbidity and mortality were registered according to the Clavien-Dindo scale: 24% did not have any complications, 25% had minor (grade I or II) complications, 45% had severe (grade III or IV) complications and two patients died during the postoperative period (6%). Median disease-free survival (DFS) was 6 months and overall survival was 16 months, with a 1-year survival of 60% and a 2-year survival of 19%. Median follow up was 20 months (range 0-83).
CONCLUSIONS: Multimodal treatment of advanced gastric cancer with PC, based on perioperative SCT and complete CRS with HIPEC, may improve survival in selected patients.
This complex treatment should be performed in experienced centers.

P513

HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY AND NEOADJUVANT CHEMOTHERAPY AS PROPHYLAXIS OF PERITONEAL CARCINOSIS FROM ADVANCED GASTRIC CANCER. EFFECTS ON OVERALL AND DISEASE FREE SURVIVAL

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BACKGROUND: The possibility to enlarge criteria for intra-peritoneal chemotherapy (IPC) to all patients at high-risk to develop peritoneal carcinosis (*i.e.*, with serosal invasion) is still discussed.
METHODS: Test efficacy of prophylactic hipec in OS and DFS in GC with a retrospective case-control study. Three-groups: advanced-gastric-cancer (AGC) (pT4) without proven carcinosis: prophylactic group (PG), those with PC: treatment group (TG), AGC (pT3–pT4) operated without hyperthermic intraperitoneal chemotherapy (HIPEC), surgery alone group (SG T3, SG T4).
RESULTS: Forty four patients. 26 (59.1%) were male. Sixteen (36%) patients underwent 16 HIPEC: 6 (38%) had AGC (pT4) without PC (PG), 10 (62%) had carcinosis (TG), 28 were operated without HIPEC (SG T3, SG T4). The mean disease free survival (DFS): TG: 7.7 months, SG T4: 21.6 months, SG T3: 27.7 months, PG: 34.5 months. DFS was significantly different for TG (P=0.03, P=0.021, P=0.013 respectively). The mean OS TG: 10 months, SG T4: 27.1 months, SG T3: 28.2 months, PG: 34.6 months. OS was significantly different for TG (P=0.04, P=0.04, P=0.045 respectively). Severe complication rate: TG: 60%, PG: 16.7%, SG T3: 7.7% and SG T4: 25% (P=0.035). Length-of-stay differs significantly (P=0.003); overall length-of-stay: 19.41 days [standard deviation (SD) ±15.03]; TG: 33.01 (SD ±23.08), PG: 20.17 (SD ±6.21), SG T3: 11.33 (SD ±3.22), SG T4: 15.36 (SD ±5.48).
CONCLUSIONS: Prophylactic intraperitoneal chemotherapy associated to neoadjuvant chemotherapy increases the DFS and OS in patients with AGC without carcinosis. More data are needed in order to confirm these results.

P514

OVERALL AND DISEASE-FREE SURVIVAL IN PATIENTS TREATED WITH CYTOREDUCTIVE SURGERY PLUS HIPEC FOR PERITONEAL CARCINOMATOSIS FROM GASTRIC CANCER

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BACKGROUND: We reviewed our experience regarding cytoreductive surgery (CRS) and hyperthermic chemotherapy (HIPEC) in patients with synchronous (SPC) and metachronous (MPC) peritoneal carcinomatosis (PC) from gastric cancer (GC) in terms of overall and disease-free survival (OS and DFS).
METHODS: A retrospective statistical analysis of prospectively collected data was conducted: data regarding patients who underwent to CRS and HIPEC from July 2011 to July 2016 were analyzed. Patients and tumor characteristics, pre and post-operative data were collected. The outcomes were overall survival and disease-free survival in the two groups.
RESULTS: A total of 17 cases were reported. All patients of SPC group were subjected to neoadjuvant chemotherapy and all patients of MPC group to adjuvant chemotherapy after surgery of the primary tumor. Mean follow up was 9 months (SD±9,5). Thirteen patients (76.5%) had SPC and four (23.5%) had MPC. Mean total PCI was 8,5 (SD±8,4). Mean PCI was 3,75 (SD±4,9) for SPC group and 16 (SD±9,5) for MPC (p=0,003). HIPEC regimen was cisplatin plus taxol for fourteen patients (82,4%) and cisplatin plus mitomycin-C for three patient (17,6%). OS was 16 months and 6 months respectively in patients with SPC and MPC (p=0.189). DFS was 11 months and 2 months respectively in the two groups (p=0.156). Patients with SPC and PCI=12 were significant different from SPC with PCI<12 for DFS (p=0.001). Eight patients (61%) had postoperative major complications (CTCAE>2) in SPC group and four patients (100%) in MPC group.
CONCLUSIONS: HIPEC and CRS in patients with PC from GC has promising results in improving the DFS and the OS especially in patients with PCI<12, although with an high incidence of complications.

P515

CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR ADVANCED GASTRIC CANCER IN POLAND: INITIAL EXPERIENCE

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BACKGROUND: The combined modality treatment of cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) had emerged as an effective tool for the treatment of appropriately selected patients with positive cytology and/or peritoneal metastases

from gastric carcinoma. However, there are scarce data on outcome of this comprehensive treatment in Central-European countries.
METHODS: Aim of the study is to report initial experience of CRS+HIPEC for advanced gastric cancer in Poland.
RESULTS: Between November 2011 and July 2016, 26 patients were treated according to the protocol. There were 9 (35%) males and 17 (65%) females. Age ranged 30-70 years (mean ±SD: 51,9 ±11,6). Sixteen (62%) patients had synchronous, whereas remaining 10 patients were treated for metachronous peritoneal metastases. Median PCI was 5 (range 0-19; mean ±SD: 6,5 ±6,1). Complete regression of overt peritoneal metastases found at diagnostic laparoscopy, following preoperative systemic therapy, was observed in one (4%) patient. Complete cytoreduction CC0 was achieved in 20 (77%) patients, and CC1 in the remaining 6 patients. HIPEC was performed with closed, open Coliseum, and laparoscopic technique in 18, 7, and 1 patients, respectively. In 92% of patients single cytostatic agent, mainly oxaliplatin, was used for HIPEC. Median duration time of the CRS and HIPEC were 240 and 30 minutes, respectively. In half of the patients blood transfusions were necessary with median blood loss of 250 ml. Complication rate was 69%, and grade ¾ complications were found in 35% of patients. Median CCI was 20,9. There were no in-hospital deaths. However, one patient died after re-admission to another hospital due to pulmonary embolism (30-day mortality 3.8%). Median postoperative hospital stay was 10 days (range 5-41; mean ±SD: 12 ±7,2). Two-year overall survival rate was 32%, with median survival of 12,3 months.
CONCLUSIONS: 1) Wide practical application of diagnostic laparoscopy & cytology in staging work-up is warranted; 2) referral of patients with advanced gastric cancer (positive cytology and/or peritoneal metastases) to Ts with intraperitoneal comprehensive treatment capabilities (perioperative and intraperitoneal chemotherapy; D2 gastrectomy+peritonectomy) is justified.

P516

FEASIBILITY AND SAFETY OF HIPEC IN TREATMENT OF GASTRIC CANCER WITH HIGH RISK OF CARCINOMATOSIS

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BACKGROUND: Hyperthermic Intraperitoneal Chemotherapy (HIPEC) is a feasible and safe treatment method in patients with gastric cancer having a high risk of development of peritoneal carcinomatosis.
METHODS: We started to use HIPEC as a "prophylactic" setting in gastric patients patients having a high risk of peritoneal carcinomatosis development since 2015. The indications for applying this method were massive tumor invasion of the stomach serosa and diffuse type poor-differentiated tumor histology. We used "closed" HIPEC technique, with 3 inflow and 3 outflow catheters, RAND HT performer and 7 liters of saline solution with 200 mg cisplatunum. In 2015 we have treated 8 patients with gastric surgery added by HIPEC. There were 4 men and 4 women. Median age was 48 years. In 2 cases distal subtotal gastric resection was performed, in other 6 cases - total gastrectomy with a D2 lymph nodes dissection. In 2 cases was also performed an edge resection of the pancreas. Median surgery time was 4 hours.
RESULTS: There was 0% mortality in early postoperative period, but 25% morbidity (2 patients of 8). One patient developed severe postoperative pancreonecrosis which required several re-operations. In one case an acute renal failure occured, after 3 dialyse sessions the renal function was recovered. Other 6 patients were discharged from the hospital within 14 days after surgery.
CONCLUSIONS: HIPEC with cisplatinum is a feasible and safe method which can be used in gastric cancer patients with high risk of peritoneal canceromatosis development. The use of HIPEC doesn't result in elevation of complications or mortality rate. The follow-up of these patients continues to obtain long-term results of treatment.

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CURATIVE TREATMENT INTENT OF THE ADVANCED GASTRIC CANCER WITH CHEMOTHERAPY FOLLOWING CYTOREDUCTIVE SURGERY AND HIPEC: CASE REPORT

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BACKGROUND: Gastric cancer is a therapeutic challenge in the World due to late diagnosis, advanced stages of the disease in time of diagnosis and recurrence. The importance of cytoreductive surgery and HIPEC after chemotherapy with good response seems to be a new aproach.
METHODS: Demonstrate a case report of patient who suffered from advanced tubular adenocarcinoma gastric cancer and was treated by chemotherapy following cytoreductive surgery and HIPEC.
RESULTS: Female patient, 65 years-old, with an advanced tubular adenocarcinoma gastric cancer (cT3cNxpM1 - peritoneal metastases - biopsy by laparoscopic) with peritoneal carcinomatosis index (PSI) of 3 was treated by chemotherapy (FOLFOX - Oxaliplatin, 5-fluorouracil and leucovorin) followed by a cytoreductive surgery with HIPEC (Oxaplatin and 5-Fluorouracil). The cytoreductive surgery was total gastrectomy with D2 linfadenectomy, parietal peritonectomy cholecystectomy, total hysterectomy and apendicectomy. The post operative period not had complications or recidive. The pathology did not reveal tumor in the examined specimens. The post operative period not had complications or recidive with a follow-up of 4 months. The pathology did not reveal tumor in the examined surgical specimens, only in biopsy pre-chemotherapy.
CONCLUSIONS: This case demonstrate a potential benefit of new surgical approach: chemotherapy followed by cytoreductive surgery and HIPEC in the treatment of advanced tubular adenocarcinoma gastric cancer that responds to chemotherapy

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GASTRIC PERITONEAL CARCINOMATOSIS - A RETROSPECTIVE REVIEW OF CLINICAL FEATURES AND TREATMENT OUTCOMES

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BACKGROUND: There is a paucity of literature examining the characteristics, clinical course and treatment outcomes of patients with gastric peritoneal carcinomatosis. Peritoneal carcinomatosis is known to cause various troubling symptoms requiring repeated hospitalisations which may interrupt and prematurely terminate any planned palliative systemic chemotherapy. We aim to characterise patients with gastric peritoneal carcinomatosis and their typical clinical and treatment course to see how well this subset of metastatic gastric cancer patients are doing with palliative systemic chemotherapy as the current standard of care.
METHODS: - To examine the clinical course of patients with gastric peritoneal carcinomatosis. - To examine the treatment outcomes of patients with gastric peritoneal carcinomatosis on palliative systemic chemotherapy.
RESULTS: We retrospectively studied a total of 271 patients over a 5-

year period in a single tertiary referral centre with a median age of 63.8 years and median follow-up duration of 5.1 months. The majority (n=217, 80.1%) had the peritoneum as the only site of metastasis at initial presentation. Patients with isolated peritoneal metastasis as compared to those with other concomitant distant sites of metastasis had a significantly higher proportion of females, and diffuse histology and a lower proportion of HER2/Neu overexpression. Palliative systemic chemotherapy was eventually planned for 175 (64.6%) of our patients following initial metastatic presentation, of which 171 were initiated on it. These patients underwent a median of 1 line of chemotherapy, completing a median of 6 cycles in total. Of these 171 patients, chemotherapy disruption due to unplanned hospitalisations occurred in 114 (66.7%), while cessation of chemotherapy eventually occurred in 157 (91.8%) of them, with 42 cessations primarily attributable to peritoneal disease-related complications. In terms of overall survival, patients with had initiation of palliative systemic chemotherapy had a significantly better median overall survival than those who did not (10.9 *vs* 1.6 months, p<0.001). Of patients who had initiation of systemic chemotherapy, those who experienced any disruptions to chemotherapy due to unplanned hospitalisations had a significantly worse median overall survival compared to those who did not (8.7 *vs* 14.6 months, p<0.001).

CONCLUSIONS: Gastric peritoneal carcinomatosis carries a grim prognosis with a clinical course fraught with disease-related complications which may attenuate any survival benefit which palliative systemic chemotherapy may have to offer. Patients with isolated peritoneal carcinomatosis may as such have compelling benefit in pursuing aggressive loco-regional treatment options to maximise their survival outcomes in the long run.

P519

INITIAL EXPERIENCE WITH PIPAC APPROACH FOR MANAGEMENT OF NON RESECTABLE PERITONEAL CARCINOMATOSIS

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BACKGROUND: Pressurized intraperitoneal aerosol chemotherapy (PIPAC) is a recent approach of intraperitoneal chemotherapy with promising results in local control and survival for patients with peritoneal carcinomatosis (PC).

METHODS: To evaluate the postoperative outcome of the initial experience of PIPAC in 3 experienced centers in the management of PC beginning a PIPAC program.

RESULTS: Between December 2015 and June 2016, 45 patients underwent a PIPAC procedure for non resectable PC in 3 expert centers of PC management. Before PIPAC, 31 patients presented symptoms from PC (pain: 16; ascites: 11; transit disorder: 8). PC was from colorectal, gastric, ovarian, malignant mesothelioma, pseudomyxoma peritonei or other origin for 11, 17, 8, 4, 1 and 4 patients respectively. At time of the first PIPAC procedure, median patient' age was 58.6 (range: 32.3-77.9), with a median PCI of 20 (1-39). For 40 patients, systemic chemotherapy was proposed before PIPAC, with a median number of cycle of 9 (2-50), and 28 patients underwent more than 2 lines of preoperative chemotherapy. Among 45 patients who underwent a first PIPAC procedure, for 26 and 18 patients a second and then a third PIPAC procedure was performed, respectively. The second PIPAC procedure was not performed for occlusion in 2 patients, 2 patients died before the second procedure, 2 could undergo complete cytoreductive surgery, and for 2 the second PIPAC was no feasible. The third PIPAC was not performed for 2 patients due to occlusion and digestive perforation. The second and third PIPAC procedures are pending and scheduled for 11 and 6 patients, respectively.

Among the 89 PIPAC, 56, 27 and 6 were performed using cisplatinum-doxorubicin, oxaliplatin and mitomycin, respectively. The median hospital stay was 3 days (2-56). Major complications occurred for 13 patients (14.6%), and 2 patients died within 30 days the first PIPAC procedure. Seventy four patients restarted chemotherapy after PIPAC with a median delay of 14 days (4-28). Among 31 patients with preoperative symptoms related to PC, 14 patients presented with complete disappearance of symptoms.

CONCLUSIONS: Implementing PIPAC program is associated with a risk of postoperative morbidity even in high experimented teams in the management of PC. International consensus is mandatory to determine a standardized PIPAC protocol, before evaluating the impact of PIPAC on postoperative and long term outcome for patients with non resectable PC with randomized control trials.

Unusual Applications of Cytoreductive Surgery and Hyperthermic Intraperitoneal Chemotherapy

P601

PERITONEAL METASTASIS FROM UNUSUAL CANCER ORIGINS. CATALONIAN PERITONEAL CARCINOMATOSIS PROGRAM (SPAIN) EXPERIENCE

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BACKGROUND: Cytoreductive surgery (CRS) plus hyperthermic intraperitoneal chemotherapy (HIPEC) is the gold standard for curative treatment of peritoneal metastasis (PM) arising from colorectal cancer, peritoneal mesothelioma and peritoneal pseudomyxoma peritonei (PMP). The results of HIPEC remain controversial in PM originated from ovarian cancer, gastric cancer, neuroendocrine tumors, or sarcoma. HIPEC has also been used, although very rarely, for other malignant carcinomatosis. There is increasing literature helping to identify patients who may benefit from this treatment modality with other primary cancers. We present our experience with cytoreduction and HIPEC in patients with PM from rare or unusual primary tumors.
METHODS: From september06 to april16: 653 patients with peritoneal metastasis (PM) from different types of Peritoneal Surface Malignancies have been treated with 729 CRS+HIPEC procedures.
38 patients (6%) had secondary peritoneal carcinomatosis from unusual primary tumors: 8 PM from neuroendocrine tumours, 7 from peritoneal sarcomatosis (non GIST), 6 from small bowel PM, 5 from primary peritoneal serous carcinoma, 5 PMP of urachal origin, 3 endometrial carcinomatosis, 2 PM from GIST and 2 PM from adenocarcinoma mucinous of the endocervix. Female: 25, Male: 13. Mean age: 57.8 y (range 38-78). Mean PCI: 11/ 39.
RESULTS: Overall morbidity: 29% (11 pt). G III-IV: 15% (5 pt). 1 reoperation for hemoperitoneum. Non anastomotic leaks. Mortality: 0% Mean survival: 25 m. PM from neuroendocrine tumour: median sv 10m. Peritoneal sarcomatosis (non GIST): median sv 45.6 m. Small bowel PM: median sv 13 m. Primary peritoneal serous carcinoma: 2 pt alive disease-free (ADF) (14, 24 m), 2 pt alive with disease (AWD) (34 48 m), 1 pt dead of other cause (7m). PMP of urachal origin: 1 ADF (37m), 2 dead of disease (DOD) (11, 26m). Endometrial carcinomatosis: 2 AWD (11, 13m), 1 DOD (26m) PM from GIST: 1 AWD (77 m), 1 DOD (91m) Adenocarcinoma mucinous of the endocervix: 2 AWD (10-17m) 10 patients are ADF, and 11 are AWD (10, 17 m) 3 patients underwent a second CRS+HIPEC.
CONCLUSIONS: CRS+HIPEC approach to PM from rare primary tumors require: individualized assessment based in specialized centers: age, histology, natural history, chemosensitivity, incidence of other metastatic manifestations, PCI ...These patients should be prospectively entered into registries in order to better define their indications. This combined therapeutic approach, performed in an experienced center, is safe and can provide a survival benefit over conventional palliative treatments.

P602

OPEN-LABEL PILOT PHASE I/II STUDY OF HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY IN ADDITION TO MACROSCOPIC COMPLETE RESECTION (R0/R1) OF PANCREATIC ADENOCARCINOMA (PANHIPEC; EUDRA-CT NUMMER 2015-002288-41)

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BACKGROUND: In pancreatic adenocarcinoma, long-term survival remains poor with 5-year survival rates less than 20% even after curative resection. Disease recurrence has been reported in the local and regional area (50%), on peritoneal surfaces (40-60%) and as hepatic metastases (50-60%). Because of the anatomic location of the pancreas, wide resection margins are not possible resulting sometimes in R1-resections. Tumor dissemination and implantation within the resection site during surgery might be another possible explanation for the large number of local and regional failures. Hyperthermic intraperitoneal chemotherapy (HIPEC) combined with radical surgery has been shown to be capable of improving survival in selected patients suffering from peritoneal metastases derived from colorectal cancer. The goal of HIPEC is to erase minimal residual tumor and free floating tumor cells. However, this putative survival benefit hast to be weighed up against an increased perioperative morbidity and mortality.
METHODS: The aim of this phase I/II trial is to evaluate the impact of HIPEC with 1000 mg/m2 gemcitabine for 60 min in addition to macroscopic complete resection (R0/R1) of pancreatic adenocarcinoma. 30-day mortality was defined as primary endpoint. Safety and toxicity according to CTCAE 4.0 are defined as secondary endpoints. In case of a 30-day mortality of less than 10%, overall survival and disease free survival are going to be investigated in a separate phase III study.
RESULTS: The power to detect a critical event in more than one patient (=patient death) is >81.5%, when the incidence of the critical event is >10% in our patient population. Therefore, a maximum of 16 patients are enrolled for safety evaluation. The study will be stopped if more than one patient experiences a critical event.
CONCLUSIONS: The study is supported by a AKF-Grant of the University of Tübingen. Study initiation as investigator-initiated trial (IIT) was performed in november 2015. So far, 2 patients have been included and no severe HIPEC-related toxicity was observed.

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CRS AND HIPEC FOR RARE PERITONEAL TUMORS: RESULTS FROM INDIAN CENTERS

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BACKGROUND: CRS and HIPEC is the standard of care for treating malignant mesothelioma, pseudomyxoma peritonei and limited peritoneal spread from colorectal cancer and gastric cancer. For ovarian cancer, this treatment is investigational. Peritoneal metastases from other cancers are generally associated with wide spread systemic spread and are seldom candidates for this radical procedure. In addition, some rare peritoneal tumors or metastases to the peritoneum from rare tumors have been treated with CRS and HIPEC. There is no evidence to support the use of the treatment. However the only other alternative would be to offer palliative chemotherapy or supportive care.
METHODS: • This is a retrospective study of patients with peritoneal metastases from tumors other than colorectal, gastric, ovarian, peritoneal mesothelioma and pseudomyxoma peritonei treated with CRS and HIPEC at five Indian centers. • Patients with peritoneal spread from rare ovarian tumors like germ cell tumors, granulosa cell tumors, as well as mucinous tumors were included in the study. • To study the surgical outcomes and survival.
RESULTS: From Jan 2011 to April 2016, 28 patients with rare primary and secondary peritoneal tumors were treated with CRS and HIPEC. 7 (25%) patients had primary peritoneal tumors (DSRCT-1, primary peritoneal cancer-2, peritoneal sarcomatosis-2, GIST-1, PNET-1) and 21 (75%) had rare secondary peritoneal metastases (cervix-2, uterine papillary serous carcinoma-2, uterine adenocarcinoma-3, HCC-2, ovarian germ cell tumor-2, ovarian mucinous tumors-5, clear cell -1, sertoli cell-1, transitional cell-1, granulosa cell-1, borderline ovarian tumor-1). 18

(64.28%) patients had prior chemotherapy. The mean PCI was 16.8 (median 17, range 3-37). All patients underwent surgery with the intent of performing a complete CRS. A CC-0/1 was attained in 25(89.2%) patients. HIPEC was performed in 21 patients (75%). The most common regimens used were a combination of cisplatin and adriamycin (n=11) or mitomycin and adriamycin (n=2) both with bidirectional chemotherapy. Melphelan and Adriamycin were used in combination in 2 patients. 1 patient had HIPEC with EPIC (Paclitaxel, 175mg/m2 for 5 days) and one had EPIC alone. There was no 30 day mortality, one patient died 90 days after surgery. Grade 3-4 complications were seen in 5 (17.8%) patients. The mean follow up was 11.5 months (range 3-48 months). 4 (14.2%) patients developed rapid disease progression and died within 6 months of surgery. 8 patients had disease progression, of which 6 died and 2 were alive with disease. 2 patients died due to other causes. 18(64.2%) patients were alive and disease free at the last follow up. 9 patients were disease free for 12 months or more and 4 for 24 months or more. The median OS was 22.8 months. A PCI of 20 or more was associated with early recurrence and death. (p=0.04)

CONCLUSIONS: Patients with rare primary peritoneal tumors and rare secondary peritoneal cancer spread can be treated with CRS and HIPEC with an acceptable morbidity and mortality. Few patients experienced a prolonged recurrence free survival, while others experienced rapid disease progression.

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PERITONEAL METASTASES OF RARE CARCINOMAS TREATED WITH CYTOREDUCTIVE SURGERY AND HIPEC – A SINGLE CENTER EXPERIENCE

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BACKGROUND: In selected cases, cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) is an established treatment method for several patients suffering from peritoneal carcinomatosis from colorectal, ovarian, gastric and appendiceal origin. The effectiveness of this extensive therapy within other rare diseases has not been elucidated by now.

METHODS: We conducted a retrospective analysis of all patients who were surgically treated for peritoneal carcinomatosis at the surgical department of Charité – Universitaetsmedizin Berlin during the period between July 2010 and September 2015. Inclusion criteria were implementation of a CRS with or without HIPEC. Exclusion criteria were adenocarcinomas of the stomach, colon, neoplasms of the appendix, low grade appendiceal mucinous neoplasm (LAMN), mesothelioma and ovarian cancers. The aim of this study was to examine the feasibility, complication rate and survival of patients with these rare diseases who were treated with CRS and HIPEC.

RESULTS: A total of 14 Patients were included (7 male, 7 female). The tumor entities were: 4x gynecological tumors (granulosa cell tumor [ovarian primary] n=1, yolk sac tumor [ovarian primary] n=1, endometrial adenocarcinoma n=1, adenocarcinoma of the fallopian tube n=1, 3x adenocarcinomas of the small intestine, 3x retroperitoneal sarcomas, 1x cholangiocellular carcinoma, 1x neuroendocrine tumor of the stomach, 1x malignant peripheral nerve sheath tumor and 1x CuP syndrome. The mean Peritoneal Cancer Index was 12.2 (± 4.8). In 12 of 14 patients CCR0 could be achieved. The average operative time was 6.5 (± 1.9) hours. HIPEC was performed with an average temperature of 40.9 (± 0.76)°C. No patient died during hospitalization. Seven of 14 patients experienced at least one complication of stage III according to NCI CTCAE V4.0 (National Cancer Institute-Common Terminology Criteria for Adverse Events), while only two patients experienced complications of stage IV. The most common complications were infections, gastrointestinal disorders and respiratory disorders. The median follow-up time was 15.5 months. All patients developed a recurrence or disease progression during follow-up. 8 patients had died during the observation period (57.1%), 7 of them because of their disease. The median survival time was 11.3 months.

CONCLUSIONS: Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy is well established for several entities in selected patients. But even for selected patients with rare tumors, a therapy in this form is feasible with an acceptable perioperative morbidity and mortality. To improve the knowledge in patient selection and outcome, rare tumors which were treated with CRS and HIPEC should be documented in a central database (as for example BIG RENAPE, Pierre-Benite, France).

P605

PRESSURIZED INTRAPERITONEAL AEROSOL CHEMOTHERAPY, A NEW SURGICAL TECHNIQUE FOR THE TREATMENT OF UNRESECTABLE PERITONEAL CARCINOMATOSIS

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BACKGROUND: Patients with unresectable peritoneal carcinomatosis treated with systemic chemotherapeutics have a bad prognosis. Pressurized intraperitoneal aerosol chemotherapy (PIPAC) can be a valuable adjunct. This is a minimally invasive and repeatable technique to deliver chemotherapeutic drugs into the peritoneal cavity.

METHODS: We report about the practical organization and implementation of this technique, its indications and its impact on patients' early postoperative recovery.

RESULTS: To perform this kind of surgery, a specific certificate is necessary. Working with vaporized chemotherapeutics in the operation room is potentially dangerous. Therefore, an extensive checklist was made; two simulation procedures were performed; and several meetings with nurses, the department of security (for preventive actions and preparation in case of aerosol leakage in the operation room), pharmacists (for suited preparation and administration of chemotherapeutics); anesthesiologists (for patient monitoring outside the operation room and early postoperative follow-up) and a specialist of pressure injectors were necessary. No increased platinum concentrations were detected in the air during the first two procedures. Every surgery occurred uneventful. Seventeen surgeries have been performed in 11 patients, of whom 4 underwent 2 procedures and 1 underwent 3 procedures. The primary disease was cancer of colorectal (3), gastric (3), cholangio (1), esophageal (1), mesothelial (1), breast (1) and ovarian (1) origin. Postoperative recovery was uneventful except for one patient, who developed a toxic inflammation of the abdominal wall, which was successfully treated with antibiotics.

CONCLUSIONS: This is a new surgical procedure for the treatment of unresectable peritoneal carcinomatosis. This technique is safe for the surgical team under controlled circumstances. Its practical implementation requires extensive teamwork. The impact of this chemotherapeutic procedure on patients' postoperative recovery is limited.

P606

THE IMPACT OF OSTOMY CREATION AFTER CYTOREDUCTION AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY IN A NEWLY ESTABLISHED PERITONEAL MALIGNANCY PROGRAM

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BACKGROUND: Cytoreduction and hyperthermic intraperitoneal chemotherapy (CRS/HIPEC) have improved the outcome for selected patients with peritoneal carcinomatosis. Maximal tumor debulking often requires multivisceral resection and creation of an ostomy. We examine the impact of ostomy creation in a newly established peritoneal malignancy program.
METHODS: After IRB approval, a retrospective review was performed for patients whom underwent CRS/HIPEC from 12/2011-2/2016. Ostomy-related outcomes are described.
RESULTS: Fifty-seven patients underwent CRS/HIPEC with a median age of 52 years (11-73). A majority were male (63%) and Caucasian (63%). Thirty-nine underwent previous laparotomy. Forty-two were treated with chemotherapy prior to CRS/HIPEC, 16 had liver metastasis and 5 had extra-abdominal disease. Pathology originated from the appendix (25), ovary (9), sarcoma (DSRCT) (9), colon (8) and other (6). All 57 underwent CRS/HIPEC, most commonly with mitomycin-C. The median peritoneal cancer index was 15 (1-39). A completeness of cytoreduction score of 0/1 was performed in 93%. The median length of surgery was 542 hours (210-836) and median blood loss was 600 ml (50-4300). Fifty patients (88%) underwent multivisceral resection with 34 undergoing resection of 4 or more organs. The median hospital length of stay was 9 days (5-35) after undergoing CRS/HIPEC. Twenty-four (42%) suffered a complication with 10 (18%) suffering grade III-V complication. With a median 16 month follow up, 15 (26%) have died (12 of disease) and 32 are alive (28 without disease). At the time of CRS/HIPEC, an ostomy was created in 15 (26%): definitive procedure (N=5) or as diversion (N=10) of a low-rectal anastomosis. At last follow up, 6 (40%) had undergone reversal of the ostomy with a median time to reversal of 4.2 months. Fifty percent (3/6) had a complication after ostomy reversal. There were no operative mortalities after ostomy reversal.
CONCLUSIONS: Creation of a temporary or permanent ostomy may be required after maximal cytoreduction for patients with peritoneal carcinomatosis. Ostomy reversal is not without potential for complication. In some patients, even an intended temporary ostomy may never be reversed. Counseling of patients with peritoneal carcinomatosis should include discussion on the impact of ostomy placement at CRS/HIPEC.

P607

INTRA-ABDOMINAL PRESSURE MONITORING DURING HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY IN THE MANAGEMENT OF PATIENTS WITH PERITONEAL CARCINOMATOSIS: IMPROVING PATIENT SAFETY AND TREATMENT EFFECTIVENESS

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BACKGROUND: Cytoreductive surgery with hyperthermic intraperitoneal chemotherapy is now a standard treatment for disseminated gastrointestinal and gynecologic malignancies, yet there are safety variables that lack uniformity and standardization. The American Society of Peritoneal Surface Malignancies (ASPSM) consensus guidelines which published certain operative variables serve as a starting point which require further expansion and standardization; the measurement of the intra-abdominal pressure (IAP) during HIPEC is a variable that can further assist in optimizing safety and effectiveness of this treatment.
METHODS: From October 2011 to May 2016, 215 patients were evaluated by a multidisciplinary team and taken to the operating room with curative intent: 152 patients successfully underwent complete CRS with HIPEC. A standardized protocol was followed by the surgeon (RB), chief perfusionist (JC) and anesthesiology team (CA, -A). All patients had IAP monitored and recorded every 15 minutes during the perfusion. Additional parameters recorded included: esophageal temperature, urine output, peak airway pressures, total reservoir volume and drug used.
RESULTS: From August 2014-June 2015 thirty-two consecutive HIPECs were performed by a single surgeon (R.B.). Each patient received IAP pressure monitoring per standard protocol. Thirty patients were perfused with Mitomycin C and 2 with Cisplatin+Doxorubicin. The average IAP ranged from 13.1mmHg to 24.6mmHg with a mean 17.6mmHg (SEM 0.405, 95% CI 16.7-18.42). Urine output ranged from 71-392cc/15min with a mean of 172cc/15min (SEM 11.9, 95% CI 148.8-197). Peak airway pressures ranged 21.6-37.9 with a mean of 28.3 (SEM 0.748, 95% CI26.8-29.86). Esophageal temperature ranged from 35-37.6 Celsius with a mean 36.5 Celsius (SEM 0.118, 95% CI 36.2-36.7). Total reservoir volume ranged from 4-11L with a mean of 6.1L (SEM 0.284, 95% CI5.5-6.7).
CONCLUSIONS: With more widespread interest in cytoreductive surgery and HIPEC for peritoneal malignancies it is essential that we define safety parameters that can be used during the perfusion to optimize surgical outcomes. In our study we demonstrate that the measurement of IAP during HIPEC can be performed safely. Furthermore, IAP measurement may be a useful parameter during the perfusion to ensure an effective chemoperfusion with durable outcomes.

P608

OUTCOMES OF CYTOREDUCTIVE SURGERY WITH HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY PERFORMED AT A COMMUNITY HOSPITAL IN PATIENTS OLDER THAN 70 YEARS OF AGE

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BACKGROUND: Cytoreductive surgery (CRS) with hyperthermic intraperitoneal chemotherapy (HIPEC) can be used for peritoneal dissemination from various primary malignancies. Historically CRS+HIPEC experienced high morbidity and mortality and general age cut off was considered <65years of age. There is very limited data on the use of CRS+HIPEC in patients greater than 70 years of age. Our study evaluated morbidity, mortality and outcomes after 120 consecutive CRS+HIPEC in patients 70 years of age and older at a community hospital by a single surgeon (RB).
METHODS: From October 2011 to January 2016, 134 consecutive patients successfully underwent CRS+HIPEC. One hundred twenty one patients met inclusion criteria. Using an institutional review board approved study a comprehensive database of all surgeries, pathologies and outcomes was developed. The control group was comprised of patients less than 70 years of age (n=11) and intervention group those 70 years of age or older (n=110). Outcomes were compared using survival curve analysis.
RESULTS: The average age of the control group was 52.7 years and 70+ group was 74.1 years. The most common diagnosis for both was mucinous appendiceal adenocarcinoma. The mean Eastern Cooperative Oncology Group Performance Status for both groups was 0. No statistically significant differences were found with average length of stay (9.5 *vs* 11.7 days), 30 day readmission rate (7.2% *vs* 16.7%), or rate of grade III Clavien-Dindo complications (11.8% *vs* 25%) and grade IV complications (1.8% *vs* 0%). There was no inpatient, 30, 60 or 90-day postoperative mortality. The overall survival (OS) for patients <70years at 1 year was 93%, 2 years was 71% and 3

years was 62%. The OS was patients 70+ years at 1 year was 100%, 2 years was 38% and 3 years was 38%. There was no significant difference in OS (p=0.35) between the two groups.
CONCLUSIONS: Our study demonstrates that patients over the age of 70 years may be candidates for CRS+HIPEC with no overall increase in morbidity, mortality or OS when compared to younger patients. This can occur if a surgeon led multidisciplinary team is assembled that can provide good patient selection and protocol driven outcomes based high quality care.

P609

PROPHYLACTIC CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY IN HIGH-RISK GOBLET CELL CARCINOIDS

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BACKGROUND: Malignant tumors may be found incidentally in appendectomies performed on the indication appendicitis. Goblet cell carcinoids (GCC) are rare mixed adeno- and neuroendocrine carcinomas which are found in less than 1% of appendectomies. Patients presenting with perforated appendicitis, periappendicular abscess, or if the resection margin of the appendectomy is tumor-involved, *i.e.*, R1-resection have an increased risk of peritoneal recurrence of the disease. Up to date, there is no international consensus about the treatment of these high-risk patients.
METHODS: To describe outcome of prophylactic cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC). All patients with GCC from western part of Denmark are managed at Aarhus University Hospital in the ENET centre and prospectively recorded. GCC patients who presented with perforated appendicitis, periappendicular abscess, or had an appendectomy classified as a R1-resection were offered CRS and HIPEC if also physiologic age <75 yrs. and ASA <3. A minimum of 10 days admission was set as safety standards for HIPEC at AUH to recover any complication promptly. Follow-up included a (PET)CT scan at 3, 6, 12, 18, 24, 26, 48, and 60 months after surgery. Survival time was calculated from time of diagnosis of GCC.
RESULTS: From March 2009 through May 2016, 8 patients with GCC fulfilled the criteria for prophylactic CRS and HIPEC. Four patients had perforated appendicitis, three patients had perforated appendicitis combined with R1-resection of the appendix, and one had a R1 resection of the appendix. Median age was 63 years (range 38-75). All had undergone right-sided hemicolectomy, greater omentectomy, removal of the umbilicus, and ovaries. Mitomycin C was used for the HIPEC procedure in the dose of 35 mg/m2 for 90 minutes. Major postoperative complications, *i.e.*, Clavien-Dindo score >2, were seen in two patients (fascial dehiscence, CD score 3ba), one of which also had a pneumonia. No other complications were recorded. Median hospital stay was 14 days (range 10-14) for six patients. Two patients were transferred to their local hospital for further recovery after 14 days at our centre. Follow-up time was by median 35 months (range 4-59). No recurrences were identified within the follow-up time. Median overall survival was not reached and no patients have yet passed away.
CONCLUSIONS: In this series, prophylactic CRS and HIPEC for high-risk GCC is a safe treatment associated with a favorable long-term outcome compared to historical outcomes. Its final benefit should be evaluated in larger series and preferable in long lasting series.

P610

STOMA FORMATION IMPLICATIONS AS PART OF CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Cytoreductive Surgery and Hyperthermic Intraperitoneal Chemotherapy (CRS-HIPEC) is gaining acceptance as a therapeutic option for selected patients with peritoneal surface malignancies. Complete Cytoreduction is associated with improved outcome but may require multiple bowel resections and anastomoses, resulting with high morbidity. In this setting, formation of stoma seems as an optional and a necessary tool.
METHODS: The purpose of this study was to evaluate the incidence and implications of stoma formation during CRS-HIPEC and to examine whether a creation of stoma reduces the anastomotic leakage rate.
RESULTS: A Cohort-retrospective analysis of all patients who underwent CRS-HIPEC between February 2004 and July 2016 was conducted. Patients were divided into two groups, depending on formation of a stoma during the procedure. Clinical and demographic data was collected and analyzed, along with intraoperative data and short term follow up on surgical outcomes. 186 patients (66% females) underwent a total all 199 CRS-HIPEC procedures. Tumor origin included colorectal (64%), appendix (21%), as well as ovarian, gastric, mesothelioma and others. Thirty-four patients (17%) underwent stoma formation, 23 of them as protective stoma. There were no statistical differences between the stoma group and the group without stoma in terms of baseline characteristics (p>0.05). Formation of a stoma was correlated with peritoneal carcinomatosis index (PCI) score (13.6±8 *vs* 9.5±7.7, p=0.007), number of organs resected (p<0.001), number of anastomoses (p<0.001), duration of surgery (8.1±2.7 *vs* 6.6±2.2 hours, p=0.002) and hospital stay (12 *vs* 8.5 days, p=0.001). In procedures required 2 or more anastomoses, formation of protective stoma reduced the number of anastomotic leakages (6% *vs* 37%, p=0.025). Stoma related complications included 6 cases (18%) of high output stoma and higher rate of surgical site infection (p=0.01). Fourteen patients (41%) underwent stoma reversal, three of whom had a postoperative complications which was treated non-operatively.
CONCLUSIONS: CRS-HIPEC is an aggressive therapeutic approach for peritoneal surface malignancies. Stoma formation is an important tool during this procedure, especially in extensive operations requiring multiple organ resections and anastomoses. Creation of protective stoma should be considered in cases of 2 or more anastomosis. However, it should be considered selectively as only 41% of the patients had their stoma reversed.

P611

A NOVEL APPLICATION OF PROPHYLACTIC HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY IN EARLY-STAGE MUCINOUS OVARIAN CANCER WONG D,1 MAGTIBAY P,2 WASIF N,3 KARLIN N1 1DIVISION OF HEMATOLOGY & MEDICAL ONCOLOGY AND 2DEPARTMENT OF MEDICAL AND SURGICAL GYNEC

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BACKGROUND: It has been more than 30 years since the first report of cytoreductive surgery (CRS) combined with heated intraperitoneal chemotherapy, similar to modern-day hyperthermic intraperitoneal chemotherapy (HIPEC), to treat pseudomyxoma peritonei. Many advances have since ensued, and HIPEC is now utilized in a variety of malignancies, most commonly gastrointestinal and gynecologic cancers with peritoneal dissemination, to deliver higher local concentrations of cytostatic/cytotoxic agents combined with heat to eradicate microscopic disease after a complete cytoreductive surgery. Whether there is a role for HIPEC in patients without measurable peritoneal disease after CRS is unclear.
METHODS: We present a case of a 68-year-old female with past medical history significant for early stage mucinous ovarian cancer. She had originally presented for routine annual exam and a palpable mass was detected. After confirmatory ultrasound, she was taken to the operating room for exploratory laparotomy, total abdominal hysterectomy, bilateral salpingo-oophorectomy, right pelvic lymphadenectomy, subcolic and subgastric omentectomy, multiple peritoneal biopsies, and appendectomy. Pathology revealed an 11.5 cm right ovarian tumor

and negative lymph nodes. Other findings included intraperitoneal acellular mucin along the right fallopian tube and appendix. Final stage was T1aN0M0, FIGO IA. Several months later, the patient presented to our institution for a second opinion. Given the mucinous histology of her surgical specimen, the patient was referred for consideration of HIPEC as primary prophylaxis to decrease the risk of intraperitoneal microscopic seeding and subsequent development of pseudomyxoma peritonei. The patient subsequently underwent diagnostic laparoscopy and laparoscopic administration of HIPEC. No peritoneal disease was seen and she tolerated the prophylactic HIPEC well. She continues to be free of disease one year later.

RESULTS: Pseudomyxoma peritonei most frequently arises from appendiceal mucinous neoplasms. However, the syndrome has also been described in neoplasms of the colon or rectum, gallbladder, small intestine, ovarian teratoma, lung, breast, pancreas, fallopian tube, and urachus. Low-risk, early stage mucinous ovarian cancer typically has an excellent prognosis after CRS alone, and HIPEC is not currently included as standard treatment. Review of the literature yields a dearth of cases in this setting. It is known that when mucinous ovarian cancer is metastatic at presentation or after recurrence, outcomes are far inferior compared with serous tumors, perhaps owing to the unique clinical behavior and molecular profile of mucinous tumors. Thus, strategies are needed to optimally manage advanced mucinous ovarian carcinoma, and opportunities to decrease the risk of recurrence after initial treatment of early-stage disease should be further explored. To our knowledge, no data or guidelines exist on the role of HIPEC in early-stage ovarian mucinous carcinoma to prevent peritoneal carcinomatosis.

CONCLUSIONS: This case demonstrates that the application of HIPEC in patients with ovarian mucinous histology may be a prudent approach for primary prophylaxis against future development of pseudomyxoma peritonei. Clinical trials are needed to explore the value of prophylactic HIPEC after CRS and further evaluate the outcomes of novel uses of HIPEC.

P612

PERITONEAL METASTASES OF SMALL BOWEL ADENOCARCINOMAS: A POPULATION-BASED STUDY ON INCIDENCE, RISK FACTORS, TREATMENT AND SURVIVAL IN THE NETHERLANDS BETWEEN 2005-2014

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BACKGROUND: Peritoneal metastases (PM) of small bowel adenocarcinoma has not been well documented. As a result, knowledge on incidence, risk factors, treatment possibilities and survival is virtually absent. Therefore a population-based study addressing these issues was performed.

METHODS: All patients diagnosed with PM of small bowel adenocarcinoma between 2005 and 2014 in the Netherlands were included. The influence of patient and tumor characteristics on the odds of developing peritoneal metastases was analyzed by means of a multivariable logistic regression analysis. The log-rank test and Kaplan-Meier analysis were conducted to estimate survival and subsequently, the Cox proportional hazards model was used to evaluate the risk of death.

RESULTS: In total, 1428 patients were diagnosed with small bowel adenocarcinoma between 2005-2014, of whom 178 (12%) presented with PM. A primary tumor in the jejunum or ileum as compared to the duodenum, an advanced or unknown T- and N-stage and diagnosis in the last period 2010-2014 were associated with higher odds ratios of developing PC. Median overall survival for patients with PM was 5.4 months, with 1-year survival rates of 24%. Multivariable survival analysis showed that an advanced T-stage and other metastases besides PM were associated with a poorer overall survival and surgery of the primary tumor, systemic therapy and cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS+HIPEC) were associated with a better overall survival. Without any kind of those treatments mentioned above, median overall survival was only 2.5 months. Median overall survival increased to 10.7 months after surgery of the primary tumor, 10.9 months in patients who were treated with systemic therapy and even to 32 months after CRS+HIPEC. Multivariable survival analysis in patients with a primary duodenal tumor revealed metastases elsewhere next to PM as a poor prognostic factor and systemic therapy as a positive prognostic factor. In patients with PM of non-duodenal origin, an advanced T-stage appeared to be a poor prognostic factor, whereas surgery of the primary tumor, systemic therapy and CRS+HIPEC were favorable prognostic factors for prolonged survival in multivariable survival analysis.

CONCLUSIONS: In this population based study, 12% of the patients with small bowel adenocarcinoma presented with synchronous PM. Without treatment, survival appeared to be extremely poor, but patients undergoing surgery of the primary tumor and systemic therapy had a significant better overall survival. The best survival was obtained in those patients undergoing CRS+HIPEC. These promising results should be further explored to determine the optimal treatment for patients with PM of small bowel adenocarcinoma.

P613

HIPEC IN THE TREATMENT OF LATE STAGE CANCER WITH MALIGNANT ASCITES

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BACKGROUND: Repeated paracentesis is often used for the treatment of carcinomatosis-induced ascites, but the therapeutic result is poor with less than 10% of one-year survival rate. Hyperthermic intraperitoneal chemotherapy (HIPEC) is an innovative therapy, and the current study was designed to compare HIPEC and conventional chemotherapy in the treatment of malignant ascites.

METHODS: GD-HIPEC device (Xi'an Good Doctor Medical Science and Technology, Xi'an, China) was used under topical anesthesia and abdominal puncture in 10 medical centers nationwide in China. Patients with carcinomatosis-induced ascites were enrolled in the study with written consent from July 2004 through February 2016. Patients were either treated with HIPEC (25mg/m3 cisplatin with continuous and hyperthermic circulation for 60min) or paracentsis plus intraperitoneal injection of cisplatin. HIPEC or paracentisis was given every 3 days and total 3 times as one therapeutic course.

RESULTS: Total 980 patients were enrolled in the current study. Of them, 628 patients were given HIPEC and 352 patients were given conventional paracentesis plus intraperitoneal cisplatin injection. Six months overall survival (OS) rate and progress-free survival (PFS) rate in HIPEC group were 78.5±12.5% and 36.6 ±10.2%, respectively, and significantly higher than that of control group (20.1±9.5% and 5.9±4.6%, respectively, $p<0.01$). Four weeks after therapy, objective response rate (ORR) was 88.2% in HIPEC group while 42.3% in control group ($p<0.01$).

CONCLUSIONS: HIPEC is superior to conventional paracentisis. GD-HIPEC is easy to use under local anesthesia, can significantly extend patient's life, and can improve patient's quality of life.

P614

A DOUBLE CATHETERIZATION OF CANNULA PERSISTENT BATHE AND VACUUM ASPIRATION SYSTEM TO TREAT INTESTINAL FISTULA AFTER CYTOREDUCTIVE SURGERY PLUS HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR PERITONEAL CARCINOMATOSIS

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BACKGROUND: Intestinal fistula is one of the most serious adverse events after CRS+HIPEC to treat peritoneal carcinomatosis, with mortality rate up to 15%-20%. However, most episodes of intestinal fistula could be adequately managed by conservative treatments, and the key to the successful conservative treatment is efficient drainage.
METHODS: A double catheterization of cannula persistent bathe and vacuum aspiration method has been developed at our center. This retrospective study was to summarize our experiences in this system, focusing on the key technique considerations and advantages. CRS+HIPEC was performed on 131 pts with PC from April 2015 to June 2016, and post-operative intestinal fistula occurred in 6 cases (4.9%). All the 6 pts were conservatively managed by double catheterization of cannula persistent bathe and vacuum aspiration method.
RESULTS: Among the 6 pts with intestinal fistula, 5 (5/6, 83.3%) were successfully treated and the pts recovered well and discharged with no events. One patient (1/6, 16.7%) was initially managed well but gave up treatment subsequently and died 3 months later. After adequate implementation of double catheterization of cannula persistent bathe and vacuum aspiration, fever subsided in 1 to 3 days, and abdominal infections could be well-controlled in about 5 days. In 21 to 60 days, the intestinal fistula from the 5 pts healed spontaneously, and pts were discharged. At the 6-month follow-up, these pts recovered well with no major adverse events.
CONCLUSIONS: For PC pts with high-risk CRS+HIPEC procedures, prophylactic implementation of double catheterization of cannula persistent bathe and vacuum aspiration system is a key factor for adequate prevention and management of post-operative intestinal fistula.

P615

REITERATED SURGICAL CYTOREDUCTION AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY AND TIME INTERVAL BETWEEN THE FIRST AND THE SECOND PROCEDURE IN PATIENTS AFFECTED BY PERITONEAL CARCINOSIS

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BACKGROUND: Reiteration of hypertermic intraperitoneal chemotherapy (HIPEC) and surgical cytoreduction (SCR) in patients affected by recurrent intraperitoneal cancers is an uncommon surgical procedure.
METHODS: This study evaluates the outcomes of patients submitted to repeated HIPEC procedures and the time lapse between the two procedures in two Italian centers.
RESULTS: In the two centers 34 patients underwent two subsequent SCR and in 32 cases also HIPEC was repeated at a median follow up of 15 months (IQR 10-23). Mean age at diagnosis was 53.5 years (±9.83), mean BMI was 25.97 kg/m² (±3.98). Primary tumors were 13 pseudomyxoma peritonei, 11 colorectal cancers, 6 ovarian cancers, 2 gastric cancers, and 2 mesothelioma. Intraoperative PCI were similar before first and second HIPEC procedure and had respectively a median of 13 (IQR 6-25) and 14 (IQR 6-23). Also optimal CCS after first and second procedures were similar respectively 67.7% (23/34) and 58.8% (20/34). A long interval between the first and the second HIPEC procedure was associated to a significant increase in overall survival after the second procedure ($p<0.05$). In addition, in the second procedure we had lower prevalence of complications, requiring re-intervention, than during first procedure (12% *vs* 6%). Complications were not associated with the time length of the interval between the first and the second HIPEC procedure (83.3% (15/18) *vs* 46.7% (7/15), $p<0.05$). The overall survival at 5 years was 28.4% (95% CI 9.2-88.2) in colorectal cancer, 33.3% (95% CI 10.8-100.0%) in ovarian cancer, 83.1% (95% CI 64.1-100.0%) in pseudomyxoma peritonei, 50% in the two cases of gastric cancer, and 100% in the two cases of mesothelioma.
CONCLUSIONS: This multi-centric experience shows promising data about safety and efficacy of SCR and HIPEC reiteration. However, HIPEC reiteration requires additional studies and at the moment should represent a tailored treatment strategy after a correct preoperative patients selection.

P616

INTRAOPERATIVE ADHESIONS DEVELOPING DURING CLOSED-ABDOMEN HIPEC

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BACKGROUND: Hyperthermic intraperitoneal chemotherapy (HIPEC) is delivered after cytoreductive surgery in selected patients with peritoneal surface malignancies. Different methods for delivering HIPEC exist, substantially being variations between two modalities: the open technique and the closed technique. The open technique improves the distribution of the cytotoxic solution, with the disadvantage of heat loss at the surface of the perfusion fluid and leakage of cytotoxic drugs. The closed technique prevents heat loss and drug spillage, increases drug penetration but does not warrant adequate circulation and homogeneous distribution of the perfusion fluid. Recently, a novel procedure was described, the Laparoscopy-Enhanced Closed Abdomen Technique (LE-HIPEC), in which a laparoscopic approach to the closed abdomen was applied to stir the abdominal contents, to untie any adhesions and to achieve optimal distribution of heat and cytotoxic drugs. This procedure aims to combine the advantages and overcome the weaknesses of both open and closed techniques. It also makes possible for the surgeon to perform repeated exploration of the abdomen during a closed abdomen perfusion.
METHODS: LE-HIPEC was performed in 8 patients and the incidence of intraoperative adhesions developing during the perfusion period was recorded. The study aimed to evaluate the feasibility of LE-HIPEC and to investigate the incidence of intraoperative adhesions developing during a closed abdomen HIPEC together with the possibility to lyse those adhesions by means of LE-HIPEC. Average age of the patients was 52±12 years (range 37-71). Average PCI score was 8±6 (range 2-20).
RESULTS: During the closed-abdomen perfusion period, intraoperative adhesions developed in 62.5% of the patients. Adhesions were observed between the loops of the bowel in 2 patients (25%) and between the bowel and the abdominal wall in 4 patients (50%). Intraoperative adhesions developed always in the period between closure of the abdomen and the subsequent filling of the abdomen with the perfusion fluid. After their division in the early phase of LE-HIPEC, during the subsequent perfusion period intraoperative adhesions between the bowel and the abdominal wall reformed in 2 patients (25%).
CONCLUSIONS: Intraoperative adhesions are frequently developed during closed-abdomen HIPEC and could result in the inadequate distribution of the perfusion fluid. LE-HIPEC provides the surgeon with an efficient tool to stir the abdominal content and to prevent and divide any adhesion during the perfusion period, thus overcoming the most relevant weaknesses of the closed-abdomen technique.

P617

TREATMENT OF PERITONEAL CARCINOMATOSIS FROM RARE ORIGINS WITH CYTOREDUCTIVE SURGERY AND HIPEC. A SINGLE-CENTER EXPERIENCE

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BACKGROUND: Peritoneal carcinomatosis is one of many ways of tumor dissemination, produced by diffusion from cell tumors originated in the abdominal or pelvic cavity. The most common sources of peritoneal carcinomatosis are colorectal adenocarcinomas, gastric, gynecological (ovary, fallopian or primary peritoneal), mucinous neoplasms of the appendix, or peritoneal mesotheliomas. However, any type of tumor may develop tumor spread to the peritoneum.
METHODS: The aim of this study is to present the experience gained in the use of complete cytoreductive surgery (CRS) with hyperthermic intraoperative intraperitoneal chemotherapy (HIPEC), for the treatment of peritoneal carcinomatosis of unusual origin in a center with wide experience in the treatment of the peritoneum disease.
RESULTS: From June 2011 to March 2016, 9 patients with peritoneal carcinomatosis of unconventional origin were included in this multimodal treatment. All of them have been treated with systemic chemotherapy (SCT) -depending on the origin of the tumor- followed by CRS and HIPEC at 42-43°C according to the Sugarbaker's open technique (Colliseum). The 44.4% were women; the median age was 56 years (range 17-72). The origins of the tumor are varied: 1 immature teratoma, 1 serous-papillary carcinoma uterine, 1 small bowel adenocarcinoma, 3 sarcomatosis, 1 cholangiocarcinoma, 1 endometrial carcinoma and 1 carcinoma of unknown origin with suspected pancreatobiliary origin. Median peritoneal carcinomatosis index (PCI) was 8 (range 1-25). Only two patients (22.8%) have required bowel resections -two each patient- and only one patient (11.1%) did not complete cytoreduction (CC-1). Intraperitoneal chemotherapy regimen used has been different depending on the response to systemic chemotherapy, ranging from cisplatin plus doxorubicin, to paclitaxel, oxaliplatin or mitomycin C. Only 1out of 9 patients has presented severe complications -grade III or IV according to Clavien-Dindo scale-. No events of mortality have been registered. Median hospital stay was 6 days (range 4-28). Although the median disease-free survival cannot be assessed due to the different tumor origin of patients, it is 7 months. Seven patients have had tumor recurrence during follow-up (77.8%). Median follow-up was 19 months, and only one patient died during the surveillance.
CONCLUSIONS: Peritoneal carcinomatosis of rare origins, in selected cases, can be treated aggressively with CRS plus HIPEC, with acceptable morbidity and mortality in experienced centers.

P618

URACHAL ADENOCARCINOMA WITH LIMITED PERITONEAL METASTASES TREATED WITH PARTIAL CYSTECTOMY, CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Cancer of the urachus, a fibrous remnant of the allantois connecting the fetal urinary bladder to the umbilicus, is a rare malignant disease. In contrast to bladder cancer, which Is typically urothelial cell carcinoma, the majority of urachal cancers are adenocarcinomas, histologically similar to colorectal adenocarcinoma. As the urachus is a small tubular structure located just outside the anterior parietal peritoneum, peritoneal breaching by adenocarcinoma occurs relatively early, leading to early intra-abdominal dissemination, causing urachal peritoneal metastases. Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) has been shown to improve clinical outcomes for various tumours with peritoneal dissemination, including colorectal peritoneal metastases, mucinous ovarian tumours and pseudomyxoma peritonei (PMP) of appendiceal origin. This treatment strategy may therefore be similarly beneficial to patients with urachal peritoneal metastases, especially those arising from mucinous adenocarcinomas. We report our experience of structured stepwise staging and CRS with HIPEC for these patients.
METHODS: • Identification of patients treated for urachal cancer at the Netherlands Cancer Institute (Amsterdam, the Netherlands) between January 1994 and October 2015. • Outcomes of structured stepwise staging with computed tomographic (CT) imaging of the abdomen, pelvis and chest (or conventional chest radiography) and from 2001, in the absence of distant metastases, staging supra-umbilical laparoscopy. • Development of multimodality treatment strategy consisting of neo-adjuvant external radiotherapy, followed by partial cystectomy with en-bloc umbilical excision and brachytherapy, with additional CRS and HIPEC in case of peritoneal metastases. • Presentation of oncological outcomes following treatment with curative intent of patients with urachal peritoneal metastases.
RESULTS: Between January 1994 and October 2015, 56 patients were referred to the study institute for treatment. Of these 56, 9 patients had urothelial cell carcinoma and were excluded from further analysis. Radiological staging demonstrated distant metastases or large volume peritoneal carcinomatosis in 11 patients. Of the remaining 36 patients, 26 underwent staging laparoscopy, 6 of whom (23%) had limited peritoneal metastases; the remaining 20 patients did not have any peritoneal disease. A further 3 patients who did not undergo staging laparoscopy were found to have limited peritoneal metastases. In total, 9 patients underwent underwent CRS and HIPEC with partial cystectomy. The other 27 patients underwent partial cystectomy with brachytherapy. No clinically relevant differences were found between laparoscopic staging of peritoneal disease and findings at definitive laparotomy. Grade 3 complications after CRS and HIPEC occurred in 2 patients (22%). After a median follow-up of 25 months (interquartile range 19-71 months), 6 of the 9 patients undergoing CRS and HIPEC (67%) remained disease-free. Median disease-specific survival was 105 months (95% confidence interval: 53-159 months), with 3-year survival rates of 75%.
CONCLUSIONS: In patients with limited urachal peritoneal metastases, partial cystectomy with CRS and HIPEC confers favourable oncological outcome with limited morbidity. A structured staging approach incorporating laparoscopy can reliably identify patients with limited peritoneal metastases in the absence of distant disease.

P619

HEPATOCELLULAR CARCINOMA PERITONEAL METASTASIS: ROLE OF CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Peritoneal dissemination of hepatocellular carcinoma (HCC) is a rare presentation of the disease with an incidence of 2-6%. The most common cause of peritoneal deposits is a ruptured HCC that results in tumor spillage into the peritoneal cavity. The overall incidence of spontaneous ruptures of HCC ranges from 5 to 15% and carries a high mortality rate of up to 50%. Other factors influencing peritoneal dissemination are metastasis to the lymph nodes and the

direct invasion of the diaphragm. There is no significant association with lung or adrenal metastasis, or a past history of FNAB, percutaneous RFA or ethanol injection. Aim of the present study is to present our results in this relevant clinical topic and to propose a therapeutical algorithm in case of peritoneal dissemination of HCC, by considering time of treatment, diagnosis and multimodal therapy of these lesions.
METHODS: •We present our experience with 4 patients with localized peritoneal metastases from HCC. • All patients controlled and managed with cytoredactive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC). • In two cases there is a history of rupture at the onset of diagnosis and in one case dissemination of peritoneal cavity after FNB procedure. • All patients after CRS and HIPEC received sorafenib. • The mean PCI was 10,2.
RESULTS: • The mean survival was 30 months. • The mean time of onset of peritoneal metastasis are 13,5 months from initial operation. • Our results are compareble with other studies. • In well-selected patients with peritoneal metastases from HCC, CRS and HIPEC and Sorafenib may prolong survival compared to systemic chemotherapy alone.
CONCLUSIONS: Peritoneal metastasis of hepatocellular carcinoma is a rare and the benefit of systemic chemotherapy is poor and from sorafenib is not well discribed yet. Surgical resection of extrahepatic HCC metastasis remains challenging. However several case reports and a few case series have provided that surgical resection of HCC peritoneal implants may benefit. We believe from our experience in well-selected patients with peritoneal metastasis from HCC, cytoredactive surgery with HIPEC and sorafenib may prolong survival compared to systemic chemotherapy alone.

P620

UTILIZING AN ENHANCED RECOVERY AFTER SURGERY PATHWAY FOR PATIENTS UNDERGOING CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Malignant neoplasms are among the leading causes of mortality across all age-groups in the Philippine health landscape. Accruing experience in cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) is in the early phases of development, and the associated perioperative care remains a challenge.
METHODS: A retrospective study describing outcomes in 35 patients presenting with peritoneal dissemination of a primary disease undergoing CRS and HIPEC was performed. An Enhanced Recovery After Surgery (ERAS) protocol was observed beginning September 2014. To describe clinical outcomes in patients under conventional perioperative care compared with clinical outcomes in patients under the ERAS pathway. To identify morbidity and mortality rates in patients under the ERAS pathway. To describe how the ERAS pathway affects a health center of limited resources.
RESULTS: A total of 16 out of 35 (45.7%) patients were managed under this clinical pathway. All patients in the study were primarily managed by a colorectal surgeon (MJL); moreover, a medical oncologist, surgical intensivist, anesthesiologist, and gynecologic oncologist comprised the multidisciplinary team (T). Patients prior to ERAS had a mean length of stay of 19 days (10-43 days), and those who underwent the clinical pathway had an average length of stay of 11.8 days (3-46 days). Moreover, mean operative time was longer in patients prior to ERAS, 7.0 hours (4-12 hours) compared to 5.9 hours (4-8 hours) seen in the latter group. Postoperative ileus was observed in 3 patients prior to ERAS; while 2 patients had ileus following the clinical pathway. Grade II and III morbidities were observed in 4 patients; 3 of which occurred under conventional perioperative care. Average postoperative length of stay for patients prior to ERAS was 12.7 days (9-18 days); while, length of stay in patients under the standardized pathway was 8.5 days (3-10 days).
CONCLUSIONS: Despite growing evidence of incorporation in surgical management, ERAS has yet to gain ground in local clinical practice. The ERAS pathway has resulted in decreased or similar morbidity rates when compared to conventional perioperative care in surgeries covering various specialties. Our study demonstrated that CRS and HIPEC can be safely performed in a tertiary medical center where an T provides the needed expertise in this procedure. Furthermore, ERAS resulted in decreased total and postoperative length of stay, while maintaining comparable outcomes without compromising patient safety. The ERAS pathway also provides the opportunity at standardization of patient care. Evidence of an effective and beneficial pathway allows for appropriate allocation of limited health resources which is of particular relevance in the Philippine setting.

P621

URETERAL RECONSTRUCTION IN CASE OF RESECTION FOLLOWED BY HIPEC: REIMPLANTATION WITH URETERONEOCYSTOSTOMY SEEMS SAFER THAN END TO END URETERAL ANASTOMOSIS

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BACKGROUND: The pelvic ureter resection may be necessary in case of peritoneal carcinomatosis for surgery with hyperthermic intraperitoneal chemotherapy (HIPEC). With decreasing the morbidity of cytoreduction and HIPEC, expert teams began to perform surgical procedures more complex associated with HIPEC, including pelvic reconstructions. After ureteral resection, reconstruction of two types is possible: reimplantation with ureteroneocystostomy (with psoas hitch technic) or end to end ureteral anastomosis.
METHODS: In compiling the experiences of three surgical teams performing surgeries HIPEC, we tried to compare the efficiency of the two techniques. Comparative multicentre retrospective study with case matching operated between 2005 and 2014. The patients included had ureteral resection in a context of HIPEC for peritoneal carcinomatosis with reconstruction either by end-to-end anastomosis (ANA Group) by reimplantation with ureteroneocystostomy (RUC group). The primary endpoint was the occurrence of urinary fistula in postoperative.
RESULTS: 14 patients were included in the ANA group and 14 in the RUC group. The groups were comparable for age, the extent of carcinomatosis (PCI index) and operative time. There were 4 urinary fistulas in the ANA Group (28.5%) and 0 in the RUC (O%) (p=0, 0308).
CONCLUSIONS: The reimplantation with ureteroneocystostomy during HIPEC, is the best procedure in case of renal conservation.

P622

PRESSURIZED INTRAPERITONEAL AEROSOL CHEMOTHERAPY WITH OXALIPLATIN, CISPLATIN AND DOXORUBICIN IN PATIENTS WITH PERITONEAL CARCINOMATOSIS FROM COLORECTAL, OVARIAN, GASTRIC CANCERS AND PRIMARY TUMORS OF THE PERITONEUM: PRELIMINARY ANALYSIS OF AN OPEN

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BACKGROUND: Pressurized IntraPeritoneal Aerosol Chemotherapy (PIPAC) is an innovative approach to peritoneal carcinomatosis (PC) that applies chemotherapic drugs into peritoneal cavity as an under pressure air-flow. It improves local bioavailability of cytostatic drugs as compared with conventional intraperitoneal chemotherapy. Aim of this study is to prove feasibility, efficacy and safety of this new approach; hereinafter the first step analysis of this phase II trial.
METHODS: Patients included for the analysis underwent at least 2 PIPAC procedures; drugs used were Oxaliplatin 92 mg/m2 for colorectal cancers and Cisplatin 7.5 mg/m2+Doxorubicin 1.5 mg/m2 for ovar-

ian, gastric and primary peritoneal cancers. A pressure of 10 mm Hg and a temperature of 37°C were applied for 30 min/course. The primary endpoint was the Overall Response Rate according to RECIST criteria (version 1.1) after 2 and 3 PIPAC. Secondary significant endpoints were the clinical tumor response using FDG-Positron Emission Tomography according to PERCIST criteria (version 1.0), the tumor regression on histology, PC Index improvement on repeated PIPAC and the quality of life measured with the SF-36 and EORTC QLQ-30 questionnaire. Safety and tolerability has been assessed by collection of adverse events, according to the Common Terminology Criteria for Adverse Events 2 including physical examination results, laboratory assessments.

RESULTS: Between June 2015 and July 2016, 94 single-port PIPAC procedures in 42 patients presenting PC from different primary tumors, not eligible for surgery +/- HIPEC, were performed. Thirty patients were enrolled in this trial. Laparoscopic non-access rate was 1/30 (3.3%). Nineteen patients (47 PIPAC procedures) were eligible for analysis. Six patients reported a disease stability, 3 a partial response and 10 patients a progression of disease. Thirteen patients were undergoing systemic chemotherapy (sCT) with a wash-out interval of at least 2 weeks before and 1 week after each PIPAC. Clinical tumor response according con PERCIST Criteria resulted to be a not reliable tool considering the mucinous histology of some patients and the lack of sensitivity in assessing the PC. Tumor regression on histology and PC Index improvement were observed in 5/19 (26.3%) and in 4/19 (21.1%), respectively. CTCAE grades 1 and 2 were observed after 3 and 5 procedures, respectively, for abdominal pain and nausea. Renal and hepatic functions were not impaired; no cumulative renal toxicity was observed after repeated PIPAC procedures. These preliminary data show that the association of PIPAC and sCT does not induce significant hepatic and renal toxicity. There were no treatment-related deaths. SF-36 and EORTC QLQ-30 global physical health scores and pain improved during therapy.

CONCLUSIONS: Single-port PIPAC resulted to be feasible, safe and easy to perform; the combined treatment based on sCT and PIPAC doesn't induce significant hepatic and renal toxicity. This new approach as well as being ethically accepted, may be an useful strategy for patients not eligible to radical surgery, presenting extra-peritoneal disease or at high risk of developing it. The drug doses currently used must be likely increased as well as further studies are needed to assess whether this combination therapy could become part of the standard treatment for PC.

P623

SINGLE – PORT ACCESS FOR PRESSURIZED INTRAPERITONEAL AEROSOL CHEMOTHERAPY: TECHNIQUE, FEASIBILITY AND SAFETY

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BACKGROUND: Peritoneal carcinomatosis (PC) is a common route of dissemination of abdominal neoplasms and it is often characterized by poor prognosis. Pressurized IntraPeritoneal Aerosol Chemotherapy (PIPAC) is an innovative drug delivery system based on laparoscopic chemotherapic agents administration in under pression gaseous form for the treatment of PC. In literature the open access and the one with Verres needle and two balloon safety trocars are described. The aim of the study was the attest feasibility and safety of the single-port access for PIPAC procedure.

METHODS: From June 2015 to July 2016, 94 PIPAC procedures were carried out for PC. For this study we considered 80 operations performed in 34 patients. Seven patients were subjected to 1 PIPAC, 12 patients to 2 PIPAC, 11 to 3 PIPAC and 4 to 4 procedures. Midline single-port access (QuadPort+, Olympus Medical, Tokyo, Japan) was used.

RESULTS: The access to peritoneal cavity was possible in all cases. The capnoperitoneum was stable in all the procedures with zero CO2-flow. Neither surgical intraoperative nor postoperative complications according to CTCAE (Common Terminology Criteria for Adverse Events) >2 were observed; no re-laparotomies were required and no perioperative mortality was recorded.

CONCLUSIONS: This is the first report of single port-access for PIPAC procedure. The new approach resulted to be feasible and safe; the unique midline access allows to reduce the port-site seeding risk or to remove it during a latter cytoreductive surgery. Further investigation and clinical trials are needed in order to explore the real oncological impact of this promising therapy option on PC.

P624

MULTI-INSTITUTIONAL STUDY OF PERITONEAL SARCOMATOSIS FROM UTERINE SARCOMA TREATED WITH CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Uterine sarcoma (US) is a rare tumor representing 1% of female genital tract malignancies and 7% of sarcomas. This tumor is considered to be very aggressive, difficult to manage with relatively poor response to standard treatment. When peritoneal sarcomatosis (PS) occurs, the median overall survival (OS) and progression-free survival (PFS) with cytoreductive surgery alone, with or without systemic chemotherapy is less than one year and 6 months, respectively. A multi-institutional review of PS from US was conductedto evaluate the present use of cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) and its effects on survival outcomes.

METHODS: A retrospective review of 36 patients from 7 specialized international centers was performed. Selection criteria included patients with PS of uterine origin with CRS/HIPEC treatment. Clinical data were analyzed. OS and PFS were estimated with Kaplan-Meier method. Calculations were performed in patients with sufficient available data. Postoperative deaths were included in OS analysis.

RESULTS: Thirty-six patients underwent a total of 38 HIPEC procedures performed from 2005-2014: 35 with previous treatment and 1 primary treatment. Median age at time of CRS/HIPEC was 48 years (range 38-73). Seventeen patients (47%) presented with leiomyosarcoma, 12 (33%) undifferentiated stromal sarcoma, 3 (8%) with low-grade endometrial stromal sarcoma, and 3 (8%) with adenosarcoma. Intraperitoneal chemotherapy was heterogeneous. Perfusion agents included 22 cisplatin/doxorubicin, 2 cisplatin/mitomycin-C, 10 melphalan, 2 mitomycin-C, 1 cisplatin, and 1 unknown. Median PCI was 16 (range 2-39), and 10 patients had PCI =20. Thirty-four patients (94%) had complete cytoreduction (CC 0-1). Five patients (14%) had postoperative complications grade III/IV/V. Two surgery-related deaths occurred on postoperative days 26 and 88. Fifteen patients received adjuvant chemotherapy: 5 gemcitabine/docetaxel, 5 doxorubicin/ifosfamide, 5 early postoperative intraperitoneal chemotherapy with paclitaxel, and 2 received gemcitabine/docetaxel. Nineteen patients recurred following CRS/HIPEC. Following recurrence, 3 patients underwent adjuvant therapy: 1 letrozole, 1 doxorubicin/cisplatin/dacarbazine, and 1 gemcitabine/docetaxel. At a median follow-up of 24 months (7-200 months), 17 patients are alive(47%), and 12 (33%) have no evidence of disease. OS from CRS/HIPEC (n=36) at 1, 3, and 5 years was 75%, 53%, and 32%, respectively with median OS of 37 months [CI 95%: 20-54 months]. Recurrence was documented in 19 of 34 patients with CC. PFS in 32 patients with CC and sufficient available data at 1, 3, and 5 years was 67%, 32% and 32%, respectively with median PFS of 18.9 months [CI 95%: 6.7-31 months]. Sites of recurrence included 16 in peritoneum, 8 chest, 3 retroperitoneum, 2 liver, 1 bone, 1 vaginal stump, 1 breast and 1 abdominal wall. Four

patients (11%) had multiple sites of recurrence. Histological subtype did not influence survival.
CONCLUSIONS: CRS/HIPEC is a promising treatment modality for patients with PS. The goal of complete cytoreduction is similar across international centers. However, significant discordance exists in selecting regional and systemic chemotherapy. A global prospective registry of patients to further assess the efficacy of CRS/HIPEC is needed.

P625

CYTOREDUCTION SURGERY PLUS INTRAPERITONEAL CHEMOTHERAPY FOR SMALL BOWEL ADENOCARCINOMA: A CASE REPORT

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BACKGROUND: The small bowel adenocarcinoma already spread to the peritoneum has a poor prognosis when adressed with traditional therapy. This paper objectives do discuss the use of cytoreduction surgery plus heated intraperitoneal chemotherapy (HIPEC) as an alternative therapy. Based on a pacient case that was treated and followed with this new approach, by the peritoneum diseases specialist team at the Santa Casa de Misericórdia, a reference institution, located at Porto Alegre, RS, Brazil
METHODS: To discuss cytoreduction surgery as a reasonable alternative in treatment of small bowel adenocarcinoma with peritoneal carcinomatosis.
RESULTS: A twenty five years old paciente, was admited in june 2015, with an obstructive acute abdomen. The CT has showed an obstructive tumor in small bowel (at the level of jejunum). The exploratory laparotomy diagnosed an invasive jejunal lesion and spread peritoneal carcinomatosis, therefore only an enterectomy and a side-to-side anastomosis was performed. Adjuvant chemoteraphy with eleven FOLFOX cicles had a favorable response, even though complicating with stage 2 periferical neurotoxicity. A new laparoscopy, in order to staging the disease was perfomed later and showed a 5 PCI - an indication criteria for cytoreduction surgery followed by intraperitoneal chemotherapy for local peritoneal control. The surgery was a sucess, performed in July 2015, and currently the pacient is in clinical follow.
CONCLUSIONS: As so, we can conclude that: HIPEC seems to be an interesting alternative in small bowel adenocarcinoma with an acceptable morbimortality. The use of pre surgery chemoterapy in has proved itself as a fundamental in an adequate pacient selection for this kind of treatment

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MULTIMEDIA PATIENT INFORMATION RESOURCE FOR CYTOREDUCTIVE SURGERY AND HIPEC

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BACKGROUND: Currently in our unit, patients have been counselled regarding Cytoreductive Surgery and hyperthermic intraperitoneal chemotherapy (HIPEC) primarily in the clinic setting in which a large amount of information is disseminated over one or two visits. To facilitate understanding of the procedure, including the risks and post-operative recovery involved, further information is supplemented with written booklets. However, patients and their families now have increased access to various information resources and the use of information technology continues to grow within healthcare. An emerging tool for patient education is use of multimedia technology. Multimedia has been evaluated in patient communication with positive results with regards to pre-operative counselling, consenting and comprehension. The aim was to design and develop, in collaboration with a professional multimedia company, a 'Multimedia Information Resource for Cytoreductive Surgery and HIPEC patients' covering the whole patient journey from referral through to discharge. This resource was specifically designed for patients and their families.
METHODS: • To design and develop a 'Multimedia Information Resource for Cytoreductive Surgery and HIPEC patients'.
RESULTS: We are developing and producing a comprehensive multimedia patient information resource. This resource will be made available both online and on DVD. This has been achieved by initially filming in multiple locations (*i.e.* ward, ITU, theatre, out-patient consultation) with a series of interviews with key staff members and interaction with patients (Feb 22nd-26th 2016). An animated pathway has been created using Adobe® Flash® Premiere. The pathway separates the patient journey into key steps (*i.e.* T), allowing users to follow the steps of the pathway sequentially or navigate to particular areas of interest. All steps, edited in Final Cut Pro, were supplemented with animation, text and voiceover.
CONCLUSIONS: Cytoreductive surgery and HIPEC is a complex procedure requiring intensive post-operative care and extended inpatient duration compared to other major abdominal procedures. There is now increasing emphasis on engaging and empowering patients using information resources to make informed decisions about their treatments. One such method is to embrace technology and innovation in patient education; multimedia technology can potentially serve as an effective adjunct to traditional materials to enhance patient education. By producing a comprehensive multimedia resource, we hope patients and their families can gain a better understanding of what the procedure and post-operative recovery entails. Future studies are now required to evaluate the acceptability, usability and comprehension of the resource amongst patients and family members.

P627

MORE EFFICIENT SYSTEM OF HIPEC PROCEDURE

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BACKGROUND: Cytoreductive surgery+HIPEC is complex oncosurgical procedure. The succes is based on three bases - quality of cytoreduction, quality of lavage, quality of postoperative intensive care. We focused on quality of lavage especially on possibilities of increasing the effectiveness lavage procedure treating.
METHODS: Analysis following points: 1st influence of Flow volume. 2nd reliability (infallibility), precise and stability of cytostatic solution temperature. 3rd minimization lost time caused any interruption during lavage procedure. 4th to finish lavage procedure in any case as well as dysfunction of any main control unit. 4th open hydromechanical system for operator (staff) 5th minimum elements for resterilization (*e.g.* temperature probes). 6th easy and simple operator (without extra-special expertise). 7th impact to acquisition and operating expenses.
RESULTS: Through about three years we carried out theoretical analysis, reckoning and practical verification of above described points. From several solutions every object we choosed the most effectiveness solutions with consideration mutual long-term stability and reliability function. By the way we discovered several very interesting

practical solutions, which brought new finding possibilities in majority of analyse above points. The final verification of main parts we tested *in vitro* with anticipated results for practical clinical operation.
CONCLUSIONS: By comparison above-mentioned aims and practical verified results, we concluded, that is very probable, that contemporary used conceptions of systems for HIPEC and derivated methods have a great reserves in effectiveness entire procedure. Realisation of results above increased not only efficiency of HIPEC method, but significantly the safety to patient as well as to surgical team too. Results above point on positive influence of higher cytostatic flow and lavage shortening or rather lower cytostatic contentration, too. According to the primary evaluation discovered conception is very economy too (about 50%). (Supported by RVO VFN 64165)

P628

HEPATOBILIARY AND PANCREATIC PROCEDURES IN PATIENTS UNDERGOING CYTOREDUCTIVE SURGERY AND HIPEC FOR PERITONEAL METASTASIS

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BACKGROUND: Hepatobiliary and pancreatic resection procedures are often part of cytoreductive surgery followed by HIPEC in patients with metastatic peritoneal carcinomatosis. We retrospectively studied the influence of HBP surgery in the early post-operative outcome in patients undergoing CRS and HIPEC.
METHODS: Between 2005 and 2015 we treated 260 patients for peritoneal carcinomatosis, with cytoreductive surgery (CRS) and HIPEC. 68 of them (26, 1%) required hepatobiliary and pancreatic resection procedures.
RESULTS: Liver resections were performed in 12 patients. Non-anatomical resections were offered to 10 patients and 2 hepatectomies were performed. The Glisson capsule was resected in 50 patients, bile duct resection in 5 patients, distal pancreatectomy in 14 patients and one whipple procedure was performed. Complete microscopic cytoreduction (cc0/1) was performed in 94.1% of our patients. Mortality rate was 2,95%. Minor complications were observed in 38 patients and major complications in 31 patients (pancreatitis, abdominal abscesses, pancreatic fistulas, bile leakage, intra-abdominal bleeding). Six of them (8,8%) were treated with reoperation. There wasn't a significant statistical difference in morbidity and mortality between patients that have had hepatobiliary and pancreatic resection procedures and those that were offered only CRS and HIPEC. On the other hand the median hospital stay was longer for the HBP procedures group ($p<0,03$).
CONCLUSIONS: In order to achieve complete cytoreduction its reasonable and safe to proceed to hepatobiliary and pancreatic resections when necessary.

P629

PERITONEAL CARCINOMATOSIS FROM ENDOMETRIAL CANCER: SHOULD WE TREAT WITH CYTOREDUCTIVE SURGERY AND HIPEC?

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BACKGROUND: We investigated the role of cytoreductive surgery and hyperthermic intraperitoneal chemotherapy in the treatment of peritoneal carcinomatosis from endometrial cancer.
METHODS: We performed a retrospective analysis in 40 patients with peritoneal carcinomatosis from endometrial cancer, divided in 2 groups. The first group (Group A:20 patients) received CRS+HIPEC+post-operative systemic chemotherapy while the second group (Group B: 20 patients) was treated with CRS and post-operative systemic chemotherapy. Preoperative, intraoperative and post-operative data were collected.
RESULTS: Both groups had similar PCI score and cc score. Morbidity and mortality rates were similar without statistical significant differences. Median survival for group A was 36 months *versus* 15 months for group B ($p<0.001$). The use of hyperthermic intraperitoneal chemotherapy (HIPEC), low PCI and cc0 were good prognostic factors for prolonged survival
CONCLUSIONS: Patients with peritoneal carcinomatosis from endometrial cancer may benefit from cytoreductive surgery followed by HIPEC procedure with acceptable morbidity and mortality rates. Prospective randomized clinical trials are necessary in order to confirm the above preliminary concept.

P630

THE IMPACT OF UROLOGICAL RESECTION AND RECONSTRUCTION ON PATIENTS UNDERGOING CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) are increasingly being used to treat peritoneal malignancies. Urological resections and reconstruction (URR) are occasionally performed during the surgery. We aim to evaluate the impact of these procedures on peri-operative outcomes of CRS and HIPEC patients.
METHODS: A retrospective review of a prospectively maintained database of all patients who underwent CRS-HIPEC from April 2001 to February 2015 was performed. Outcomes between patients who had surgery involving, and not involving URR were compared. Primary outcomes were the rate of major complications and the duration of stay in the intensive care unit (ICU) and hospital. Secondary outcomes were that of overall survival (OS) and prognostic factors that would indicate a need for URR.
RESULTS: A total of 214 CRS-HIPEC were performed, 21 of which involved a URR. Baseline clinical characteristics did not vary between the groups (URR *vs* No URR). Urological resections comprised of 52% bladder resections, 24% ureteric resections, and 24% involving both bladder and ureteric resections. All bladder defects were closed primarily while ureteric reconstructions consisted of 2 end-to-end anastomoses, 1 ureto-uretostomy, 5 direct implantation into the bladder and 3 boari flaps. URR were more frequently required in patients with colorectal peritoneal disease ($p=0.029$), but was not associated with previous pelvic surgery (76% *vs* 56% $p=0.12$). Patients with URR suffered more complications, but this did not reach statistical significance (25% *vs* 14%, $p=0.31$). ICU (2.2 days *vs* 1.4 days $p=0.51$) and hospital stay (18 days *vs* 25 days $p=0.094$) was not significantly affected by URR. Undergoing a URR did not affect OS ($p=0.99$), but was associated with increased operation time (570 *vs* 490 min, $p=0.046$).
CONCLUSIONS: While concomitant URR were associated with an increase in operation time, there were no significant differences in post-operative complications or OS. Patients with colorectal peritoneal metastases are more likely to require a URR compared to other primary tumours, and needs to be considered during pre-operative planning.

P631

SINGLE AND TWO-STAGE HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY AFTER CYTOREDUCTIVE SURGERY OF PATIENTS WITH PERITONEAL CARCINOMATOSIS

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BACKGROUND: In case of primary peritoneal carcinomatosis of

unexplained origin deferred hyperthermic intraperitoneal chemotherapy (HIPEC) is given in our oncological focussed clinic. With primary confirmed histology one-stage HIPEC will be carried out following resection. Several studies have discussed the ideal time of HIPEC in relation to intraoperatively complications.
METHODS: Analysis of the results of the two-stage proceeding in terms of morbidity and mortality, Hospitalization.
RESULTS: Peritoneal carcinomatosis patients with resection of different locations were used in this for our observations. According to the histological findings, the patients were treated with one- or two-stage HIPEC. The analysis occurred retrospectively in terms of morbidity and mortality.
CONCLUSIONS: The morbidity in our series was very low. One patient died due to cardiac complications. Prolonged intensive care was needed in patients with two-stage HIPEC. However, the total average length of stay in hospital was not significantly higher. The apportionment of the individual complications will be discussed at the congress. Comparing the published data with the one-stage approach, a significant difference of the total hospitalisation time as well as time needed in intensive care has been shown. The documented morbidity and mortality is comparable to the documented results of other studies. In terms of long-term survival rates, no difference can be detected in our relatively small group of patients compared to the published data on one-stage procedures.

P632

TREATMENT OF PEDIATRIC ABDOMINAL ANGIOSARCOMA WITH CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Angiosarcoma is a rare, but highly aggressive tumor arising from vascular endothelial cells, with a five-year overall survival rate of 35%. Peak incidence of abdominal angiosarcoma is in the seventh decade of life, and very few cases have been reported in the pediatric population. Due to the sparse literature regarding the management of abdominopelvic angiosarcomas in the pediatric population, there are no formal guidelines for treatment at this time. Additionally, there are currently no reported cases of angiosarcomas treated with cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) in the literature.
METHODS: - Report the case of an adolescent girl who developed a pelvic epithelioid angiosarcoma treated with neoadjuvant chemotherapy, CRS and HIPEC. - Conduct a systematic review of the current literature from 1990 to 2016 to investigate primary and secondary abdominopelvic angiosarcoma in the pediatric population and the treatment outcomes with CRS and HIPEC.
RESULTS: A post-menarchal 13-year-old girl presented with refractory malignant ascites. Imaging and diagnostic laparoscopy revealed a widely metastatic pelvic angiosarcoma that appeared to arise from the right ovary. The patient received one cycle of doxorubicin and cyclophosphamide, followed by four cycles of doxorubicin, ifosfamide and mesna, resulting in a partial response with resolution of ascites. The patient then underwent extensive CRS and HIPEC with mitomycin C. The patient had an uneventful peri- and post-operative course. Surgical pathology revealed foci of high-grade epithelioid angiosarcoma. Overall, 70% of the tumor appeared to show treatment effect and 30% was viable. Our literature review demonstrated the efficacy of CRS with HIPEC in treatment of diffuse multifocal abdominal disease from sarcomatous origin. CRS with HIPEC increases disease free survival (DFS) and overall survival (OS) in pediatric patients with peritoneal sarcomatosis. Pediatric patients who treated peritoneal cancer with HIPEC had a three year OS of 71%, compared to 26% and 62% with chemotherapy alone and surgery alone, respectively. Additionally, the only survivors at 3 years from time of diagnosis were those that had the addition of the HIPEC.
CONCLUSIONS: There is little literature regarding the management and treatment of abdominopelvic angiosarcomas in the pediatric population. Although there is no standardized treatment protocol, and CRS and HIPEC has never been used to treat pediatric angiosarcomas, our experience suggests that CRS and HIPEC is a safe, reasonably tolerated treatment modality in pediatric patients with extensive abdominal metastasis from angiosarcoma origin. We propose the creation of a multi-institutional registry to evaluate the role of CRS and HIPEC in inducing remission of abdominopelvic angiosarcomas in the pediatric population.

P633

MORBIDITY AND MORTALITY OF ELDERLY PATIENTS FOLLOWING CYTOREDUCTIVE SURGERY AND HIPEC

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BACKGROUND: Cytoreductive surgery (CRS) and Hyperthermic Intraperitoneal Chemotherapy (HIPEC) have been shown to improve survival in selected patients with peritoneal metastasis. However, there is limited data supporting the role of CRS and HIPEC in elderly patients.
METHODS: A retrospective review of a prospectively maintained database of patients who underwent CRS-HIPEC between April 2001 and July 2015 from a single institution was performed. Patients were divided into two groups based on age-non-elderly (<65 years old), and elderly (=65 years old). Clinicopathological parameters of the patients including the primary tumour histology, resection status, length of hospitalization, morbidity, mortality, and overall (OS) and disease-free survival (DFS) were compared.
RESULTS: During the study period, 177 patients (median age 52, range 9-74) underwent CRS and HIPEC with curative intent. There were 159 non-elderly patients and 18 elderly patients. Complete cytoreduction was achieved in 86.6% in the non-elderly and 93.8% in the elderly patients. Median PCI scores were 12 (0-39) and 11 (1-29) for non-elderly and elderly patients respectively (p=0.77). Median peritonectomy duration were 8.4 hours (3.3 hours-14.7 hours) and 8.25 hours (3.1 hours–16.0 hours) for non-elderly and elderly patients respectively (p=0.17). 39 non-elderly patients (24.5%) and 8 elderly patients (44.4%) suffered from high-grade complications (grade III and above) (p=0.786). 58 non-elderly patients (38.7%) and 7 elderly patients (41.2%) stayed in ICU for more than 1 day (p=0.69). After a median follow-up of 16 months, there was no difference in 5-year OS (51.0% *vs* 59.6%, p=0.879) and DFS (23.3% *vs* 53.3%, p=0.602) between the 2 groups. Median OS and DFS were 69 months (15.4-122.5) and 34 months (29.1-38.9) for the non-elderly patients. Median OS for elderly patients was not reached while median DFS was 36 months (0-82.4) for the elderly patients (p=0.602). There was no 30-day mortality in both groups.
CONCLUSIONS: CRS and HIPEC can be performed to achieving good survival outcomes, without increase in mortality rates but tended towards increased morbidity in elderly patients. Careful patient selection of those without significant co-morbidities and good tumour biology is critical.

AO108

CYTOREDUCTION SURGERY WITH HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY IN PATIENTS WITH PERITONEAL HEPATOCELLULAR CARCINOMA AFTER SORAFENIB FAILURE

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BACKGROUND: Peritoneal metastasis from hepatocellular carcinoma is regarded as a poorly treatable malignant disease. Over the past decade, the modalities that combine cytoreductive surgery (CRS) with hyperthermic intraperitoneal chemotherapy (HIPEC) have shown favorable outcomes in certain malignancies; while, their role in peritoneal HCC remains unknown.
METHODS: N/A.
RESULTS: We present three patients with peritoneal metastases from hepatocellular carcinoma. Two patients were due to tumor rupture in their previous minimal invasive surgery. The other one was spontaneous peritoneal seeding. They received sorafenib treatment for 1-3 months but the treatment failed. Sorafenib treatment induced rapid tumor progression in one patient. They were then treated with CRS plus HIPEC. Intraoperative PCI was 15, 22 and 25; multiple small intrahepatic nodules and hilar lymphatic invasion were also noted intra-operatively. Complete mascroscopic cytoreduction (CCR 0-1) was achieved. They discharged 3 weeks after the operation. Abdominal CT in post-operative 3 months showed no residual peritoneal tumors.
CONCLUSIONS: The combination treatment of CRS and HIPEC is safe and effective to remove peritoneal tumors of HCC. It can be considered in patients with adequate preservation of liver function. It may be done as early as possible to decrease the risk of tumor spread via blood or lymphatic routes.

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P701

A NOVEL FORMULATION FOR SENSITISING TUMOUR CELLS TO CHEMOTHERAPEUTIC AGENTS

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BACKGROUND: The concentration at which common chemotherapeutic drugs (Cisplatin, Doxorubicin, Gemcetabine and 5-FU) that are used clinically have severe adverse effects on the patients such as nephrotoxicity, cardiotoxicity etc. If the cells can be sensitised to react effectively to a lower concentration of these drugs, then the ensuing adverse events can be minimised. Hence, we developed and tested a formulation comprising of N-acetyl cysteine (NAC) and Bromelain that sensitise the tumour cells and hence reduce the dosage of chemotherapeutic agents used.
METHODS: To increase the sensitivity of tumour cells to chemotherapeutic drugs.
RESULTS: All the tumour cell lines tested reacted favourably with the treatment of bromelain+chemotherapeutic agents; NAC+chemotherapeutic agents and bromelain+NAC+chemotherapeutic agents with a dramatic reduction of the IC50 values compared to individual chemotherapeutic agents. The triple combination produced a very noticeable reduction in IC50 value. Particularly, in Hepatic carcinoma cells (HCC), a two thousand fold reduction was achieved with Gemcitabine, bromelain and NAC combination
CONCLUSIONS: Triple combination of Bromelain, NAC and cytotoxic agents, particularly with Gemcetabine, the IC50 was significantly lowered, as compared to drug alone. This effect was more evident in HCC lines.

P702

IMPACTS OF PREOPERATIVE SERUM ALBUMIN LEVEL ON OUTCOMES OF CYTOREDUCTIVE SURGERY AND PERIOPERATIVE INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: There were only few small studies in the literature that explored the impacts of preoperative serum albumin level and clinical outcomes of patients with peritoneal surface malignancy (PSM) who underwent cytoreductive surgery (CRS) and perioperative intraperitoneal chemotherapy (PIC).
METHODS: 1. Evaluate the value of preoperative serum albumin as a prognostic factor for long-term survival outcomes following CRS and PIC in a large patient cohort. 2. Determine if preoperative serum albumin is correlated with perioperative complications.
RESULTS: A total of 591 patients were included in this study. Hypoalbuminaemia is found to be associated with a significantly higher rate of major morbidity ($p<0.001$), longer ICU stay ($p=0.003$), HDU stay ($p<0.001$) and total hospital stay ($p<0.001$), as well as a shorter overall survival (OS) ($p=0.016$). Factor analysis showed preoperative serum hypoalbuminaemia was a prognostic factor of a poor perioperative outcome ($p=0.018$) and poor OS ($p=0.026$).
CONCLUSIONS: Preoperative hypoalbuminaemia is associated with poor perioperative outcomes. More importantly, it is a predictor of poorer overall survival in patients with PSM, independent to PCI, age and completeness of cytoreduction. In future, strategies should be undertaken to improve preoperative nutrition in malnourished patients to improve clinical outcomes of patients with PSM.

P703

PREVALENCE OF INHERITED AND ACQUIRED THROMBOPHILIAS IN PATIENTS WITH CYTORREDUCTIVE SURGERY AND HIPEC

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BACKGROUND: Thrombosis is a mayor complication with potentially fatal outcomes in patients undegoing CRC+HIPEC. The prevalence of peritoneal maliganancies in the world population in the past few decades. This has led to a simultaneous rise in the number of ccr+hipec surgeries procdures being performed. Peritoneal carcinomatosis has been shown to be an independant risk factors for the development of venous trhomboelism, wich can add significant morbidity and mortality. To this procedures, it is not currently not completily understood the relationship between CCR+HIPEC, thrombophilias and venous thromboembolism. There is also no concensus in the best preventive strategies and the appropiate screening testing for patients being evaluated. A better understanding of the hypercoagulability derangements associated with cancer. May lead to the implementation of prevention strategies that can decrease the incidence of venous thromboembolism or pulmonary embolism in the perioperative period.
METHODS: Know the association among factors and prevalence of thrombotic events.
RESULTS: - 41 patients were evaluated. - Demographic data was obteined included gender, age, BMI. - Risk factors for thromboembolism were collected including presence of previous events, Homocystein, Antitrhombin III, C and S protein, V Factor. anticardiolipin antibodies. - There were 14 thrombotic events. - 5 alterations in thrombophilia screening were detected.
CONCLUSIONS: CCR+HIPEC surgery patients are at increased risk of thromboembolic events compared to the general population. The preoperative assessment of thrombophilias was not a predictor of thrombotic events in this population.

P704

RENAL FUNCTION FOLLOWING HEATED INTRAPERITONEAL CHEMOTHERAPY WITH MITOMYCIN C

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BACKGROUND: Mitomycin C is used in hyperthermic intraperitoneal chemotherapy (HIPEC) for colorectal carcinoma and pseudomyxoma peritoneii. Precautions to reduce renal injury are implemented during HIPEC and mitomycin C itself has a risk of dose-related renal injury (1). No data is available on the renal safety profile of mitomycin C use during HIPEC.
METHODS: - To characterise the effects on renal function of mitomycin C HIPEC during cytroreductive surgery. - A retrospective study of patients. - Serum creatinine and estimated glomerular filtration rate GFR) were recorded pre-operatively, immediately following surgery (day 0) and on days 1 and 7. - Age, sex, American Society of Anesthesiologists (ASA) classification and pre-operative renal function were recorded. Mitomycin C 10mg/m2 diluted in 3 to 5L of fluid at 42C was administered using the Coliseum technique via the SunChip Heated Intraperitoneal Chemotherapy System (GamidaTech). HIPEC duration was between 30 and 60 minutes.
RESULTS: 91 patients were included in the study. Mean age was 57 years (range 23 to 86). 32 were female, 59 male. All patients were ASA 2 or 3. Stage 2 CKD was present pre-operatively in 33 (36.26%) of patients, stage 3 CKD was present in 5 (5.49%) pre-operatively. A reduction in eGFR was seen in 30 (32.96%) of patients, 19 63.3%) of these patients had stage 2 CKD and 1 had stage 3 CKD. This reduction in eGFR was resolved by day 7 in all but 1 patient. No patients required renal replacement therapy. According the RIFLE serum creatinine criteria, 3 patients (3.3%) developed acute kidney injury (AKI) and 3 further patients were classified into the renal risk group. Of those who developed AKI, 1 had pre-operative stage 2 CKD and 2 had normal renal function pre-operatively.
CONCLUSIONS: There is a small risk of renal injury from mitomycin C therapy during HIPEC. In almost all cases, this is temporary and resolves with supportive therapy.

P705

RATIONALE FOR THE ADMINISTRATION OF SYSTEMIC 5-FU IN COMBINATION WITH HEATED INTRAPERITONEAL OXALIPLATIN

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BACKGROUND: Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (HIPEC) with oxaliplatin (OX) is the treatment of choice in selected peritoneal carcinomatosis patients. Because 5-FU is mandatory to improve efficacy of OX when used by systemic route, several teams now combine empirically intravenous (IV) 5-FU with HIPEC OX, but this practice is not supported with data. Using a murine model, we studied the impact of IV 5-FU on peritoneal absorption of HIPEC OX.
METHODS: - Evaluate the impact of IV 5-FU on peritoneal absorption of HIPEC Oxaliplatin. - Obtain pharmacokinetics data. - Provide rationale for administrating systemic 5-FU in combination with HIPEC Oxaliplatin for the treatment of peritoneal carcinomatosis.
RESULTS: Under general anesthesia, 24 Sprague-Dawley rats were submitted to 4 different doses of IV 5-FU (0, 100, 400 and 800 mg/m²) and a fixed dose of HIEPC OX (460 mg/m²) perfused at 40°C during 25 minutes. At 25 minutes, samples in different compartments were harvested (peritoneum, portal vein and systemic blood) and the concentrations of 5-FU and of OX were measured by high performance liquid chromatography. Peritoneal absorption of OX was significantly higher (17.0, 20.1, 34.9 and 38.1 nmol/g, $p < 0.0001$) with increasing doses of 5-FU (0, 100, 400 and 800 mg/m², respectively). Peritoneal absorption of OX reached a plateau between 400 and 800 mg/m² of IV 5-FU.
CONCLUSIONS: IV 5-FU enhances peritoneal absorption of HIPEC OX. 400 mg/m2 of IV 5-FU seems to be the best logical dose to be used in combination with HIPEC OX.

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NOVEL PATIENT-DERIVED XENOGRAFT MODELS AS PLATFORM FOR CHEMOSENSITIVITY TESTING AND BIOMARKER VALIDATION

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BACKGROUND: Peritoneal carcinomatosis (PC) from colorectal cancer (CRC) represents a terminal stage with limited therapy options. Systemic chemotherapy regimens reach median survival up to 22 months. Prediction of chemotherapy response for patients with peritoneally metastasized CRC is essential to improve therapeutic success and overall survival. Thus, availability of *in vivo* models for PC could significantly promote the evaluation of chemosensitivity towards standard, targeted and novel drugs as well as analysis of novel biomarkers. The aim of our study was to generate patient derived xenograft (PDX) models for evaluation of chemotherapy response and biomarker analysis, since to our knowledge no PDX models for PC have been established from CRC.
METHODS: Surgical colorectal cancer samples were transplanted subcutaneously onto NOD SCID gamma (NSG) mice for PDX establishment and transferred to NMRI nu/nu mice for further passaging. Chemosensitivity of PDX models was evaluated *in vivo* by application of a panel of conventional and targeted drugs. Tumor growth in treated mice was compared to control mice (T/C-value). After treatment, tumor tissues were collected. In treated PDX tumors gene expression was analyzed using real-time RT-PCR and immunohistochemistry and compared to the untreated control group.
RESULTS: PC tissues of 47 patients were transplanted onto NSG mice for PDX establishment. 49% of these patients had tumors of colorectal origin, 51% originated from appendix. So far, 13 PDX have engrafted. These 13 models arise from 10 patients, as for 3 patients models of two different sites of PC (omentum, mesenterium or parietal peritoneum) exist. Of these 10 patients only 2 tumors evolved from appendix, whereas 8 PCs originated from CRC. Patients' tumors were moderately and poorly differentiated adenocarcinomas. Histologies of PDX tumors match with adenocarcinoma of colorectal or appendiceal origin. PDX models had a diverging tumor doubling time ranging from 6.3 to 25.6 days. 9 models were tested for chemosensitivity. Response to chemotherapy was heterogeneous: 3 models showed overall good response to chemotherapeutics with mean T/C values of all treatment groups <50%. Limited response was observed in 4 models with less than half of chemotherapeutics reaching T/C <50%. 2 models showed moderate response with 2-3 chemotherapeutics not reaching T/C <50%. Intriguingly, PDX models of different sites, but from the same patient, appeared to have different response to chemotherapy: while for one model tumor tissue derived from omental involvement showed overall good chemotherapy response with T/C values <38%, response for mesenteric involvement of the same patient was worse with T/C values up to 100%. These results reveal heterogeneity of PC in association with the actual localization. Overall, for conventional drugs best response was seen for irinotecan (9/9), whereas 5-FU and oxaliplatin showed limited response (3/9). Regarding the targeted drug cetuximab the PDX showed heterogeneous and limited response (3/9), whereas avastin was effective in these models (6/9).
CONCLUSIONS: PDX mouse models reflect heterogeneity in tumor growth and response to chemotherapy of peritoneal metastasized CRC. Heterogeneity is shown both between different patients and within the patient. They offer a beneficial platform for evaluation of predictive biomarkers.

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QUALITY OF LIFE POST-CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY IN PATIENTS WITH PERITONEAL CARCINOMATOSIS: A PROSPECTIVE STUDY

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) for peritoneal carcinomatosis from various pathologies are increasingly being performed in many institutions worldwide. While many studies have shown a good quality of life post surgery, few have been performed prospectively. We conducted a prospective quality of life (QOL) study on all patients undergoing CRS and HIPEC for peritoneal carcinomatosis.
METHODS: All patients who had undergone CRS and HIPEC for peritoneal carcinomatosis from various primaries at our institution from March 2012 to April 2014 were included. A total of 131 procedures were performed. The European Organization for the Research and Treatment of Cancer Core Quality of Life Questionnaire (EORTC QLQ-C30) were administered to the patients. The questionnaire was administered at baseline prior to surgery and thereafter at 3, 6 and 12 months.
RESULTS: There were 36 males and 95 females. The median age was 54 years old (range 19-76). The median follow up was 1.1years. 2-year overall and disease- free survivals were 88.2% and 42.3% respectively. 36.6% of patients had ovarian primaries or primary peritoneal malignancies; 29% of patients had colorectal primaries; 22.9% had appendiceal primaries, 3.1% had peritoneal mesothelioma and 8.4% had other primaries. The median duration of surgery was 425 minutes (range 200-830). The median PCI score was 10 (range 0-39). 29.8% of patients had a stoma post-operatively. 21.3% had high-grade complications. The median length of stay in the intensive care unit was 1 day (range 0-40) while the median length of hospital stay was 13 days (range 6-94). With respect to the global health status, there was no significant change from pre-operative levels to 3 months post-operatively. However, this score did improve at 6 months and subsequently at 12 months. Physical and role functioning scores decreased at 3 months but improved at 6 months and remained stable at 12 months. Social functioning scores remained stable at 3 months but improved at 6 and 12 months. Emotional functioning scores were the only ones that increased at 3 months, again at 6 months and remained stable at 12 months. Amongst symptoms scores, there was an improvement in almost all symptoms by 6 months, especially the pain scores. Only the diarrhea symptoms had increased from baseline at 3 and 6 months.
CONCLUSIONS: Apart from an initial decline in physical and role functioning during the recuperative first 3 months, all patients returned to their baseline or improved in all other functional categories, with most significant improvement in the emotional category within 3 months after CRS and HIPEC. Quality of life is significantly improved by 6 months post CRS and HIPEC in all (most) patients.

P708

DEVELOPMENT OF PACLITAXEL LOADED GENIPIN-CROSSLINKED GELATIN MICROSPHERES FOR INTRAPERITONEAL DRUG DELIVERY AND PREVENTION OF POSTSURGICAL PERITONEAL ADHESIONS

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BACKGROUND: Postoperative intraperitoneal (IP) chemotherapy has established a frontline role in the treatment of advanced ovarian cancer due to pharmacokinetic and survival benefits compared to conventional intravenous (IV) chemotherapy. Since no chemotherapeutic formulations are approved for IP administration, formulations designed for IV therapy are used off-label, but this is associated with rapid peritoneal clearance of the drug and local and systemic toxicity. Additionally, peritoneal adhesions frequently develop after surgery for abdominopelvic malignancies and compromise the effectiveness of IP therapy since uniform drug distribution is hampered. A formulation that distributes evenly in the abdominal cavity, provides local drug release over a prolonged period and simultaneously prevents peritoneal adhesions is of high clinical interest. This work describes the characterization of genipin-crosslinked gelatin microspheres (GP-MS) for this application.
METHODS: Peritoneal adhesions were induced in Balb/c mice by peritoneal wall and cecum abrasion. Control (n=11) and GP-MS-mice

(n=11) were intraperitoneally injected with 2 ml physiological saline or 50 mg GP-MS in 2 ml physiological saline, respectively. In a third group Hyalobarrier gel (Anika Therapeutics) (n=11) was applied to the cecal and peritoneal defect. Adhesions were scored in a blinded manner day 14 postoperative. Wilcoxon-Mann Whitney test was used to compare total score and grade of adhesions. Incidence of adhesions was compared using Fisher's Exact test. Interleukin 1ß, IL-6 and TNF-alpha were quantified in plasma and peritoneal fluid. Histopathological examination of peritoneum, cecum and adhesion tissue was performed. Distribution of GP-MS in the abdominal cavity of Balb/c mice was examined using T2-weighted spin echo sequence on a 7T system (Bruker PharmaScan 70/16) by incorporating iron oxide nanoparticles in GP-MS. GP-MS were loaded with paclitaxel (PTX), and the incorporation efficiency was determined using UPLC-UV-MS/MS. In vitro PTX release was evaluated by immersing a dialysis membrane (cut-off 10 000 Da) containing 2.5 ml of PTX-loaded-GP-MS in PBS into 150 ml PBS/SDS solution at 37°C.

RESULTS: GP-MS-treated-mice developed less postsurgical adhesions compared to control and Hyalobarrier-group (P=0.0039). There was a significant difference (P<0.0001) in total score of adhesions between GP-MS-group compared to control and Hyalobarrier-group, whereas no difference was reported between control and Hyalobarrier-group (P=0.42). A lower adhesion grade was seen in GP-MS compared to control and Hyalobarrier-group (P<0.0001). A decrease of peritoneal inflammation over time in GP-MS-treated mice with recovery of peritoneal wounds was observed upon histopathological examination. Cytokine evaluation did not show difference between groups. GP-MS were distributed evenly throughout the abdominal cavity, confirmed by both visual observation and longitudinal follow-up by MRI. Incorporation efficiency of 7 wt% PTX into GP-MS was obtained. This can possibly be improved by incorporation of PTX nanocrystals into GP-MS. PTX release from GP-MS was sustained in time.

CONCLUSIONS: GP-MS are able to prevent peritoneal adhesions. While PTX can be incorporated into GP-MS, further optimization of *in vitro* and *in vivo* drug release is required. Future work will include the evaluation of efficacy of PTX-loaded-GP-MS in a mouse model for peritoneal metastasis of ovarian origin.

P709

RISK OF ACUTE RENAL FAILURE AND PROGNOSTIC FACTORS OF RENAL FUNCTION ALTERATION AFTER CISPLATIN-BASED HIPEC

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BACKGROUND: Cisplatin-induce nephropathies as systemic toxicity are well documented. However, very little is known intraperitonealy, in a context of hyperthermic intraperitoneal chemotherapy (HIPEC). The aim of this study was to assess the risk of acute renal failure (ARF) and to identify renal function alteration (RFA) prognostic factors after a cisplatin-based HIPEC.

METHODS: This was a monocentric retrospective study of a cohort of 60 patients who underwent complete cytoreductive surgery and cisplatin-based HIPEC (either alone or associated to doxorubicin for 6 patients or mitomycin C for 19 patients) between June 2006 and June 2014, whatever the peritoneal malignancy. The pre- and post-operative glomerular filtration rates (GFR) were estimated by the RD formula adapted to the serum creatinine dosage technique. The occurrence of a RFA was defined according to the RIFLE criteria. Post-operative tubular toxicity markers were also recorded.

RESULTS: A RFA was observed in 25 patients (41.7%) including 8 (13.3%) ARF. At 3 months, 10 patients (16.7%) had chronic renal disease and 3 (5%) had end-stage kidney disease. The occurrence of a RFA increased the length of hospital stay (p <0.01) but did not affect the 5-year overall survival rate, which was 61.3% (CI 95% [38-84.6]) for patients with RFA and 52.2% (CI 95% [12.2-76.2]) for those without RFA (p=0.526), after a median follow-up of 27.6 months. In the univariate analysis, a pre-operative malnutrition (p <0.01) and hypoalbuminemia (p <0.01), postoperative sepsis (p <0.01) and the use of antibiotics with nephrotoxic potential (p=0.02) were significantly associated to the occurrence of a RFA. However, no connection where found with the type of preoperative systemic platinum salt, the number of prior cisplatin systemic cycles and the intraoperative peritoneal carcinomatosis index. In the multivariate analysis, the only predictive factor of RFA was the occurrence of a postoperative sepsis (p=0.003, OR: 16.32 CI 95% [2.48-107.28]).

CONCLUSIONS: Only one study published by Breakeit *et al.* evaluated the impact of a cisplatin-based HIPEC (associated to doxorucicin) on 53 patients and the IRA rate was 3.8%. This lower incidence may be explained by an albumin-based hydration protocol with a competition between albumin (which sequester plasmatic cisplatin) and 0.9% sodium chloride. Furthermore, they reported maybe lower incidence rates of sepsis and use of antibiotics with nephrotoxic potential. Cisplatin-based HIPEC increases the risk of IRA. In order to reduce its nephrotoxicity, it seems interesting to evaluate more precisely the pre, per and post-operative kidney and tubular functions and the pre-operative nutrition state. Malnourished patients should be supplemented before the intervention, the peri-operative hydration protocol should also be revised and antibiotics with nephrotoxic potential avoided. Further studies measuring the pre, per and post-operative plasmatic cisplatin level could provide a better understanding of the cisplatin pharmacokinetics after cisplatin-based HIPEC.

P710

PROGNOSTIC FACTORS OF HEMORRHAGIC COMPLICATIONS AFTER OXALIPLATIN-BASED HIPEC: TOWARD ROUTINE PREOPERATIVE DOSAGE OF VON WILLEBRAND FACTOR?

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BACKGROUND: Oxaliplatin-based hyperthermic intraperitoneal chemotherapy (HIPEC-ox) induces specific morbidity with hemorrhagic complications (HC). Nowadays, there are no clinical or biological factors explaining the higher incidence of HC after HIPEC-ox. The only prognostic factor previously reported is a Peritoneal Carcinomatosis Index (PCI) over 13. The aim of this study was to identify preoperative, intraoperative and postoperative HC predictive factors after HIPEC-ox.

METHODS: A prospective single center study that included all consecutive patients treated with curative-intent HIPEC-ox, whatever the origin of peritoneal disease, was conducted. All patients underwent systematic blood tests exploring primary hemostasis and endothelial activation before surgical incision (D0) and on postoperative days 2 (POD2) and 5 (POD5). The analyzes included a closure time in the

presence of epinephrine (CT-EPI) and Adenosine diphosphate (CT-ADP), dosage of Von Willebrand factor antigen (VWF:Ag) levels, dosage of VWF-ristocetin cofactor activity (VWF:RCo) and dosage of the plasminogen activator inhibitor (PAI). Platelet aggregation was performed with the light transmission assay method.

RESULTS: Between May 2012 and August 2015, 47 patients were enrolled in the study. The overall HC rate was 38%. The most common HC was peritoneal bleeding in 83% of cases. The median delay of HC occurrence was 3 days (range 2-10) after HIPEC-ox. Major morbidity was significantly higher in patients with HC. The PCI was similar between patients who bled and those who did not. In the univariate analysis, the protective prognostic factors for HC were the colonic origin of the primitive tumor (p=0.006), the use of preoperative chemotherapy (p<0.001), a higher D0 VWF:Ag level (p=0.001), a higher D0 VWF:RCo level (p=0.007) and a lower POD5 PAI level (p=0.008). Multivariate analysis showed that a higher plasmatic level of D0 VWF:Ag was a significant protective predictive factor for HC (p=0.049, HR: 0.97 for each additional unit of D0 VWF:Ag). ROC curves showed that a D0 VWF:Ag level below 138% had a sensitivity of 87.5%, a specificity of 67% and an area under the curve of 80.3% (p<0.01) for predicting HC. The occurrence of HC did not influence disease-free survival.

CONCLUSIONS: This study highlighted a subgroup of patients with low risk of HC after HIPEC-ox through the identification of prognostic factors: colorectal cancer, preoperative chemotherapy and high D0 VWF:Ag level. We postulate that preoperative chemotherapy with 5-fluorouracil may induce a procoagulant state protecting patients from HC after HIPEC-ox through an increase of VWF:Ag. Routine preoperative dosage of VWF may help the surgeon to select the most suitable patients for HIPEC-ox and decrease related morbidity.

P711

MITOMYCIN C PHARMACOKINETICS AS PREDICTOR OF SEVERE NEUTROPENIA IN HYPERTHERMIC INTRAPERITONEAL THERAPY

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BACKGROUND: Complete cytoreductive surgery (CCRS) combined with hyperthermic intraperitoneal chemotherapy (HIPEC) is an approach to overcome peritoneal metastasis from colorectal adenocarcinoma. Mitomycin C (MMC) is frequently used but not devoid of toxicity, of which the most common and feared is neutropenia. The aim of this study was to investigate the incidence of severe neutropenia (grade 3 and 4 according to the National Cancer Institute's Common Terminology Criteria for Adverse Events) after CCRS-HIPEC with MMC. We explored the impact of severe neutropenia and the possible clinical, surgical, and/or biological risk factors. Furthermore, we examined the efficiency of MMC pharmacokinetics to predict the risk and the grade of neutropenia.

METHODS: A total of 45 patients undergoing CCRS and 90 min Mitomycin C-based closed HIPEC (MMC-HIPEC) for peritoneal carcinomatosis of colorectal origin between 2004 and 2010 were followed in this prospective and single center study. For each patient, MMC was measured using a liquid chromatography method in plasma. Each pharmacokinetic profile was determined before HIPEC and the others at 30, 45, 60, 90, 150 and 330 min after the start of the MMC-HIPEC. The area under the MMC concentration–time curve (MMC-AUC) was calculated.

RESULTS: The incidence of severe neutropenia was 40%. No demographic, clinical or surgical factors increased the risk of neutropenia. The global morbidity and mortality rates of the population in the postoperative period were 68.8 and 6.6%, respectively, without significant differences in the neutropenic and nonneutropenic groups. The mean MMC dose in the patients who developed neutropenia was not significantly higher than those who did not. However, we found that the occurrence of neutropenia and its gravity significantly increased in direct correlation with an increase in MMC plasma concentration 30 min (T30) and 45 min (T45) after the start of HIPEC, p=0.002 and 0.019, respectively. The same correlation was observed between the MMC-AUC and the risk of neutropenia. A logistic regression analysis showed that T30 (p=0.008), T45 (p=0.001), and MMC-AUC (p=0.008) can predict the grade of the neutropenia. T30 MMC plasma concentration appeared to be the most effective parameter to predict neutropenia.

CONCLUSIONS: Neutropenia is a frequent complication associated with MMC-HIPEC. The results of our study indicate the feasibility and the potential benefit of a protocol including the MMC dosage at T30 after the start of HIPEC. A threshold of 572 µg/L gives a predictive sensitivity of 86% and a specificity of 80% to predict severe netropenia. These results must be considered in the management of patients undergoing MMC-HIPEC in order to place high-risk patients under neutropenic monitoring while the other patients can undergo simple hematological monitoring.

P712

INTRAVENOUS FLUID AND PARENTERAL NUTRITION USE IN THE HOME SETTING FOR PALLIATIVE PATIENTS POST CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY: A CASE SERIES

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) is a management strategy increasingly being undertaken to treat peritoneal surface malignancy (PSM). While the procedure offers significant survival benefit, postoperative complications can include intestinal failure and gastrointestinal obstruction. Postoperative disease progression is also not uncommon. The use of home-based intravenous fluid (IVF) therapy and home-based parenteral nutrition (PN) in palliative patients with cancer is controversial.

METHODS: Present 6 cases post CRS and HIPEC with intestinal failure and disease recurrence where home-based IVF or PN administration was utilised to prolong life.

RESULTS: In Four cases IVF was utilised in the home setting for 7 months or longer, with 1 patient achieving sufficient intestinal adaptation to cease IVF reliance. In the remaining 2 cases PN was utilised in the home setting for 6 months or longer. In all of these cases life was extended with the use of home-based IVF or PN.

CONCLUSIONS: Factors such as cost, associated risk, predicted quantity of life and quality of life (QOL) should be considered as a part of a 'case by case' approach for future patients. Further research into QOL in the context of home-based IVF and PN should also be undertaken.

P713

REDUCTION OF CARCINOMATOSIS RISK USING ICODEXTRIN AS A CARRIER SOLUTION OF INTRAPERITONEAL OXALIPLATIN CHEMOTHERAPY

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BACKGROUND: Risk factors of metachronous peritoneal carcinomatosis (PC) in colonic cancer are well known. There is no standard treatment in patients with high risk of PC. Icodextrin 4% (ICDX), presently used to prevent postoperative abdominal adhesions, could inhibit the coactivation of the tumor cells and the microenvironment cells, which is essential to the development of the PC. The aim of this study was to inhibit the formation of the PC in a murine model mimicking surgical situation using ICDX and intraperitoneal (IP) prophylactic chemotherapy.
METHODS: We created a model of growing PC in mice by injecting IP tumor cells of murine colonic cancer CT26. Four groups were created: CT26 (control), CT26+ICDX (ICDX), CT26+chemotherapy (oxaliplatin and 5FU) (chemo), CT26+chemotherapy+ICDX (ICDX chemo). At day 15, PC was evaluated with peritoneal cancer index (PCI) adapted to rodents.
RESULTS: In the chemo group, PCI was significantly lower than in the control group (3,2 *versus* 8,4, p=0,02). ICDX had a synergetic effect on PC with chemotherapy; indeed PCI in ICDX chemo group was lower than in chemo group (1,4 *versus* 3,2, p=0,04). There were no difference between control group and ICDX group.
CONCLUSIONS: Safety of ICDX needs to be verified, particularly on colonic anastomosis before using ICDX combined with IP chemotherapy as a preventive treatment of PC in high risk of PC patients. This prophylactic treatment is easy to use and would be administrated at the end of a curative surgery for a colonic cancer.

P714

ASSESSMENT OF SENSITIVITY OF TUMOR TISSUE TO CYTOTOXIC DRUGS AS AN AID IN THE SELECTION OF AN ANTICANCER DRUG USED IN THE HIPEC PROCEDURE

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BACKGROUND: Different cytostatics are used in the treatment of peritoneal metastases using cytoreductive treatments and hyperthermic intraperitoneal perfusion chemotherapy (HIPEC). However, there are no randomized trials comparing the results of treatment with various anticancer drugs. The aim of this study was to assess the sensitivity of tumor tissue to cytostatics in order to individualize the approach to the treatment of patients with metastases to the peritoneum and the inclusion of targeted chemotherapy based on the results of this study.
METHODS: The study included 22 patients diagnosed with abdominal tumors with metastases to the peritoneum. Tumor tissue sensitivity to cytotoxic drugs was performed on tumor biopsies. The sensitivity assessment of tumor tissue to cytostatics was performed by means of the *in vitro* adenosine triphosphate-based chemotherapy response assay (ATP-CRA).
RESULTS: Out of 11 patients with ovarian carcinoma the sensitivity to drugs used in the HIPEC procedure in this type of tumor (cisplatin) was observed in 4 patients (11.7 - 64%). In 3 of cases, sensitivity to doxorubicin was also observed. In turn, sensitivity to paclitaxel was observed in 9/11 patients (82%), 7 of whom the sensitivity was defined as strong and as poor in 2. In the 7 patients with bowel cancer, appendix cancer, and peritoneal pseudomyxoma (PMP), where the drug used in the HIPEC procedure was mitomycin C or oxaliplatin, no sensitivity to any of the cytostatic drugs was observed in the tumor tissue. Instead, sensitivity to paclitaxel was observed in 4/7 patients (57%), including all 3 patients with PMP. In the remaining patients, sensitivity to irinotecan (1 patient) and doxorubicin (1 patient) were observed, and there was a lack of sensitivity to all tested cytostatics in 1 patient.
CONCLUSIONS: The test results indicate a lack of sensitivity of tumor tissue of metastases to the peritoneum of colorectal cancer and the PMP to cytotoxic drugs generally used in the HIPEC procedure (mitomycin C, oxaliplatin). Frequent efficacy of paclitaxel to tumor metastases to the peritoneum with respect to the above mentioned cancers, ovarian cancer, and other types was observed. The results of the study suggest that the drug of choice in the HIPEC procedure should be paclitaxel.

P715

EXPERIENCES AFTER 10 YEARS OF CYTOREDUCTIVE SURGERY AND HIPEC IN A SINGLE CENTER

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BACKGROUND: Cytoreductive surgery and HIPEC still remains a challenging operation with the necessity of an interdisciplinary team.
METHODS: 10 years data were collected prospectively and analyzed retrospectively at the University Hospital of Tübingen at the department of General, Visceral and Transplant Surgery
RESULTS: 528 patients with an median age of 56 years (2-80) were operated with the intent of cytoreductive surgery and HIPEC. 29% were of colorectal orirgin and 26% recurrent ovarian cancer. In 71% a CC0 or CC1 resection was achieved and HIPEC was performed. Median PCI was 19 (0-39). Median hospital stay was 15 days (3-105). 90 day mortality was 4%. 3% experienced an anastomotoc leakage. 10% underwent reoperation.
CONCLUSIONS: Nowadays CRS and HIPEC can be performed with acceptable morbiditiy. The HIPEC alone does not seem to increase the rate of severe complications compared to other major surgical procedures.

P716

ANTIMICROBIAL PROPERTIES OF PERFUSATE FLUID AFTER CS-HIPEC WITH MITOMYCIN C

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BACKGROUND: Infectious postoperative complications often delay systemic chemotherapy after cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CS-HIPEC). Because we have empirically observed less then expected incisional infectious complications after CS-HIPEC with mitomycin C (MMC), we here investigate the antimicrobial properties of HIPEC perfusate fluid.
METHODS: Investigate the antimicrobial properties of HIPEC perfusate fluid.
RESULTS: The concentration of MMC from perfusate fluid at the conclusion of HIPEC was 5.4±0.1 µg/mL. HIPEC perfusate fluid produced an inhibition zone in E coli plates of 15.1±5.5 mm, while no inhibition zone was observed for MMC saline in concentrations of 2 through 8 µg/mL (p<0.001 each), and inhibition of 4.56±5.7 mm was observed for MMC saline concentration 8.75 µg/mL (p=0.002). Greater growth inhibition was noted for ertapenem solution at 32.3±0.7 (p=0.007), 35.1±0.6 (p=0.007), 37.0±0.5 mm (p=0.007) for concentrations 10, 20, and 30 µg/mL, respectively. HIPEC perfusate fluid produced an inhibition zone in Staphylococcus plates of 8.5±9.2 mm, while the inhibition zone was 2.2±2.1 (p=0.008), 5.1±2.3 (p=0.213), 7.5±1.0 (p=0.670), 9.6±0.9 (p=0.035), 10.2±0.4 mm (p=0.009) for the MMC saline solution in concentrations 2, 4, 6, 8, 8.75 µg/mL, respectively. Stronger growth inhibition was noted for ertapenem solution at 25.0±0.0 (p=0.028), 28.0±0.8 (p=0.029), 29.3±0.5 mm (p=0.029) for concentrations 10, 20, and 30 µg/mL, respectively. HIPEC perfusate demonstrated stronger bacterial inhibition against E coli as compared to Staph aureus (15.1±5.5 *vs* 8.5±9.2 mm, p=0.003).
CONCLUSIONS: HIPEC perfusate exhibits considerable antimicrobial properties, which are variable between patients and are stronger against E coli as compared to Staph aureus. Oddly, Mitomycin C solution alone has significant activity against Staph aureus but less so against E coli. Further studies of HIPEC carrier solutions and chemotherapy agents may result in reduction of surgical site infection and thus enhanced patient recovery.

P717

DEDICATED ANESTHESIA MANAGEMENT IMPROVES PATIENT OUTCOME AFTER CRS/HIPEC

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BACKGROUND: Despite knowledge about the role of the surgeon, no data is available regarding the specific anesthesia management during cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC). Here we analyzed anesthesia management during CRS/HIPEC, and identified factors associated with patient outcomes.
METHODS: An entire cohort of patients (n=112) after completed CRS/HIPEC between 2009-2014 was analyzed. Group A included the first (n=57) patients, and group B the (n=55) patients operated after introduction of our multidisciplinary guidelines. The guidelines were introduced to standardize anesthesia in CRS/HIPEC, including patient monitoring, fluid management and coagulation.
RESULTS: There was no difference between the two groups for age, gender, BMI, and comorbidity (Charlson index). More patients with DPAM (p=.04) were observed in group B, and the disease load (peritoneal cancer index) was higher (p=.02), including more splenectomies (p=.01), liver capsule resections (p=.001), and colectomies (p=.05), with a higher dose of chemotherapy during HIPEC (p=.02) in group B. Despite more complex surgery in in group B, the rate of major complications (p=.003) and reoperations (p=.01) was lower. After the introduction of guidelines, anesthesia management was different in group B, including a higher use of coagulation factors (p=.008) and albumin (p<.001), less diuretics (p=.007), and less invasive monitoring (p=.001). Temperatures remained at higher physiologic levels at the end of the operation (p=.005), and very low temperatures were avoided (p=.02). This resulted in more patients extubated in the OR (p=.02) in group B. On multivariate analysis two independent factors were identified: the use of >2000mL of colloid (p=.042, HR=5.3) was associated with worse, and the substitution of albumin (p=.046, HR=8.6) with better outcomes.
CONCLUSIONS: This data is novel and highlights the central role of anesthesia, to provide continuous and proactive maintenance of patient physiology without aggressive overcorrection, as a critical part of a peritoneal surface malignancy program.

P718

MAJOR POSTOPERATIVE COMPLICATIONS ARE A RISK FACTOR FOR IMPAIRED SURVIVAL AFTER CRS/HIPEC

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BACKGROUND: Cytoreductive Surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) is a combined treatment for well-selected patients with peritoneal carcinomatosis (PC). We aimed to identify factors influencing cancer specific survival (CSS) and disease free survival (DFS).
METHODS: Data of 113 patients with colorectal or appendicular carcinomatosis from a single center between 2009 and 2014 analyzed. Patients with high grade tumors received standard perioperative chemotherapy, patients with low-grade appendix tumors were directly operated. HIPEC was performed after radical cytoreduction. Follow-up included clinical exams, tumor markers and CT scans every six months.
RESULTS: Patients had carcinomatosis from appendix neoplasms in 63% (71/113), including low-grade and high-grade tumors, and colorectal cancer in 37% (42/113). Curative surgery was possible in 67% of patients. Major morbidity occurred in 10.6% of patients and mean follow-up was 28 months. For colorectal PC, median CSS and DFS were 40 and 12 months. Median DFS was 19 months for high-grade appendix tumors, while mCSS has not been reached. All patients with DPAM were still alive at time of analysis and rate of DFS was 96% for these patients after 3y. The peritoneal cancer index (p=.047, HR 3.4) and signet ring histology (p=.10, HR=3.5) were factors influencing CSS, while positive nodal state of the primary (p=.014, HR 7.0), ras-mutations (p=.056, HR 3.9) and indeterminate pulmonary nodules (p=.178, HR 3.3) were associated with an impaired DFS. Major postoperative complications were associated with an impaired CSS (p=.016, HR 5.742) as well as shortened DFS (p=.283, HR=2.6).
CONCLUSIONS: CRS/HIPEC can offer a survival benefit in well-selected patients with PC. Major postoperative complications have a major impact on the long-term oncological outcome of these patients.

P719

A VALIDATED HIGH PERFORMANCE LIQUID CHROMATOGRAPHY – DIODE ARRAY DETECTOR METHOD FOR THE QUANTIFICATION OF MITOMYCIN C IN PLASMA, URINE AND PERITONEAL FLUID

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BACKGROUND: Mitomycin C (MMC) is an alkylating antibiotic, whose most important mechanism of action is through DNA cross-linking. Today, MMC is used as a chemotherapeutic agent due to its antitumor properties. MMC has been extensively studied in preclinical and clinical work, and is widely used for the treatment of peritoneal carcinomatosis (PC) from colorectal, appendiceal, ovarian, gastric cancer and diffuse malignant peritoneal mesothelioma. This treatment modality, a combination of cytoreductive surgery (CRS) and hyperthermic intraperitoneal peroperative chemotherapy (HIPEC), has shown encouraging clinical results in several phase II and III trials. Now that the prove of concept of CRS and HIPEC has been delivered in PC treatment, the question remains how to further improve it. There is a much-needed standardization amongst the dosing regimens that are currently in use. We should rely on pharmacologic evidence supporting such a standardization.
METHODS: A fully validated high performance liquid chromatography (HPLC) – diode array detector (DAD) analytical method is provided for the quantification ofMMC in plasma, urine and peritoneal fluid (PF).
RESULTS: The HPLC-DAD system consisted of a Hitachi LaChrom Elite (VWR) system equipped with a Hitachi L-2200 autosampler and a Hitachi L-2455 DAD. The stationary phase was a reversed phase C18 column (Polaris 3 C18-A, 150 x 3.0 mm, 3 µm, Agilent). The mobile phase for the plasma and PF analysis consisted of 27% methanol in 73% 20 mM ammoniumacetate buffer (pH 6.5) at a flow rate of 0.4 mL/min. The mobile phase for the urine analysis consisted of 9% acetonitrile (ACN) in 91% 20 mM phosphate buffer (pH 6.5) at a flow rate of 0.4 mL/min. HPLC-DAD settings involved an injection volume of 50 µL, a temperature of 25°C (plasma and PF) or 30°C (urine) and UV-detection at 365 nm. Plasma sample preparation involved protein precipitation with ACN. PF and urine sample preparation involved 10-fold dilution with mobile phase and filtration through 0.45 µm nylon syringe filter. Porfiromycin was used as an internal standard. The HPLC-DAD analytical method allows quantification of MMC in plasma over a range of 0.05 µg/mL-50 µg/mL; in PF over a range of 0.1 µg/mL-160 µg/mL and in urine over a range of 0.1 µg/mL-100 µg/mL. The respective extraction recoveries of the sample preparation methods are 86.1 5.5%, 98.2 3.2% and 88.5 3.6%. The HPLC-DAD method was validated with a precision and accuracy 15%. Plasma and PF samples remained stable after a storage period of 20 days at 4°C, -27°C and -80°C. Urine samples remained stable after a storage period of 20 days at -27°C and -80°C.
CONCLUSIONS: A new validated specific HPLC-DAD method is presented for the quantification of MMC in plasma, PF and urine samples. This method will be applied for pharmacologic research of samples retrieved during HIPEC.

P720

A VALIDATED INDUCTIVELY COUPLED PLASMA MASS SPECTROMETRY METHOD FOR THE QUANTIFICATION OF PLATINUM IN PLASMA, ULTRAFILTRATE, URINE AND PERITONEAL FLUID

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BACKGROUND: Oxaliplatin is a third generation platinum (Pt) complex with proven cytotoxicity in colon and appendiceal neoplasms. In vivo, oxaliplatin is biotransformed rapidly and nonenzymatically to various products, including complexes with chloride, water, methionine, and glutathione. However, there is no consensus whether the different biotransformation products contribute to the cytotoxicity of the chemotherapy drug. Most pharmacokinetic studies of intraperitoneal oxaliplatin during hyperthermic intraperitoneal peroperative chemotherapy (HIPEC) have been based on the use of atomic absorption spectroscopy (AAS) or inductive coupled plasma mass spectrometry (ICP-MS), unselective analytical techniques measuring the total Pt content. This method will codetermine oxaliplatin and Pt containing biotransformation products. Matheme *et al.* used a selective analytical technique, high performance liquid chromatography (HPLC) and post-column derivatization with N,N-diethyldithiocarbamate using microwave heating, to measure the systemic exposure of oxaliplatin after hyperthermic intraperitoneal peroperative chemotherapy (HIPEC). They demonstrated that the systemic exposure to intact oxaliplatin is considerably lower than previously reported.
METHODS: A highly sensitive and specific ICP-MS method is provided for the quantification of oxaliplatin-derived Pt in plasma, plasma ultrafiltrate (UF), peritoneal fluid (PF) and urine. As it is known that oxaliplatin binds rapidly to plasma proteins, a timeline was created assessing the extent of plasma protein binding at 37°C over a period of 23 hours.
RESULTS: The ICP-MS Perkin Elmer system (Nexion 350 S) consisted of a PFA ST Microflow nebulizer, a Quartz Cyclonic (Peltier cooled) spray chamber and a 1.8 mm Sapphire injector. The analyte masses were set at Pt 194 and Pt 195 with an internal standard mass of Terbium (Tb) 159. Plasma and plasma UF sample preparation involved 1000-fold dilution with 0.5% nitric acid (HNO3). PF and urine sample preparation involved 1000-fold dilution with 2% HNO3. The ICP-MS analytical method allows quantification of oxaliplatin-derived Pt in plasma over a range of 0.017 ppt-100 ppt and in PF and urine over a range of 0.003 ppt-100 ppt. The respective extraction recoveries after sample processing are 96.6 2.6%, 96.3 1.8% and 96.2 1.3%. The ICP-MS method was validated with a precision and accuracy 15%. The effect of long-term storage at 4°C, -27°C and -80°C was investigated. Plasma protein binding over a period of 23 hours at 37°C was extensive with a loss of 14.7% oxaliplatin-derived Pt after 30 minutes storage, 40.1% loss after 1 hour, 82.1% loss after 5 hours and 99.1% loss after 23 hours.
CONCLUSIONS: A highly sensitive and specific ICP-MS method is provided for the quantification of oxaliplatin-derived Pt in plasma, plasma UF, PF and urine. This method will be applied for pharmacologic research of samples retrieved during HIPEC. Because oxaliplatin binding to plasma proteins is very extensive, the time point of ultracentrifuging the plasma samples is standardized to maximum 30 minutes after HIPEC.

P721

A COMBINED METHOD TO EVALUATE THE EFFECTIVENESS OF HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY TO ERADICATE INTRAPERITONEAL FREE CANCER CELLS

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BACKGROUND: Intraperitoneal free cancer cells (IFCCs) are the fundamental cause of peritoneal carcinomatosis (PC). Cytoreductive surgery (CRS) plus hyperthermic intraperitoneal chemotherapy (HIPEC) has been developed as an integrated treatment package to bring significant benefits for selected PC pts. In routine clinical setting, it is important to develop a fast and accurate method to evaluate the effectiveness of HIPEC to eradicate IFCCs, and to explore the feasibility of cytological cure for PC.
METHODS: This study was aimed at developing a combined method integrating cytological, molecular and serological studies of key tumor markers, to adequately evaluate the effectiveness of HIPEC on IFCCs. The intraperitoneal fluid pre- and post- CRS+HIPEC from 50 PC patients were obtained for cytological studies using conventional peritoneal lavage cytology test, and for molecular studies using RT-PCR and real-time quantitative RT-PCR to detect CEA mRNA and CK20 mRNA levels. In addition, serological studies on serum levels of tumor makers CEA, CA125 and CA19-9 were also conducted before and after CRS+HIPEC.
RESULTS: The positive rate of conventional cytology before *vs* after HIPEC were 100.0% *vs* 22.0% (P=0.000). The positive rates of CEA mRNA and CK20 mRNA before *vs* after HIPEC were 100.0% *vs* 86.0% (P=0.012) and 100.0% *vs* 96.0% (P=0.495), respectively. Moreover, after HIPEC, 18 (36.0%) patients had a decline in CEA mRNA (P=0.000) and 17 (34.0%) patients had a decline in CK20 mRNA (P=0.000). The positive rates of serum CEA, CA125 and CA199 before *vs* after HIPEC were 52.0% *vs* 28.0% (P=0.014), 52.0% *vs* 44.0% (P=0.423) and 40.0% *vs* 28.0% (P=0.205), respectively.
CONCLUSIONS: HIPEC could effectively eradicate IFCCs, and partially reduce molecular levels of key tumor markers CEA and CK20.

P722

OXALIPLATIN PHARMACODYNAMICS DURING HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY: EVALUATION OF PERFUSATE BIOACTIVITY AS A POTENTIAL NOVEL PARAMETER FOR THE STANDARDIZATION OF HIPEC PROTOCOLS

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BACKGROUND: Hyperthermic intraperitoneal chemotherapy (HIPEC) is used to treat peritoneal surface malignancies, employing different cytostatic agents as oxaliplatin (OX) after cytoreductive surgery. Despite its increasing use, studies assessing pharmacokinetics and particularly pharmacodynamical aspects of HIPEC are scarce. Therefore, protocols employed for HIPEC are inconsistent and optimal drug dosage and required durations for HIPEC mainly uncertain.
METHODS: In this study, a systematic evaluation of the OX distribution was performed in nine patients during HIPEC (300mg OX/m² body surface area over 30 min in Physioneal 40 glucose solution). The distribution of OX compounds in peritoneal perfusates, circulation and tissues

was evaluated. OX abundance and OX compounds were measured over time by liquid-chromatography coupled mass spectrometry (LC-MS) and total platinum concentration was additionally analyzed by atomic absorption spectrometry (AAS). Further, a novel *ex vivo* impedance-based real-time cytotoxicity assay (RTCA) was established to evaluate the bioactivity of OX compounds in platinum sensitive cells.

RESULTS: Compared to calculated amounts of OX expectable in peritoneal perfusates only 10-15% OX was detected as inert drug by LC-MS during HIPEC, yet further OX compounds could also be evidenced. The assessed total platinum (assessed by AAS) however was consistent with calculated values (mean 93.7 µg/ml [75.0-108.9] [min.-max.]), remaining essentially unchanged during the procedure. The bioactivity of perfusates remained also stable during HIPEC, with only a slight but significant decline evidenced after 30 minutes. Further we evidenced platinum by AAS in both peritoneum and subjacent fascia without significant differences.

CONCLUSIONS: We found evidence that bioactivity of OX in peritoneal perfusates used in the described HIPEC protocol is mainly preserved during a 30 min procedure and show further pharmakokinetics parameters in this connection. Our data suggest that the bioactivity of peritoneal perfusates *ex vivo* might be a useful parameter to evaluate the cytotoxic potential of OX and its compounds during HIPEC. Respective pharmacodynamics might be useful to establish rationales for standardization of HIPEC protocols in the future.

P723

ASSESSMENT OF TEMPERATURE DISTRIBUTION WITH MULTIPOINT TEMPERATURE MEASUREMENT SYSTEM FOR IMPROVING INTRAPERITONEAL CHEMOHYPERTHERMIA TREATMENT

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BACKGROUND: Sustained research efforts are devoted to the improvement of the treatment of Peritoneal Surface Malignancies patients with HIPEC equipment. HIPEC requires intra-peritoneal spread of cytostatic drugs, at high temperatures (41-43 C), accomplished within 60-90 minutes, during surgical interventions. The problems associated with the currently available equipment are: lack of appropriate distributed temperature monitoring; uncontrolled flow distribution that favors the existence of multiple areas with a temperature that is lower than the appropriate one, compromising the synergic effect cytostatic drug; lack of advanced control mechanisms implemented in order to achieve homogeneous temperature in the peritoneal cavity.

METHODS: The design of a HIPEC multipoint temperature measurement system must address the placement, the number, the mobility and transmission method of the temperature sensors, in order to provide architecture able to collect relevant and accurate temperature data. A fully automated system was developed allowing multipoint temperature measurement and recording in HIPEC procedures with minimal exposure of the personnel. Stainless steel probes with dedicated geometry were designed for hosting very small size platinum transducers, providing reduced inertia and assuring easy placement, as well as hermetically sealed implementation withstanding multiple sterilization cycles. The setup used for the assessment of intraperitoneal temperature distribution in studies with pigs consisted in: heat exchanger with associated controller for assuring a temperature of 43 C for the liquid in the inflow way, peristaltic pump with adjustable flow rate, eight channels temperature data logger with simultaneous display for all channels, 5 liters reservoir for recirculation of the solution. The temperatures were sampled simultaneously every second and recorded on local memory for later downloading in the computer. The proper placement of the probes inside the peritoneal cavity was confirmed through CT scans.

RESULTS: The developed system allows multipoint intraperitoneal temperature measurement, providing scalable operation (8 to 16 input channels), an accuracy of 0.2 C and resolution better than 0.1 C. The measurement results obtained on experimental studies with pigs having the weight between 50 kg and 70 kg demonstrated a large range (38.3 C to 42.9 C) for the temperatures sampled simultaneously in eight intraperitoneal points, in the case of the one inflow way, one outflow way HIPEC setups.

CONCLUSIONS: The simple setups are not providing the uniformity of exposure to drugs and a consistent temperature of the solution for various intraperitoneal volumes, but setups with multiple delivery channels could provide more even distribution for both temperature and flow of the cytostatic fluid. Most devices monitor the intra-peritoneal temperature in several points (2 to 4), which is insufficiently to be sure that the whole peritoneum is exposed to the optimal temperature. In addition, up to the present, there is no optimal placement defined for the location of temperature sensors, but the location showing significant differences indicated in this study can suggest good candidates.

P724

THE SIGNIFICANCE OF LAPAROSCOPY IN THE TREATMENT DECISION FOR PERITONEAL SURFACE MALIGNANCIES

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BACKGROUND: The role of Diagnostic Laparoscopy (DL) had to be reconsidered due to technical progress (Multiple detector computed tomography-CT), to the diversification of abdominal imaging methods (Magnetic resonance imaging, Positron emission tomography–computed tomography), and to the introduction of the dedicated, radical treatment for Peritoneal Surface Malignancies (PSM): Cytoreductive Surgery with Intraperitoneal Chemotherapy (+/-Hyperthermia). Therefore, Staging Laparoscopy (SL), as a new perspective, has increasingly gained interest and several studies investigated its value, but the expected potential was not reached yet. Our previous studies assessed the impact of DL to avoid the pure Explorative Laparotomies (EL).

METHODS: After the implementation of radical treatment of PSM, our aim was the accurate selection of patients for the radical treatment. Patients with PSM (colorectal, ovarian, appendiceal, pseudomyxoma peritonei, peritoneal mesothelioma) referred to CF Clinical Hospital Cluj-Napoca, Romania were included prospectively in the study between January 2012 and December 2015. Preoperative evaluation included mainly CT and DL in patients deemed amenable to dedicated treatment. CT aimed to highlighting PSM, tumor primitive origin, resectability, and hepatic metastases. DL followed hepatic metastases, small bowel and mesentery involvement, PSM histology (included large-size biopsies for pseudomyxoma peritonei and malignant peritoneal mesothelioma), PSM staging, and evacuation of ascites. The results of CT and DL were

assessed by EL, as a gold standard. DL was performed as a separate procedure from a planned radical treatment, if indicated.
RESULTS: In the period, from 110 patients selected by CT, 87 patients completed radical treatment. 82 (75%) underwent pretherapeutic DL, successful in all patients. The laparoscopic evaluation excluded 18 patients (22%) to radical treatment because of extensive disease (small bowel involvement, hepatic metastases) and PSM absence. Of 28 patients who were not eligible for laparoscopic evaluation and were subjected to EL, 23 (82%) completed the radical treatment. There was a significant correlation between the SL and EL findings (correlation coefficients 0.9133). Related to the EL, the accuracy of the DL (100%) was significantly higher ($p<0.05$) than CT (79%), to indicate the eligibility of the patients for radical treatment. Laparoscopy was uneventful and associated with no deaths. The mean DL time was 39 minute (standard deviation 9; range 20-55) and hospitalization 2.3 days (standard deviation 0.4; range 2-3).
CONCLUSIONS: Diagnostic laparoscopy represents a valuable tool in preoperative assessment of PSM, and acts as a Staging Laparoscopy. It improved patient selection for the radical treatment and it must be included in decision algorithms for synchronous PSM.

P725

SAFETY OF NOVEL PROTOCOL FOR BIDIRECTIONAL OXALIPLATIN-BASED HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Intraperitoneal chemotherapy has an established role in the treatment of selected patients with colorectal peritoneal metastases. Oxaliplatin is highly suitable as a chemotherapeutic agent for hyperthermic intraperitoneal chemotherapy (HIPEC); however, its use to date has been limited by the morbidity caused by severe electrolyte and glycemic imbalances associated with 5% glucose as its obligatory carrier solution. Recent evidence demonstrates that oxaliplatin degradation in more physiological, chloride-containing carrier solutions is limited and associated with formation of the active platinum-containing metabolite. A novel, evidence-based protocol was developed and implemented for bidirectional HIPEC using systemic leucovorin (20mg/m2) and 5-fluorouracil (400mg/m2) with 30 minutes of intraperitoneal oxaliplatin (260mg/m2) in Dianeal® PD4 dextrose 1.36% instead of 5% glucose. Here, we present the results of safety tests of this novel protocol and demonstrate that its impact on intra-operative electrolyte and glucose levels is minimal.
METHODS: • Clinical safety testing of novel HIPEC protocol during 8 consecutive cases of cytoreductive surgery (CRS) and HIPEC in Erasmus Medical Centre (Rotterdam, the Netherlands) from 1 March 2016 to 15 April 2016. • Measurement of serum sodium, potassium, chloride and glucose levels immediately prior to HIPEC, immediately after HIPEC and 1 and 3 hours after HIPEC (T=0, T=30, T=60 and T=180, respectively). • Monitoring of intravenous insulin requirements immediately prior to HIPEC, immediately after HIPEC and 1 and 3 hours after HIPEC.
RESULTS: At T=0, T=30, T=60 and T=180, median sodium levels (in mmol/L) were 140, 138, 140 and 140, respectively; median potassium levels (in mmol/L) were 4.6, 4.2, 3.7 and 3.9, respectively; median chloride levels (in mmol/L) were 112, 111, 111 and 112, respectively; and median glucose levels (in mmol/L) were 9, 11.5, 10.7 and 8.6, respectively. Median insulin requirements (in units/hour) were 0.5, 1.5, 1.175 and 0, respectively.
CONCLUSIONS: Using a novel protocol for bidirectional oxaliplatin-based HIPEC in Dianeal® instead of 5% glucose, serum sodium and chloride levels showed only transient, mild fluctuations (=1% from baseline levels). Potassium levels decreased during the procedures with a peak drop of 18.7% 1 hour after HIPEC, but levels remained within normal range and normokalemia was maintained. Transient mild hyperglycemia was observed, with return to baseline glucose levels 3 hours after HIPEC, with only minimal insulin requirements. Compared to historical values for electrolyte and glycemic changes using 5% glucose as HIPEC carrier solution, the observed fluctuations in this study were minimal and not clinically relevant. In conclusion, this novel protocol leads to only minimal and clinically irrelevant electrolyte and glycemic disturbances and its adoption as the standard protocol for oxaliplatin-based HIPEC should be considered.

P726

COMPUTED VIRTUAL CHROMOENDOSCOPY FOR DETECTION OF PERITONEAL CARCINOMATOSIS: AN ANIMAL STUDY

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BACKGROUND: Detection of an incipient Peritoneal Carcinomatosis (PC) is still challenging, and there is a crucial need for technological improvements in order to diagnose and to treat early this condition. Fujinon intelligent chromoendoscopy (FICE) is a computed virtual chromoendoscopy system merchandised as a digital image processing technique enhancing the mucosal surface structures by using selected wavelengths of light in reconstituted virtual images. The use of the FICE system in digestive endoscopy has led to a substantial benefit in the detection of minimal esophagitis, a better detection of dysplasia in Barrett's and oesophagus squamous cell cancer, as well as early gastric cancer.
METHODS: The aim of this study was to create a murine model of incipient PC, and to explore the PC with Fujinon Intelligent Chromo Endoscopy (FICE) in order to determine the wavelengths of the white light (WL) spectre that offer the highest contrast between PC nodules and surrounding peritoneum, and therefore a better detection of PC. Eighteen BALB/c mice had intraperitoneal injection of murine colonic cancer CT26 cells. Peritoneal exploration with FICE was performed at different times. For each PC nodule, 1 WL and 10 FICE images were recorded. Each image was then divided into its elementary red, green and blue band images. Depending on the FICE channel, each elementary image corresponds to a specific wavelength of the WL spectre. Through numerical analysis of these images, the value of the nodule and the background peritoneum were obtained, and the contrast value was calculated. Contrast values obtained with the different wavelengths were then compared.
RESULTS: PC grew in all the mice. The number as well as the size of PC nodules was increasingly high depending on the day of exploration. Mean PCI was 1.6±1.2 at day 5, 7.7±2.6 at day 8 and 15.0±7.3 at day 10. A total number of 1805 elementary images of PC nodules were analysed. The wavelength that offered the best contrast between PC nodules and background peritoneum was 460 nm with a mean contrast value of 0.240±0.151 ($p<0.0001$). As far as the wavelengths assigned to the R, G and B monitor inputs in the FICE system are concerned, the three wavelengths that offer the best contrast between PC nodule and background peritoneum were 450 nm, 460 nm and 500 nm.
CONCLUSIONS: This murine model of incipient PC is effective, reliable and reproducible. A monochromatic light with a wavelength at 460 nm offers the highest contrast between PC nodules and background peritoneum, allowing a better detection of PC. If a new FICE channel specific for PC detection has to be created, the wavelengths of the three images to be assigned to the R, G and B channels are 500 nm, 460 nm and 450 nm.

P727

THE INNOVATIVE TRIPLE SUPPORT DESIGNED DRUG DELIVERY NANOSYSTEMS FOR CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERRITONEAL CHEMOTHERAPY

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BACKGROUND: The combination of cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) becomes currently to be more and more used method of treatment in selected patients diagnosed with peritoneal carcinomatosis (PC). There are currently conducted several studies, clinical trials and projects at different levels affecting directly onto better, wider and more efficient implementation of CRS+HIPEC technique. Till now there has been also described and developed many of different innovative supporting methods, tools and CRS+HIPEC procedure modifications, but there is a still a big need to create an effective solutions hopefully possible to the fast translational implementation into to the clinic. There is why there are many conducted projects focused mainly onto better cancer recurrence control and prevention and projects focused onto maximally personalized - targeted anticancer therapy. To the one of the most interesting ways in the CRS+HIPEC method development becomes the potential usefulness of novel nanotechnology achievements and concepts.
METHODS: Inpresented multidicsciplinary project based onto several *in vitro* and *in vivo* self performed studies, we want show an experimental innovative triple-way therapy based onto novel DDS ready for the next advanced investigational research, which will have potential future impact on support CRS+HIPEC procedures. The first approach is to constitute the novel hybrid nano-dressing based on graphene oxide film (GOF) composites, filled with selected chemotherapeutics to "protect" the place of resection in parenchymal organs and which will be used additionally for treatment of non resectable and very small implants. The second approach will based on the innovative nanovehicles, based on hollow carbon nanospheres (HCN) which will be used as drug delivery systems (DDS) with chemically incorporated antibodies and characterized by prolonged drug release on time. Those DDS could be left in the abdominal cavity just after finishing the intraperitoneal perfusion with chemotherapy, which will have strong impact to prevent the cancer recurrence. The third approach will utilize the unique properties of innovative carbonaceous nanovechicles susceptible for near Infrared irradiation (NIR), which will be used as potential non-invasive additional adjuvant treatment in follow-up time in case of necessity.
RESULTS: N/A.
CONCLUSIONS: In our project we have obtained the data suggested that the very effective and promising materials cpuld be probably used effectively to suport experimental CRS+HIPEC method in next research phases and investigational steps.

P728

A PUMP IS NO LONGER NECESSARY TO PERFORM HIPEC: RESULTS FROM THE CHIPOFIL STUDY

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BACKGROUND: Most surgical teams in the world use a pump and a circuit to perform HIPEC for the prevention or the treatment of peritoneal carcinomatosis. Different machines are commercially available at this time. All these devices have a significant cost and this may limit the use of HIPEC in several countries and, thus, the access of patients to this therapy. Beyond the economic aspect, all those systems of HIPEC may become blocked or leak chemotherapy liquid and require the watchful surveillance of one member of the team (in addition to the surgeon). Those drawbacks of HIPEC have probably hindered its wider use around the world. In a previous animal study we have shown that the heating source could be placed within the abdomen (Thermowire device). This avoided the need for the current complex and expensive perfusion machines and the extracorporeal circuit (heating device, reservoir, and pumps) with their specific drawbacks. The CHIPOFIL study was conceived as a first use of Thermowire in humans.
METHODS: The first aim of the study was to establish the safety of Thermowire to achieve HIPEC in humans. Secondary aims were the quality of the hyperthermia, its homogeneity and the time to set up the device and achieve the target temperature (42°C).
RESULTS: According to the protocol, 13 consecutive patients (9 women and 4 men; median age: 59) undergoing HIPEC in two French University Hospitals for different indications were included after providing a written informed consent: 8 for colorectal cancer related disease, 2 for appendiceal cancer, 1 for gastric cancer, 1 for pseudomyxoma peritonei and 1 for peritoneal mesothelioma. In 5 of them the HIPEC was prophylactic (PCI=0) and the median PCI in the 8 remaining patients was 6. After a CC-0 cytorreduction was achieved, 2 sets of Thermowire were placed within the abdominal cavity: one in the supramesocolic and one in the inframesocolic space. The median time to set on the device was 25 minutes. The abdomen was left open according to a semi-open technique described elsewhere (open abdomen - closed HIPEC) and filled with 2 L/M2 of liquid. Thermowire was switched on and 42°C were achieved in all the thermal probesin a mean time of 14 minutes and mantained for 30, 60 or 90 minutes according to the modalities of HIPEC chosen by the surgical team. A permanent stirring of the viscera was performed, as it is always done in our practice. At the end of HIPEC, the device was dismantled (median delay: 11 minutes) and the whole abdominal cavity contents were carefully examined searching for any thermal injury. No patient had thermal injuries or device-related complications. There were 2 anastomotic leaks (only 1 requiring reoperation), 2 hemoperitoneum requiring reoperation, one evisceration and one prolonged gastroparesia.
CONCLUSIONS: A heating cable within the peritoneal cavity (Thermowire) can achieve safe and efficient HIPEC.

P729

THERMOGRAPHIC ANALYSIS TO CONTROL TEMPERATURE HOMOGENEITY USING A CLOSED INTRABDOMINAL RECIRCULATING CO2 CHEMOHYPERTHERMIA

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BACKGROUND: Intra-abdominal chemotherapy with closed access helps avoid toxic exposure for people in the operating room, and it reduces heat loss. However, it is unknown if hyperthermic dextrose and chemotherapeutics agents are distributed homogeneously in the abdominal cavity when using the closed technique.
METHODS: To determine the effectiveness of thermography to control the distribution of abdominal temperature in the development of a closed chemohyperthermia model. For thermographic measurement, we divided the abdominopelvic cavity into nine regions according to a modification of carcinomatosis peritoneal index.We used a difference of 2.5º C between and within the quadrants, and thermographic colors, as asymmetric criteria. We realized two preclinical studies previously to introduce our programme of CO2 recirculation chemohyperthermia in patients.Preclinical study:· Rats Model: Six athymic nude rats, male,

rnu/rnu. They were treated with closed technique and open technique.· Porcine Model: 12 female large white pigs. Four were treated with open technique and eight with closed recirculation CO2 technique. Clinical Pilot Study, EUDRACT 2011-006319-69/NCT02681432: 18 patients with ovarian cancer were treated with cytoreductive surgery and hyperthermia intraperitoneal chemotherapy, HIPEC, with a closed recirculating CO2 system. Thermographic control and intra-abdominal temperature assessment was performed at the baseline,when outflow temperature reached 41ºC, and at 30´.

RESULTS: The thermographic images showed a higher homogeneity of the intra-abdominal temperature in the closed model respect to the open technique. The thermogram showed a temperature distribution homogeneity when starting the circulation of chemotherapy. There was a correlation between the temperature thermographic map in the closed porcine model and pilot study, and reached inflow and outflow temperatures,at half time of HIPEC, of 42/41.4ºC and 42±0.2/41 ±0.8°C, respectively. There was no significant impact to the core temperature of patients after reaching the homogeneous temperature distribution.

CONCLUSIONS: To control homogeinity of temperature distribution is feasible using infrared digital images in a closed HIPEC system with CO2 recirculation.

P730

PHARMACOLOGIC PROPERTIES OF MITOMYCIN-C MIXED IN THE LIPID SOLUTION FOR HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY IN THE RAT MODEL

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BACKGROUND: The ideal carrier solution for hyperthermic intraperitoneal chemotherapy (HIPEC) should provide high solubility, stability of tissue penetration, and prolonged action for anticancer drugs. The most previous studies were confined in using water solvents as a HIPEC carrier solution such as isotonic or hypotonic water solutions. Especially, in HIPEC for colorectal cancer, mitomycin-C (MMC) with isotonic water fluid has been widely used so far. However, both solubility and drug distribution of anticancer drugs can be changed by controlling the partition coefficient between the water and lipid layer of the HIPEC solution. The logarithm of the ratio for partition coefficient (log P) of MMC is known as -1.6, which has a higher solubility to water than a lipid. However, when considering these characteristics of MMC, there are possibilities to develop HIPEC solutions to control effective distributions of anticancer agents into the HIPEC solvent. In this study, HIPEC was performed in six SD rats for 90 minutes in 42-43°C temperature using two kinds of HIPEC solution mixed with MMC 35mg/m2: group 1 (300ml of 1.5% dextrose peritoneal dialysis solution (Dianeal, n=3), and group 2 (300ml of 20% purified soybean lipid solution (Lipision, n=3). MMC was inserted three times as the following doses: 17.5mg/m2 at 0 minute, and 8.8mg/m2 at 30 and 60 minutes after HIPEC. The samples were collected with 5ml from peritoneal fluid and plasma at 0, 5, 10, 15, 20, 30, 45, 60, 75, and 90 minutes. All samples were pretreated by deproteinization methods for HPLC. The concentration (Cmax) of MMC and the area of under the curve (AUC) in the peritoneal fluid and plasma were analyzed by tandem mass spectrometry.

METHODS: This study aimed to investigate the pharmacologic characteristics of MMC mixed in the water dialysis solution and lipid solution during HIPEC in the rat model.

RESULTS: The Cmax of group 1 was 33.0 ng/ml in the plasma and 14741.9 ng/ml in the peritoneal fluid. Meanwhile, the Cmax of group 2 was 18.4 ng/ml in the plasma and 5978.5 ng/ml in the peritoneal fluid. According to the analysis for the ratio of AUC between group 1 and group 2, plasma AUC(Dianeal *vs* Lipision) was 2.66 and peritoneal AUC(Dianeal *vs* Lipision) was 2.82. On the other hand, the Cmax ratio between group 1 and group 2 was 1.80 in the plasma and 2.47 in the peritoneal fluid.

CONCLUSIONS: The concentration of MMC mixed in group 1 was higher than in group 2 in both plasma and peritoneal fluid. In addition, the AUC of group 1 was about 2-3 times higher than group 2. These results can suggest that the water solvent is more effective to perform HIPEC than the lipid solution. However, because the absolute concentration of MMC in group 2 was lower than group 1 in spite of the same initial dose, there are possibilities that MMC may escape into lymphatic channels or third space of the abdominal cavity when it is mixed in the lipid solution. Further studies are required to illuminate these characteristics in the future.

P731

UNCOVERING METASTATIC TUMOUR BIOMARKERS BEYOND RECONNAISSANCE: THE STRENGTH IN DEPTH

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BACKGROUND: Advancements in the next generation sequencing (NGS) technology have made generation of large amounts of genomic data feasible and cost effective. Unique to cytoreductive surgery (CRS) and heated intraperitoneal chemotherapy (HIPEC), multiple spatially discrete tumour specimens could be systematically harvested for genomic analysis. In this study, we hypothesized that combination of multiple tissue subsites with tissue microdissection and NGS could unmask hidden biomarkers and provide an insight into tumour biology.

METHODS: 1. To demonstrate the feasibility of in-depth sequencing using minute amounts of RNA obtained from microdissected tumour specimens obtained from CRS. 2. To exploit the advantage of CRS that allows systematic collection of tumours from multiple sites and its associated normal tissues. 3. To evaluate the gene expression profile of the microdissected tissue components compared to the matched whole tumour biopsies. 4. To propose a guideline for the identification of unique biomarkers using laser microdissection and deep sequencing.

RESULTS: After pathologic review of the tumour samples to identify tumour and stroma components, meticulous tissue microdissection via laser capture microdissection coupled with an optimized genomic library generation pipeline provided for successful sequencing of 3 to 60ng of RNA as starting material. RNA sequencing of tumour microcompartments and epithelial cancer cells uncovered multiple differentially expressed genes. qPCR verification of 9 chosen targets confirmed the high fidelity of the RNA sequencing process. Compared to the whole tumour biopsies from the same samples not subjected to microdissection, 4 targets (IGFBP7, SPINK1, S100A11 and ERBB2) were significantly enriched in the respective microdissected samples but not in the whole tumour biopsies ($p < 0.05$). Microdissected samples revealed that 4 of the targets (IGFBP7, TIMP1, SPARC & COLIA1) were expressed exclusively in the stroma compartment. High expressers (IGFBP7, TIMP1 and S100A11) were significantly enriched in the microdissected Krukenberg tumour components but not in the primary tumour ($p < 0.01$).

CONCLUSIONS: We have successfully demonstrated that in-depth analysis of tumour compartments and normalization using matched tissue samples from CRS allows for the identification of putative therapeutically relevant biomarkers that would otherwise not have been identified from traditional genomic sequencing pipelines. The combination of tissue microdissection to purify tumour cellularity with NGS provides a potential framework for clinically relevant research in the era of "omics" technology.

P732

EXPLORING THE USE OF PEGYLATED LIPOSOMAL DOXORUBICIN (CAELYX®) AS PRESSURIZED INTRAPERITONEAL AEROSOL CHEMOTHERAPY

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BACKGROUND: Pressurized intraperitoneal aerosol chemotherapy (PIPAC) is a new treatment that applies chemotherapeutic drugs into the peritoneal cavity as an aerosol under pressure. It's a safe and feasible approach that improves local bioavailability of chemotherapeutic drugs as compared with conventional intraperitoneal chemotherapy. Till now the drugs used in PIPAC for the treatment of the peritoneal carcinomatosis (PC) are Cisplatin, Doxorubicin and Oxaliplatin; as of yet, there are no data comparing different drugs and dosage schedules of PIPAC. We present our preliminary pharmacokinetics results using Pegylated Liposomal Doxorubicin in PIPAC.
METHODS: Between June 2015 and July 2016, 94 PIPAC applications in 42 patients every 6 weeks at 37°C and 12 mmHg for 30 min were performed. We considered for pharmacokinetics analysis 10 procedures performed with conventional Doxorubicin solution at the dose of 1.5 mg/m2 and 15 procedures with Caelyx® at the same dose. Peritoneal samples were collected after 30 minutes of PIPAC treatment and freezed. Subsequently the tissue samples were homogenized, extracted and the drug concentration was determined by a HPLC analysis.
RESULTS: Twenty-four tissue samples using Caelyx® and 39 using Doxorubicin solution were collected and analyzed. In the first series a mean tissue concentration of 1.27±1.33 mg/g was reported, while in the second one we registered a mean concentration of 3.1±3.7 mg/g. Therapeutic doxorubicin concentration were observed following the administration of lower doses that generally ranged between 10-60 mg/m2. The greater tissue accumulation obtained with the doxorubicin solution might be related to the aerosol pressure that can favor the coalescence of the liposomal systems. A fine tuning of the pressure applied as of the geometry of the nebulizer will be carried out to optimize the use of Pegylated Liposomal Doxorubicin.
CONCLUSIONS: The preliminary results demonstrated the feasibility of the use of Pegylated Liposomal Doxorubicin in PIPAC. The reduced doses and the local administration might decrease sideeffects and improve the quality of life of patients. The Pegylated Liposomal Doxorubicin formulation might be used in combination with other anticancer agents with the PIPAC treatment. In order to increase the local concentrations, further studies will be focused on the improvement of the technical features of the nebulizer and on the liposomal doxorubicin aerosolization.

P733

OPERATING ROOMS AND EQUIPMENT USED FOR HIPEC ARE AT RISK FOR CHEMOTHERAPY CONTAMINATION

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BACKGROUND: Healthcare workers with occupational exposure to chemotherapy experience measurable levels of contamination, increased DNA abnormalities, and long-term adverse health effects. Thus, it is imperative to minimize occupational contact with chemotherapies. Guidelines exist for chemotherapy administration, but are infrequently adapted to nontraditional areas of administration, such as in the operating room.
METHODS: - To assess the magnitude of contamination and potential exposure, operating rooms and equipment used for the HIPEC procedure were tested for baseline levels of cisplatinum.
Surfaces within the operating rooms and of equipment utilized during HIPEC with potential for contamination were wiped as a baseline, exclusive from HIPEC procedures. Cisplatinum levels on these surfaces were determined by a commercial vendor (ChemoGLO, Chapel Hill, NC) using inductively coupled plasma mass spectrometry.
RESULTS: Cisplatinum was detected on personal equipment such as surgeon's shoes (Non-detected (ND)-75.6 ng/ft2) and general equipment such as the operating room computer keyboard (ND - 45.6 ng/ft2). Pump equipment used for HIPEC showed heavy contamination on the control knob/panel (ND-163.0 ng/ft2), roller pump (130.4-2306.0 ng/ft2), and reservoir ring (70.2-4361.0 ng/ft2). Operating room floors showed no detectable contamination in the samples tested.
CONCLUSIONS: Unprotected personal attire, procedural equipment, and the pump apparatus used for the HIPEC procedure can be contaminated with chemotherapy. To protect healthcare workers, standard procedures need to be developed and adopted for the delivery of chemotherapy in the operating room and other non-traditional settings.

P734

MODELLING RESPONSE OF GASTROINTESTINAL CANCER TO MITOMYCIN C: IDENTIFYING PATIENTS WHO MAY BENEFIT FROM ADJUNCTIVE TREATMENT DURING CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) are increasingly being used to treat peritoneal malignancies. For patients with peritoneal carcinomatosis of gastrointestinal origin, the HIPEC agent is typically mitomycin C.
METHODS: We aimed to determine a signature of resistance to mitomycin C in colorectal and gastric cancer cell lines in order to identify patients who may benefit from adjunctive treatment in a personalised approach to their management.
RESULTS: With the exception of KRAS (10% gastric, 43% colorectal) and NOTCH1 (7% gastric, 4% colorectal), mutations in genes associated with MMC response (NOTCH1, EWS_FLI1, FLT3, NRAS, FGFR2, CDKN2A, KRAS, CDK4) are rare in colorectal and gastric adenocarcinoma (<5%). KRAS mutation is associated with a minor change in sensitivity (10% reduction in IC50), NOTCH1 mutation is associated with a large change in sensitivity (7.5x fold reduction in IC50). Expression analysis of 891 discovery set cell lines identified an 8-gene expression signature predictive of sensitivity to mitomycin C ($p < 0.01$). Application of the predictive model stratified colorectal cancer (CRC, n=49) cell lines as intermediate sensitivity (median IC50 89nM) or resistant (median IC50 4.53 μM) with an AUC (ROC area under the curve) of 0.72. Application of the predictive model stratified gastric cancer cell lines (n=28) as sensitive (median IC50 33nM) or resistant (median IC50 0.71 μM) with an AUC of 0.7.
CONCLUSIONS: Intraperitoneal chemotherapy provides local concentrations many times higher than that which could safely be delivered by systemic chemotherapy. Although this increased concentration may overcome resistance to mitomycin C, the use of multi-agent chemotherapy may offer improved response in a subset of patients predicted as resistant by molecular profiling. Further work should elucidate molecular mechanisms of resistance for potential complementary biological adjuncts during HIPEC to increase sensitivity.

P735

PERITONEAL METASTASIS COMPLEXITY SCORE

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BACKGROUND: 'Cynefin' framework describes the known, knowable, complex, and chaotic domains of specific knowledge models. Multidimensional dynamic surgical processes and aspects containing complex specific knowledge in clinical care reside in either one of four domains and cannot be clearly predicted. The whole process of diagnostic work-up, prognostic evaluation, and treatment strategy of peritoneal metastasis (PM) is inherently a complex entity that accumulation of specific experience and expertise is determinative instead of standard well-known predictive factors.
METHODS: The primary aim is to define a complexity scoring system with respect to 'Cynefin framework' that may be useful for predicting oncologic outcomes in PM treatment. Prospectively recorded database of 241 patients who underwent curative cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) between October 2007 and July 2015 was analyzed. A complexity score was composed with patient-based (age, body mass index, albumin level, ASA, coagulopathy, smoking, neoadjuvant chemotherapy, incomplete debulking/CRS, recurrent PM, previous HIPEC, primary tumor) and surgical-based (delayed diagnosis/intervention, radiotherapy, previous abdominal surgery, stoma existence/necessity, number of resected organs, intervention to gastrointestinal/other spaces, number of anastomoses, experience of cytoreductive surgeon, use of synthetic materials, peritoneal carcinomatosis index [PCI], intensive care unit stay, use of blood products, completeness of cytoreduction and operative time) factors which were previously found to be associated with surgical and oncologic outcomes of our series. The relationship between peritoneal metastasis complexity score (PMCS) and surgical/oncologic outcomes was assessed. Patients were tiered into low complexity (PMCS<10) and high complexity (PMCS=10) groups.
RESULTS: Median age was 55(20-86), 177 patients were female and 64 were male. Etiology was colorectal cancer in 87(36.1%) patients, ovarian cancer in 82(34%), appendix in 23(9.6%), mesothelioma in 19(7.9%), stomach in 11(4.6%) and other malignancies in 19(7.8%) patients. Median PCI was 14 (3-28). Complete cytoreduction (CC-0) was achieved in 179(74.3%) patients. Postoperative mortality rate was 5.4% (n=13). Median and minimum follow-up were 17(0-80) and 6 months, respectively. Two and 5-year overall survival (OS) rates were 77.6% and 55.2%, respectively. There were 137(56.8%) patients in low PMCS and 104(43.2%) in high PMCS groups. Postoperative mortality rates were 1.5% and 10.6% in low and high PMCS groups, respectively (p=0.002). Postoperative morbidity rate was 27% in low PMCS group and 60.6% in high PMCS group (p<0.001). Five-year OS was 67.3% and 40.9% in low and high PMCS groups, respectively (p<0.001). Intraabdominal and/or distant metastases were seen in 40.7% of low PMCS group and 68.8% of high PMCS group (p<0.001).
CONCLUSIONS: High PMCS is associated with increased postoperative morbidity and mortality and the worst oncologic outcomes. Management of complex and multifactorial processes such as PM diagnosis&treatment require specific center discipline, adaptability to complex problems, and procedural experience. Standard and most practical treatment approaches are not valid in complex systems.

P736

INITIAL EXPERIENCE OF PERIOPERATIVE ANESTHESIA AND INTENSIVE CARE MANAGEMENT DURING CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) is a long and complex procedure with significant blood and fluid loss during debulking, hemodynamic, hematological, and metabolic alterations before and during the HIPEC phase, and even in the early postoperative period, with resultant significant morbidity and mortality.
METHODS: We have planned a prospective audit to collect the data and find out and correlate different perioperative factors and parameters with number of days of ICU stay, hospital stay, morbidity and mortality at 30 and 90 days. This interim analysis of data collection was done after approval from Institutional Ethics Committee and public registry (NCT02754115) and included all the patients belonging to ASA I-III class and age between 18 to 70 years who had undergone colorectal and gynecological oncology cases posted for CRS with HIPC.
RESULTS: Total 18 patients were operated for CRS and HIPEC in a year; eight patients were excluded from analysis because CRS and HIPEC were not done in single setting. Data of 10 patients were analyzed. Mean age of the patients were 49.85 years. Median ASA class was 2. Mean duration of surgery was 11.5 hours. Mean maximum temperature, SCVO2, cardiac output, cardiac index and lactates during HIPEC phase was 36.79 0C, 80.77, 5.89, 3.55 and 5.47 respectively. Median blood loss was 2550 ml (minimum 1550 ml to maximum 8150 ml). Median fluid requirement was 11250 ml (minimum 8000 ml to maximum 16500 ml). Four patients required vasopressors intraoperatively. Median length of postoperative mechanical ventilation and ICU stay were 12 hours (12 hours to 34 days) and 5.5 days (4 days to 34 days) respectively. Mortality at 30 days and 90 days were zero and one respectively.
CONCLUSIONS: This is the prospective audit of its kind looking at the anesthetic and perioperative factors in Indian population. Our initial results trend toward more complex nature of the surgical procedure and high degree of physiological and homeostatic disturbances and hence it mandates more meticulous intraoperative and postoperative management.

P737

ABDOMINAL WALL MORBIDITY FOLLOWING CYTOREDUCTIVE SURGERY AND HIPEC

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BACKGROUND: Incisional hernia formation has been reported as high as 20% within one year after midline laparotomy. Since hyperthermic intraperitoneal chemotherapy (HIPEC) is likely to impair wound healing, we sought to investigate the incidence of incisional hernia formation and abdominal wall rupture following CRS and HIPEC.
METHODS: Consecutive patients with radiographic evidence of peritoneal metastases (PM) were scheduled for CRS and HIPEC at the Comprehensive Cancer Center, University Hospital Tübingen, Germany. Clinical data were retrospectively analyzed.
RESULTS: Between May 2005 and May 2014, 271 patients with a median age of 55 [17-76] years underwent CRS and HIPEC. Within a median follow-up of 38 [2-110] months, 19 (7%) incisional hernias and 11 (4%) abdominal wall ruptures were observed. Hernia formation occurred in median within 3.7 [0.3-42] months after surgery. Even though no incarceration was observed, hernia repair had to be performed in 12 patients (63%). Age >70, cardio-pulmonary comorbidity, the presence of pseudomyxoma peritonei or mesothelioma and postoperative abdominal wall rupture were detected as risk factors for hernia formation. However, Cox multivariate analysis only confirmed the

presence of pseudomyxoma peritonei or mesothelioma and postoperative abdominal wall rupture as independent risk factors.
CONCLUSIONS: Our data does not suggest that CRS and HIPEC is necessarily associated with a higher incidence of incisional hernia formation. However, patients suffering from pesudomyxoma peritonei or mesothelioma and patients with postoperative abdominal wall rupture seem to be at risk for developing incisional herniation.

P738

CHARACTERIZATION OF TOTAL PARENTERAL NUTRITION UTILIZATION IN PATIENTS FOLLOWING CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Cytoreductive surgery with hyperthermic intraperitoneal chemotherapy (CRS-HIPEC) is an effective treatment for peritoneal surface malignancy but can result in gastrointestinal dysfunction requiring total parenteral nutrition (TPN). Studies examining nutrition following CRS-HIPEC are limited and there is no consensus on the optimal timing of TPN initiation following CRS-HIPEC. The objectives of this study were to characterize TPN utilization and to identify factors associated with TPN use in a population of patients following CRS-HIPEC. A retrospective chart review of peritoneal surface malignancy patients treated with CRS-HIPEC at a single institution between February 2011 and December 2015 was conducted.
METHODS: Primary outcomes: - Proportion of patients receiving post-operative TPN. - Factors associated with TPN utilization. Secondary outcomes: - Rates of post-operative complications. - Length of hospital stay (LOS).
RESULTS: Of 129 patients included in the analysis, TPN was initiated in 46 (35.7%) patients at a median of 9.6 days after CRS-HIPEC. Median duration of TPN was 9.6 days. Patients who received TPN were younger (52 *vs* 58 years, p=0.02) and had longer duration of surgery (12.7 *vs* 10.5 hours, p<0.01) compared to those who did not receive TPN. There was no significant difference in peritoneal carcinomatosis index (PCI), tumor histology or receipt of neoadjuvant chemotherapy comparing patients who received TPN to those who did not. Following CRS-HIPEC, patients prescribed TPN had higher incidences of ileus (93.5% *vs* 7.2%, p<0.01) and infection (52.2% *vs* 19.3%, p<0.01), as well as longer LOS (23 *vs* 11 days, p<0.01), compared with non-TPN requiring patients. Two (4.3%) patients were discharged home on TPN.
CONCLUSIONS: TPN was prescribed in 35.7% of patients receiving CRS-HIPEC. Younger age and longer duration of surgery were associated with TPN use. Patients who received TPN had higher incidences of post-operative complications and longer LOS compared to patients who did not receive TPN. Further research should explore the impact of earlier TPN initiation on patient outcomes.

P739

ENTEROCUTANEOUS FISTULA IN PATIENTS WITH PERITONEAL MALIGNANCY FOLLOWING CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS/HIPEC) is associated with an increased risk of complications compared to conventional gastrointestinal surgery. Enterocutaneous fistula (ECF) has been acknowledged to be a higher risk following CRS/HIPEC with reported rates of 4-34% and can lead a wide variety of pathophysiological complications including intraabdominal collection, wound infection, sepsis, malnutrition and electrolyte imbalance. Mortality rates for gastrointestinal fistulas in general have been reported to vary from 6.5 to 39%. Care of these patients is long and costly with an increased hospital admission and usually involves somatostatin analogues, aiming to reduce volume output and total parenteral nutrition (TPN) primarily to prevent malnutrition and decrease risk of infection or further sepsis in an already debilitated patient. Limited review on ECF has been performed in the peritoneal surface malignancy community. The only other CRS/HIPEC study performed to our knowledge specifically evaluating gastrointestinal fistulas reported a rate of 8.6% and spontaneous fistula closure was observed in 14 (87.5%) patients.
METHODS: - ECF are a challenging to treat and still remain a significant problem occurring in a significant proportion of patients following CRS/HIPEC. - To review the incidence of ECF. - To review that management of ECF. - To analyze the possible risk factors for development. - Review patient outcome. - Limited review on ECF in CRS patients. - Factors which may be associated with spontaneous closure.
RESULTS: We report a 5.8% ECF rate, diagnosed at a median of 13 days. The mortality rate was 5.7% and other morbidity was significantly increased (p=0.0001). Twenty-five (47.2%), 8 (15.1%) and 20 patients (37.7%) had low, moderate and high output ECF respectively. Patients that had a CC2 cytoreduction, abdominal VAC or smoked had a higher risk of fistula (p=0.004, p<0.0001, p=0.008). Spontaneous closure was achieved in 49.2% with conservative treatment (median 29 days) and 33.9% underwent surgical intervention. Preoperative serum albumin <35g/L (p=0.04), PCI>17 (p=0.025) and operation >8.6hrs (p=0.001) were independent risk factors on multivariate analysis. Overall and 5-year survival was significantly reduced (p<0.0001, p=0.016). We found that there was a learning curve associated with ECF development when comparing the first 8-years to the following 8-years (p<0.01).
CONCLUSIONS: We report that hypoalbuminemia, PCI>17, a longer operation of >8.6 hours, redo CRS/HIPEC procedure and application of an abdominal VAC dressing are associated with an increased risk of ECF formation post CRS/HIPEC. This study showed that non-operative management and spontaneous closure may be achieved successfully in a number of CRS/HIPEC patients. We can also report that CRS/HIPEC shows a similar incidence of ECF occurrence in comparison to other elective gastrointestinal surgery. A multicentre, systematic review on the prevalence and risk factors of ECF following CRS/HIPEC in high-volume centres should be considered.

P740

LACTATE PREDICTS OUTCOMES IN PATIENTS UNDERGOING CYTOREDUCTIVE SURGERY

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BACKGROUND: Early lactate levels may help predict poor outcomes, especially in shock, post-resuscitation period, sepsis or with organ failure. Cytoreductive surgery associated with hyperthermic intraperitoneal chemotherapy (CRS/HIPEC) is related to important metabolic disorders, including increases in serum lactate levels. Our hypothesis was that an elevated postoperative lactate levels 24 h after surgery predicts adverse outcomes in patients undergoing CRS/HIPEC.
METHODS: After committee approval, a retrospective cohort study of 49 patients undergoing HIPEC in 2014 was performed. Patients were

divided into two groups: Group I (GI): patients with postoperative lactate levels less than 1.7 mmol/L in the first 24 h after CRS/HIPEC, and Group II (GII): patients with lactate levels greater than 1.7 mmol/L after CRS/HIPEC. Demographic patient characteristics, surgical data, intraoperative anaesthetic management, postoperative parameters, postoperative intubation time, intensive care unit (ICU) length of stay, complications and hospital length of stay were assessed.
RESULTS: GII received greater intraoperative infusion of crystalloid fluids (6585±1341 *vs* 5517±1641 ml GI; p=0.03) and transfusion therapy (44% *vs* 8%; p=0.004). ICU length of stay was longer in GII (3.6±1.4 *vs* 2.4±0.8 days in GI, p=0.001). Postoperative intubation time was longer in GII (29±22 *vs* 15±7.5 h in GI; p=0.009). GII showed a greater complication rate than GII (78% *vs* 53%, p=0.09). Twenty-eight percent of patients in GII had longer ICU stay (>4 days) compared to 4% in GI (p= 0.02). The area under the ROC.
CONCLUSIONS: Cytoreductive surgery associated with HIPEC is related to important postoperative morbidity. Elevated serum lactate levels during the first 24h are associated with criteria of greater surgical aggressiveness and predict the occurrence of postoperative complications and prolonged ICU stay.

P741

EVALUATION OF THE INCIDENCE OF NEPHROTOXICITY RELATED TO HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY AND CYTOREDUCTIVE SURGERY

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BACKGROUND: Cytoreductive surgery associated with hyperthermic intraperitoneal chemotherapy (CRS/HIPEC) may alter postoperative renal function, causing an impact in morbidity, mortality and cost of this procedure. Our aim was to examine the association of postoperative changes in renal function according to RIFLE criteria in patients who underwent CRS/HIPEC.
METHODS: After committee approval, a retrospective cohort study including 257 patients undergoing HIPEC from 2011 to 2015 was performed. Postoperative renal function was assessed using serial serum creatinine measurements and was based on serum creatinine changes from pre-operative values, according to the risk, injury, failure, loss, end-stage kidney (RIFLE) classification.
RESULTS: Postoperative acute changes in renal function were observed in 29 patients (11,1%); (Risk: n=10; Injury: n=9; Failure: n=8; Loss: n=2). Relative to the antineoplastic agent, no changes in renal function were observed in patients who received mytomicin C; (n=62); 7 of 101 patients who received oxaliplatin presented renal changes; 21 of 92 (22.8%) of patients who received cisplatin presented renal dysfunction (p<0,0001). We did not observe differences in renal dysfunction in the years evaluated. Postoperative nephrotoxicity can complicate CRS/HIPEC, however, permanent renal dysfunction was not a common complication (0.8%) in our serie. Cisplatin was the principal chemotherapy agent associated with renal dysfunction in patients undergoing CRS/HIPEC.
CONCLUSIONS: Cisplatin was the principal chemotherapy agent associated with renal dysfunction in patients undergoing CRS/HIPEC.

P742

PRE-OPERATIVE PREDICTION OF UNRESECTABILITY IN PLANNED CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS and HIPEC) are increasingly being used to treat selected patients with peritoneal carcinomatosis. At present, 20-30% of surgical exploration result in open-and-close laparotomy. Current pre-operative selection tools such as the peritoneal surface disease severity score and the Verwaal prognostic score are useful in predicting survival outcomes, but are not sensitive in excluding patients with potentially unresectable disease.
METHODS: We aim to develop a scoring system to fortify current selection process.
RESULTS: After analysis of the discovery set, 9 out of 17 variables remained significant on univariate analysis. The 9 variables were categorized into 3 groups: (i) markers of poor tumour biology, which consisted of 3 factors: history of previous inadequate resection, history of multiple lines of chemotherapy, and poorly differentiated, signet or clear cells, (ii) markers of heavy tumour burden, which consisted of 5 factors: clinical findings of abdominal distension and palpable mass, and computed tomography findings of ascites, small bowel disease and omental thickening and (iii) marker of active tumour proliferation which consisted of elevated tumour markers. Using multivariate analysis, each factor in poor tumour biopsy scored 1 point, while each factor in heavy tumour burden and active proliferation scored 2 points. Applying the scoring model for the validation set, a score of 7 translated to 89% accuracy in identifying unresectability in planned CRS and HIPEC (Area under ROC curve=89%) with sensitivity 64%, and specificity 93%.
CONCLUSIONS: We present a novel scoring system that improves current selection of patients for CRS and HIPEC by potentially avoiding unnecessary laparotomy.

AO105

IS INTRAABDOMINAL TEMPERATURE DEVELOPMENT DURING HIPEC ASSOCIATED WITH PROGNOSIS IN PATIENTS WITH PERITONEAL CARCINOMATOSIS?– A PRELIMINARY STUDY

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BACKGROUND: Hyperthermic intraperitoneal chemotherapy (HIPEC) is a wide spread treatment modality in peritoneal surface malignancies mainly of colorectal and appendiceal origin. However, the importance of the degree of intraabdominal temperature elevation of the chemotherapy solution is not known.
METHODS: The aim of this study was to analyse the evolution of the intrabodominal temperature during 30-minute Oxaliplatine perfusion and assess a possible correlation to outcome.
RESULTS: HIPEC perfusion was performed with Oxaliplatine 460 mg/m2 during 30 minutes using the Coliseum method with one inflow and four outflow catheters. The mean amount of carrier solution used was 2600 ml. The temperatures were prospectively registered in three locations at baseline and every 10 minutes (1 right subdiaphragmatic, 2 left subdiaphragmatic, 3 pelvis) in 86 patients with peritoneal carcinomatosis from colorectal cancer (49 women, mean age 57, range 22-79). Mean PCI score was 13 (range 1-38). A CC score of 0 was achieved in 73 cases and 1 in the remaining 13 patients. The temperatures showed very little variation and rapidly stabilized at 42°C. Projected 3-year overall survival was 64%. The pelvic temperature during the initial 10 minutes was mean 40.2 and 41.4 among 16 non survivors compared with 41.3 and 42.0 in 70 survivors (p=0.034, Students t-test). When summing all temperatures at all locations and time points, those above the median value had a projected 3-year survival of 57% and those below 65% (p=0.64, log rank test).
CONCLUSIONS: The sum of the intraabdominal temperature measured in three locations did not influence survival in this series. A higher

initial pelvic temperature was associated with a more favorable prognosis. These results should be interpreted with caution because of the limited number of patients and possible confounding factors. However, the results support the upfront establishment of high temperature.

AO107

HYPETRHERMIC INTRAPERITONEAL CHEMOTHERAPY – PHARMACOLOGICAL POINT OF VIEW

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BACKGROUND: HIPEC is special use of chemotherapy during surgical procedure. The main advantage is cytotoxic effect in space where is limited impact of classical chemotherapy
METHODS: We have proved by HPLC with UV detection stability of cisplatin, carboplatin and doxorubicin in 0,9% saline solution after 90 min in 42°C.
RESULTS: All tested drugs have very good stability after 90 min in 42°C. Oxaliplatin in saline solution underwent degradation to only 15% of maternal drug after 90 min incubation in 42°C.
CONCLUSIONS: From oncology pharmacy point of view we shall think about suitable infusion solution and drug concentration with good stability in hypertermic conditions. We have to take care about an appropriate premedication and hydration. Handling cytostatic solution in operating room should follow standard oncology pharmacy procedure.
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AO111

TREATMENT OF HYPERMYOGLOBINEMIA AFTER CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR PERITONEAL CARCINOMATOSIS

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BACKGROUND: Myoglobin is distributed in the myocardium and skeletal muscles. As an extensive surgical procedure, CRS+HIPEC could cause extensive muscle damage, releasing large amount of myoglobin to cause hyperglobinemia, which could significantly increase the risk of acute renal dysfunction or even renal failure.
METHODS: This retrospective study was to investigate the prevalence of hyperglobinemia after CRS+HIPEC and the management. Extensive CRS+HIPEC procedures were performed on 30 pts with peritoneal carcinomatosis. The serum myoglobin levels were daily determined for up to 5 days. Small amount of sodium bicarbonate solution and diuretics were administered intravenously daily and the renal functions were monitored.
RESULTS: Immediately after CRS+HIPEC, hypermyoglobinemia occurred among all the 30 pts studied, ranging from 1 to 8 times higher than the upper range of the normal value. The hypermyoglobinemia could last over 4 days. Pts with severe hypermyoglobinemia were often accompanied with significant back pain. In 1 patient, the serum myoglobin level reached 786 mg/L, 7.44 times of the normal value. Intravenous injection of sodium bicarbonate 50-100 ml, once or twice a day, along with intermittent administering diuretics, could significantly reduce the serum myoglobin level. In the meantime, circulation volume must be maintained adequately. The hypermyoglobinemia could be gradually lowered to normal value in 4 days. By such treatment, all the 30 pts had good recovery, with no clinically significant renal damage. And the serum BUN and Cr levels were also within 2 times of upper limit of normal value.
CONCLUSIONS: For PC pts with high-risk CRS+HIPEC procedures, post-operative hypermyoglobinemia is prevalent, and poses high risk for potential renal damage. Closely monitoring serum myoglobin level and treatment with sodium bicarbonate and diuretics are practical prophylactic methods to avoid renal dysfunction.

AO112

NO NEED FOR ICU AFTER CRC AND HIPEC

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BACKGROUND: Cytoreductive surgery (CRS) in combination with HIPEC treatment is an extremely demanding procedure for the patient due to extensive and long surgery, major peroperative fluid end electrolyte shifts and large changes in body temperature. Therefore many HIPEC centra choose to postoperatively treat the patient at the ICU. At Karolinska University hospital, Stockholm, 122 patients received CRS and HIPEC treatment between September 2012 and January 2016. Initially, the patients were postoperatively tended at in the ICU.
METHODS: Our objective was develop a perioperative management that minimised the postoperative problems commonly experienced in this patient group, and thereby be able to transfer the postoperative caretaking of this patient category from ICU to the postoperative care unit. Excessive fluid administration with subsequent postoperative respiratory complications is a common problem, so is hyponatremia due to insufficiently replaced sodium during the HIPEC treatment. In extreme cases hyponatremia can lead to brain oedema. Peroperative hyperthermia can lead to sustained vasodilation and need of vasopressor which may require postoperative ICU care. Shifts in body temperature disturbs the thermoregulation and may lead to postoperative unintentional muscle contraction, shivering, which is a highly oxygen consuming procedure potentially harmful to the postoperative patient. We believed that controlling fluid therapy, avoiding hyperthermia, balancing sodium during HIPEC treatment and preventing shivering would be the main goals in order to achieve our objective.
RESULTS: By using goal directed fluid therapy with oesophageal doppler, fluid administration was well controlled through out surgery and excess fluid administration avoided. Median postoperative fluid balance was+3500 ml. In order to control body temperature, patients were cooled down to 34°C-34.5°C- pre- HIPEC, which resulted in no patient reaching a maximum temperature higher than 39°C during the HIPEC treatment. Through out the HIPEC phase, intravenous sodium infusion was administrated, and sodium level measured every 10 minutes. Thereby plasma sodium was kept within normal values throughout the surgery. Approximately 30 minutes before end of surgery, intravenous clonidine which has shown to increase the shivering threshold, was administrated. This resulted in a decrease in occurrence of postoperative shivering from 80% to less than 10%. In may 2013, 8 months after the operation of the first HIPEC patient, the postoperative care of this patient group was transferred from ICU to the postoperative care unit. The complication rate is low (Clavien Dindo 4a+4b in 0.8%) and the median stay at hospital is 16 days.
CONCLUSIONS: CRC and HIPEC is a demanding procedure for the patient, but by tailoring the peroperative treatment regarding certain focus areas such as fluid treatment, core temperature control, peroperative sodium balance and prophylactically treatment of postoperative shivering, postoperative care after this extensive surgery can be tended at at the postoperative care unit instead of in the ICU. Above all, this is a great advantage for the patient and but also implies a significant socioeconomic saving.

AO114

DEPTH OF PENETRATION OF PACLITAXEL INTO THE ABDOMINAL WALL AFTER HYPERTHERMIC INTRAPERITONEAL ADMINISTRATION OF NAB-PACLITAXEL IN THE RABBIT: A POTENTIAL NEW DRUG FOR PERITONEAL CARCINOMATOSIS

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BACKGROUND: Paclitaxel (PTX) is currently used in combination with cisplatin for hyperthermic intraperitoneal chemotherapy (HIPEC) for the treatment of peritoneal carcinomatosis. Albumin-bound PTX (nab-paclitaxel) is a promising new drug for HIPEC because of its easy solubility in aqueous perfusion medium, which avoids the need for the surfactant Cremophor EL, and possibly because of the tendency of albumin to cross physiological barriers and accumulate in tumor tissue.
METHODS: To test the feasibility of using nab-paclitaxel in rabbits treated by HIPEC for 60 minutes with nab-paclitaxel (n=4) compared with the classical formulation (CRE-paclitaxel; n=3) at an equivalent PTX dose of 10.83 mg/Kg. To dose the effective penetration in tissues and the blood and intrabdominal organs concentration.
RESULTS: The depth of paclitaxel perfusion through the peritoneal barrier after nab-paclitaxel or CRE-paclitaxel was assessed by mass spectrometry imaging (MSI). PTX after nab-paclitaxel treatment penetrated efficiently for up to 0.63 mm in the peritoneal wall, but after CRE-paclitaxel, it was not detectable by MSI in the peritoneum. Moreover, the peritoneal concentration after nab-paclitaxel was five times that after CRE-paclitaxel. Despite the high levels reached in the peritoneum, systemic exposure of PTX was very low.
CONCLUSIONS: Present results show that nab-paclitaxel penetrates into the abdominal wall better than CRE-paclitaxel, in terms of effective penetration and peritoneal tissue concentration.

AO118

INVESTIGATING THE ASSOCIATION BETWEEN PERIOPERATIVE OPIOID CONSUMPTION AND SURVIVAL IN CHILDREN UNDERGOING CYTOREDUCTIVE SURGERY WITH HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: The role of opioids in the development of cancer recurrence remains unclear.
METHODS: In this retrospective study of children who had undergone cytoreductive surgery with hyperthermic intraperitoneal chemotherapy (CRS-HIPEC), we investigated the association between opioid consumption (OC) and progression free survival (PFS) or overall survival (OS).
RESULTS: Seventy-five children were identified. Median age and BMI were 11.64 years and 17.82, respectively. The median OC over the perioperative period was 557 Meq. A higher than median OC was observed in children with a history of chronic opioid use (p=0.0506), longer duration of anesthesia (p=0.0130), and longer length-of-stay (p=0.0034). Although not statistically significant patients with higher OC had more postoperative complications (89.5% *vs* 73% in the low OC group, p=0.0816). Higher OC was not associated with a shorter PFS (HR: 0.9998, 95% CI: 0.9993-1.0003; p=0.4104), or worse OS (HR: 0.9999, 95% CI: 0.9994-1.0004; p=0.6518). On multivariate analysis, incomplete cytoreduction was independently associated with shorter PFS (HR: 3.883, 95% CI: 1.604-9.399; p=0.0026) and worse OS (HR: 3.613, 95% CI: 1.436-9.090; p=0.0064). The presence of extra-abdominal disease was also independently associated with a shorter PFS (HR: 2.744, 95% CI: 1.059-7.108; p =0.0377).
CONCLUSIONS: In this retrospective study of children who had undergone CRS-HIPEC, higher opioid consumption in the perioperative period was not associated with worse survival.

AO119

CONTROL OF HEMODYNAMIC,BIOCHEMICAL SERUM VALUES, INTRABDOMINAL PRESSURE AND TEMPERATURE DURING THE DEVELOPMENT OF A LAPAROSCOPIC ACCESS FOR CYTOREDUCTIVE SURGERY AND CO2 RECIRCULATING HYPERTHERMIC CHEMOTHERAPY RESPECT TO OPEN AND CLOSED HIPEC

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BACKGROUND: There is controversy regarding the increased abdominal pressure during intraabdominal chemohyperthermia in addition to hyperthermia hemodynamic compromise. Morbidity could be increased using laparoscopic access for realization of cytoreductive surgery with the use of CO2 for pneumoperitoneum, and the use of CO2 to create turbulence during HIPEC in our model. In our hypothesis we consider that using laparoscopic approach for performing peritoneal carcinomatosis cytoreductive surgery and HIPEC with closed CO2 recirculation technique is possible and safe, with equal efficacy to conventional methods. Hemodynamic monitoring, distribution drug and temperatura homogeinity, are similar to the realization of open surgery with closed HIPEC technique, and open surgery with open HIPEC technique.
METHODS: Demonstrate the absence of significant differences in hemodynamic parameters and fluid control in our model with laparoscopic access and closed HIPEC respect to the model that includes open cytoreductive surgery and closed HIPEC, and open cytoreductive surgery with open HIPEC. • Monitoring the effectiveness of the thermal homogenization and pressure into abdominal cavity with laparoscopic access respect to the other two groups of surgical access. Porcine experimental model that included female 15 mini-pigs weithing between 35 to 38 kg. They were randomized in three Groups:Laparoscopic citoreductive surgery+ laparoscopic with CO2 recirculating HIPEC,G1. G2, Open citoreductive surgery+HIPEC with "colliseum" technique. Open citoreductive surgery+ closed HIPEC,G3. Gasometric parameters: ph, pO2,pCO2, HCO3, lactate. Haemodynamic parameters: Cardiac Index

(CI), Global End-Diastolic Volume (GEDI), Stroke Volume Variation (SVV), Intrathoracic Blood Volume Index (ITBI), Extravascular Lung Water Index (ELWI), Systemic Vascular Resistance (SVR), Central Venous Pressure (CVP), Heartrate (HR), Systolic blood pressure (SBP). Temperature control: Quantitative temperature control was realized using inflow and outflow measurements (Pico-Log, Pico Technology, Cambridgeshire, United Kingdom). Quantitative and qualitative control was realized using thermographic imaging (FLIR E4,0BX, FLIR Systems Ltd., United Kingdom). Pressure control in all groups at 30´after starting surgery, in remote areas as pelvic right diaphagmatic and left diaphagmatic áreas. Measurements during surgery: Thermodilution haemodynamic and gasometric determinations were performed at the following times:• T1.-At the beginning of surgery.• T2.- During laparotomy/laparoscopy.• T3.- After citoreductive surgery and the begining of HIPEC• T4.- At a half time of the HIPEC• T5.- At the end of HIPEC.

RESULTS: There were no significant gasometric and hemodinamic values differences between Group I and Group II in any checking time. Inflow and outflow temperature values were no significatly different between Group I and II. Pressure measurements between two groups were no significantly differents. There was a significant difference between Group I and Group III respect to elevated lactate,that were higher in in Group III,(25.2/39.79, respectively) p:0.01.

CONCLUSIONS: Totally laparoscopic cytoreductive and intrabdominal chemohyperthermia is safely, with no haemodynamics, gasometric values and temperature and pressure distribution differences respect to open and closed without CO2 recirculation HIPEC technique

A0124

RISK OF ACUTE RENAL FAILURE AND PROGNOSTIC FACTORS OF RENAL FUNCTION ALTERATION AFTER CISPLATIN-BASED HIPEC

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BACKGROUND: Cisplatin-induce nephropathies as systemic toxicity are well documented. However, very little is known intraperitonealy, in a context of hyperthermic intraperitoneal chemotherapy (HIPEC).

METHODS: The aim of this study was to assess the risk of acute renal failure (ARF) and to identify renal function alteration (RFA) prognostic factors after a cisplatin-based HIPEC.

RESULTS: A RFA was observed in 25 patients (41.7%) including 8 (13.3%) ARF. At 3 months, 10 patients (16.7%) had chronic renal disease and 3 (5%) had end-stage kidney disease. The occurrence of a RFA increased the length of hospital stay ($p < 0.01$) but did not affect the 5-year overall survival rate, which was 61.3% (CI 95% [38-84.6]) for patients with RFA and 52.2% (CI 95% [12.2-76.2]) for those without RFA ($p=0.526$), after a median follow-up of 27.6 months. In the univariate analysis, a pre-operative malnutrition ($p < 0.01$) and hypoalbuminemia ($p < 0.01$), postoperative sepsis ($p < 0.01$) and the use of antibiotics with nephrotoxic potential ($p=0.02$) were significantly associated to the occurrence of a RFA. However, no connection where found with the type of preoperative systemic platinum salt, the number of prior cisplatin systemic cycles and the intraoperative peritoneal carcinomatosis index. In the multivariate analysis, the only predictive factor of RFA was the occurrence of a postoperative sepsis ($p=0.003$, OR: 16.32 CI 95% [2.48-107.28]). Only one study published by Hakeam *et al.* evaluated the impact of a cisplatin-based HIPEC (associated to doxorucicin) on 53 patients and the IRA rate was 3.8%. This lower incidence may be explained by an albumin-based hydration protocol with a competition between albumin (which sequester plasmatic cisplatin) and 0.9% sodium chloride. Furthermore, they reported maybe lower incidence rates of sepsis and use of antibiotics with nephrotoxic potential.

CONCLUSIONS: Cisplatin-based HIPEC increases the risk of IRA. In order to reduce its nephrotoxicity, it seems interesting to evaluate more precisely the pre, per and post-operative kidney and tubular functions and the pre-operative nutrition state. Malnourished patients should be suplemented before the intervention, the peri-operative hydration protocol should also be revised and antibiotics with nephrotoxic potential avoided. Further studies measuring the pre, per and post-operative plasmatic cisplatin level could provide a better understanding of the cisplatin pharmacokinetics after cisplatin-based HIPEC.

Organization and Structure of Regional/National Peritoneal Surface Oncology Programs

P801

CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY IN A COMMUNITY HOSPITAL. OUR INITIAL EXPERIENCE

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BACKGROUND: Cytoreductive surgery (CRS) and intraperitoneal chemotherapy (IPC) have emerged as the standard of care of peritoneal carcinomatosis (PC), a condition that historically was treated with palliation. CRS and IPC are, however, often performed at large teaching hospitals and cancer centers.
METHODS: The purpose of this study is to present our initial experience with the treatment of peritoneal carcinomatosis by Cytoreductive Surgery and hyperthermic intraperitoneal chemotherapy, at a community hospital.
RESULTS: A total of 9 patients underwent CRS and HIPEC at our institution. 7 of the patients were men. The average age was 55 years (23-79). The origin of the PC included Appendix (2), Colon (3), Bladder (1) and Peritoneum (3). The average Pre-operative Peritoneal Carcinomatosis Index (PCI) was 20 (6 to 34). Complete Cytoreductive Resection (CCR0) was achieved in 5 patients. The organs resected included Omentum (9), Appendix (8), Ascending Colon (8), Transverse Colon (6), Descending Colon (7), Small Bowel (7), Spleen (4), Liver (2), Gallbladder (5) and Peritoneum (9). 3 patients required small bowel resections with primaryanastomosis and while 1 patient had a ileocolic anastomosis. An end ileostomy was created in 7 patients, with 1 later reversed. The average operative time was 492 minutes (377 to 588). All patient received intraoperative HIPEC in the form of Mitomycin C for 90 minutes. HIPEC was given in the postoperative period to all patients starting on postoperative day 1, for 90 minutes daily. Patients received between 3 to 5 cycles of early HIPEC. Complications by grade are as follows: grade I (2), grade II (5) grade III (1), and grade IV (1). There was no mortality. The patient who suffered the grade IV complication required a returned to the Operating Room for the repair of an anastomotic leak and the creation of a diverting loop ileostomy. 3 patients currently have no evidence of disease, 1 is alive with disease, 3 died of disease and 2 died of other causes.
CONCLUSIONS: Our initial experience suggests that PC and HIPEC can be safely performed at a community hospital with complication rates and other outcomes similar to large teaching hospitals and cancer centers.

P802

REQUIREMENTS FOR NATIONAL CRS+HIPEC PROGRAMME IN THE CZECH REPUBLIC-PREFER AND EXTEND

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BACKGROUND: Cytoreductive surgery (CRS) and HIPEC became a standard treatment of peritoneal carcinomatosis in various primary malignancies. It provides either long term survival advantage or at least prolonged palliation. The incidence of peritoneal dissemination is inhomogeneous, from rare diseases (peritoneal mesothelioma) to very frequent ones (ovarian cancer carcinomatosis). If the availability of CRS+HIPEC is limited, there is a burning question of patient selection criteria. Czech republic (CZ) is a small country with 10 mil population. Despite its health care system is generally in a good condition CRS+HIPEC availability is limited. There is only 1 center providing a consistent treatment of peritoneal carcinomatosis. The analysis of 15 years experience provides a basis for formulation of demands and organization of national developmental programme.
METHODS: CRS+HIPEC was provided at 1 center besides a routine abdominal and thoracic surgery. For administrative reasons there was a limited number of 25 interventions annually. CRS+HIPEC was provided to patients referred from any clinic in CZ. CRS+HIPEC was conditioned by common inclusion criteria (diagnosis, disease limited to peritoneal cavity, performance status etc.). A preference of PMP and mesothelioma was employed. The availability of CRS +HIPEC was assessed based on incidence data of national cancer registry and matched to a benefit of treatment.
RESULTS: Single institution results of a period 1999-2014 have been analysed. There were 260 interventions in 210 patients with peritoneal carcinomatosis of various origins-colorectal (CRCA)(51), peritoneal pseudomyxoma (PMP) (45), ovarian (33), peritoneal mesothelioma (24), primary peritoneal carcinoma (PPCA) (20), gastric (15) and others (22). A curative effect has been achieved for PMP and mesothelioma (median survival 3-6 years), prolonged survival for CRCA, ovarian and PPCA (median survival 27, 28, 36 months respectively), no significant effect for gastric.Related to the incidence of peritoneal carcinomatosis in CZ in particular primaries cytoreductive surgery was provided in about 30% of PMP, less than 10% of mesothelioma, 3% of PPCA, 0,2% of CRCA and 0,6% of ovarian. The regional availability of CRS+HIPEC was inhomogeneous, 90% of cases were referred from 5 comprehensive university centers.
CONCLUSIONS: 1 center in 10 mil population is not able to meet the demand for CRS+HIPEC in all patients who could gain any benefit. The unmet need of CRS+HIPEC requires to introduce selection criteria. It seems reasonable to prefer patients who may achieve curative effect and who have not any other option of treatment *i.e.* patients with PMP and mesothelioma. Fortunately these diagnoses are rare; a favourable but not satisfactory availability rate may be achieved even in a single center. On the other hand the availability of CRS +HIPEC for CRCA and ovarian remains crucially limited despite the treatment brings a significant benefit. There are clear requirements for the national CRS+HIPEC programme-prefer PMP and mesothelioma, extend (availability) to CRCA and ovarian.

P803

INTERNATIONAL ACCREDITATION PROCESS OF A NATIONAL CENTER OF EXCELLENCE IN COLOMBIA

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BACKGROUND: Cytoreductive surgery and hyperthermic intraperitoneal chemotherapy (CRS -HIPEC) is being used more frequently for the treatment of peritoneal surface malignancies.However, it is an extensive oncologic procedure that has been associated with relevant morbidity and mortality. As such in order to achieve excellent outcomes, it requires a center with high care standards oriented in the search for innovation and improvement.
METHODS: Joint Commission International (JCI) identifies, measures, and shares best practices in quality and patient safety with the world providing leadership and innovative solutions to help health care organizations improve performance and outcomes. The accreditation process implies conducting gap analysis and build and action plan, update policies and procedures, target improvements, evaluate and refine processes and a final survey.
RESULTS: The certified center of excellence in Peritoneal Surface Malignancies at Bogota, Colombia started the process in 2007. The evaluation was conducted in October 2015 and acreditation was granted.
CONCLUSIONS: This recognition provides assurance that clinical

standards, training, and processes meet the highest international benchmarks for accreditation entities. It is not only necessary to provide outstanding surgical care but other factors such as patient safety and quality surveillance programs need to be considered. our team evaluated safety events and quality measures in a group of patients who underwent CRS-HIPEC. Future studies and guidelines need to be developed in order to ensure centers to provide adequate quality of care.

P804

MORBI-MORTALITY OF PERITONEAL CARCINOMATOSIS CYTOREDUCTIVE RADICAL SURGERY PLUS HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY IS NOT A JUSTIFIED OBJECTION TO THIS THERAPEUTIC PROPOSAL. 653 PATIENTS. 729 CONSECUTIVE PROCEDURES. MORTALITY 0,2%

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BACKGROUND: CRS+HIPEC is a multimodal aggressive treatment usually performed on multitreated and weakened patients with a potential risk of complication. From this description a number of objections to its use have raised:: results of Sugarbaker difficult to reproduce, limited levels of evidence, highly aggressive, complex and expensive therapy, negative repercussions on the quality of life as well as an outrageous morbi-mortality rates. Despite this, it is the current standard treatment in different types of peritoneal metastasis. The published morbidity and mortality is related to the centers and teams' experience: overall 30-day morbidity 65%, surgical morbidity 5-30% and mortality 0-14%, none of them greater than those described in complex surgical oncology. We describe the results of a Peritoneal Carcinomatosis Program results (a territorial centralized, highly specialized and with government funding model) with particular reference to complications.
METHODS: The results showed in this series have been subjected to an external audit September2006/ April2016: 729 CRS+HIPEC (653 patients). 234 men and 419 women. Average age: 56.5 years (range 22-83). 289 patients had peritoneal metastasis (PM) from colon tumors, 132 pseudomyxoma peritonei, 101 recurrent ovarian cancers, 31 gastric PM, 27 appendiceal tumors, 20 malignant peritoneal mesotheliomas, 15 rectum tumors, 9 peritoneal sarcomatosis, 6 small bowel PM and 23 other pathologies. Previous chemotherapy: 78%. Previous surgery: 91,6%. Regions affected: 5/13. PCI (median): 9/ 39. Associated visceral involvement: 61.1%. 62.9% had three or more peritonectomy procedures. CC0-1: 95.4%. Gastro-intestinal anastomosis: 526. HIPEC (coliseum technique) with drugs and exposure time related to the type of PM. Mean surgical time: 5h 49m (range 3-11h).
RESULTS: Morbidity: 29%. GIII-IV: 16%. Central catheter infection 2.9%, hemoperitoneum: 2.4%, postoperative ileus 2%, abdominal abscesses: 1.8%, intestinal occlusion: 1.2%, Anastomotic leak: 0.15% (1 patient). Reoperation: 4.9%. Most frequent cause of reoperation hemoperitoneum and intestinal occlusion. Mean ICU stay: 2 d. Mean hospital stay: 12 d. Readmissions after hospital discharge: 7.5%. Mortality: 0.2% (1p). Follow-up: median 25.06 months (range 1-112.2 m). Cumulative probability of survival (12 m): 91.3%. Median survival: 46.8m. Colon PM: median sv 37.02m. Pseudomyxoma peritonei: mean sv 92.68 m. Recurrent ovarian cancer: median sv 51.48m. Gastric PM: Median sv 16.34m. Appendiceal PM: Median sv 34.96m. Malignant peritoneal mesothelioma: Median sv 52.82m. Rectum PM: median sv: 27.3 m. Peritoneal recurrence: 56% (64p underwent a second CRS+HIPEC).
CONCLUSIONS: Surgery is the treatment's keystone. Right surgical indication, right technical realization and postoperative care determine clinical results, specially complications, of Sugarbaker's technique.
Accurate planning, development and implementation of a specialized program in the management of PC, in conjunction with the scientific and technical training of the surgical team, are the guarantee of efficiency and safety of this procedure.

P805

ORGANIZATION AND STRUCTURE OF A NATIONAL PERITONEAL SURFACE ONCOLOGY PROGRAM: 10-YEAR EXPERIENCE AT THE CATALONIAN PERITONEAL CARCINOMATOSIS PROGRAM

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BACKGROUND: Currently CRS+HIPEC is performed with curative intent and considered standard treatment in pseudomyxoma peritonei, peritoneal mesothelioma and peritoneal carcinomatosis from colorectal and appendiceal tumors. There is broad consensus on primary and recurrent ovarian cancer and no-GIST peritoneal sarcomatosis treatment. Ongoing evaluation (Europe) in peritoneal carcinomatosis of gastric origin and in infrequent tumors such as psammocarcinomas and small-cell desmoplastic tumors in young patients. International Health Agencies: United Kingdom, Canada, France and Catalonia, (Spain) recommend using this treatment modality at highly specialized centers, applied to selected patients, all under a carefully controlled research program. The medical team involved in this process should inform all patients about the uncertainty on its effectiveness and safety.
METHODS: We expose the phases developed to implement a Regional/National Reference Program Treatment PM. 1. Identification and promotion of surgical oncology programs. The health authorities (2001-2005) defined the group of infrequent/complex neoplasm likely to benefit from costly and highly specialized treatments. The radical treatment of PC is considered an oncologic subspecialty suitable for a highly specialized practice. Also addresses the use and development of emerging technologies in Oncologic Surgery, facilitating specific surgical training. 2. Development of the surgical oncology programs. The health authorities (2006-2010) has and will establish the following: highly specialized units, territorial/national health care network, the adequacy of technological resources, highly qualified staffing, multidisciplinary work design, clinical care guidelines and integral parallel research work. 3. Implementation of highly specialized PC unit. In January 2006 technical report on the PC radical treatment evaluation and necessity of constituting a specialized unit, quoted: "... PC radical treatment should be considered in the scope of clinical research, with attention to all clinical care, ethical issues and scientific conditions that entails. It should be centered in a few specialized hospitals (maximum two), sharing and following the same research guidelines. The health authorities should declare which centers fulfill the necessary requirements to provide this treatment and should monitor results." 4. Monitoring and evaluation of results. A collaboration agreement established with the Official Quality Agency to evaluate the results of CP Program.
RESULTS: All data and results are subject to external audit (September2006-April2016). Overall Morbidity: 29%. GIII-IV: 16%. Anastomotic leak: 0.15% (1p). Follow-up: median 25.06m. Overall survival (12m): 91.3%. Overall median survival: 46.8m. By pathologies: PMP, mean SV: 92.68m. Malignant Peritoneal Mesothelioma, median SV: 52.82m. Colon PM, median SV: 37.02m. Recurrent ovarian cancer, median SV: 51.5m. Gastric PM, median SV: 16.34m. Appendiceal PM, median SV: 34.96m. Rectum PM, median SV: 27.3m Peritoneal recurrence: 56% (64p underwent a second CRS+HIPEC). Overall costs: 21.920 Euros/patient.
CONCLUSIONS: The CRS+HIPEC must be considered within the scope of clinical research with all ethical constraints, scientists and assistance that entails. In the public sector, health authorities should determine the specialized reference centers. The relevant scientific societies should participate in the standards and accreditation of these centers.

P806

INDIAN HIPEC REGISTRY: A REGISTRY FOR INDIAN PATIENTS WITH PERITONEAL SURFACE MALIGNANCIES

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BACKGROUND: There are various national and international registries for peritoneal malignancies. They aid in pooling of data and generate evidence that dictates future clinical practice. The Indian HIPEC registry was set up with a similar goal by a group of Indian surgeons treating peritoneal surface malignancies. The Indian HIPEC registry is a registry of patients with peritoneal metastases treated with cytoreductive surgery and HIPEC in India. It also acts as a data base for storing treatment related information of patients enrolled to the registry. Patients with peritoneal metastases from colorectal ovarian, gastric, appendiceal tumors and other rare peritoneal tumors/metastases from rare tumors are enrolled in the registry. A coordinator contacts the patients and updates the disease status of each patient on a yearly basis. The registry is maintained by an independent organization and a non-disclosure agreement is signed between the company and each surgeon as they enroll in the registry. For security purposes, each surgeon is provided with a password. The domain is SSL certified (Secure Sockets layer) which is the standard security technology for establishing an encrypted link between a server and a browser. For the maintenance, each surgeon pays a nominal fee annually. Institutional permission is not mandatory and depends on the requirement of each institute that is different in India. Patient consent is mandatory and patients have to agree to be contacted by a coordinator on a regular basis. Data entry is done for specific diseases separately. The data base captures for each patient, the demographic information, a detailed clinical history and imaging details, surgical details and perioperative outcomes, further treatment taken and follow up of patients. Information entered by each surgeon can be exclusively seen by the surgeon alone and is password protected. The system administrator has access to all the data entered. Data entry can be prospective or retrospective. A scanned copy of the surgical pathology report and hospital discharge summary need to be uploaded for each patient. This ensures authenticity of the data. The registry coordinator is a qualified medical practitioner trained to use the system and familiar with peritoneal surface malignancies and their management. The coordinator monitors the data being entered periodically and is in contact with all the surgeons. For publication of data, each proposal is approved by a scientific committee. A surgeon has to contribute a minimum of 25 cases to the registry, before conducting a study. All surgeons contributing any number of cases to the particular study merit authorship. Analysis of an individual surgeon's data is also possible and can be done by the service provider.
METHODS: N/A.
RESULTS: N/A.
CONCLUSIONS: The Indian HIPEC registry is a useful and practical database for Indian surgeons. There is no regulatory body that mandates collection and publication of scientific data in India. The onus is on each surgeon to capture valuable information pertaining to these common and rare diseases that could contribute to the existing scientific knowledge and guide the treatment of these patients in the future. The registry can be accessed at www.indianhipecregistry.com

P807

A SURVEY OF PHYSICIAN ATTITUDES AND PRACTICE PATTERNS REGARDING TREATMENT OF PATIENTS WITH PERITONEAL METASTASES

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BACKGROUND: Cytoreductive surgery (CRS) and heated intraperitoneal chemotherapy (HIPEC) is a treatment option for patients with peritoneal metastases that has been shown to provide improved overall survival for appropriately selected patients. However, the availability and utilization of this treatment remains limited and there is great variability in the rate of referral to expert HIPEC centers. Factors that influence treatment choices, including potential referral to a HIPEC center, among practicing physicians who see patients with peritoneal metastases have not been extensively studied in the past.
METHODS: The aim of this study was to evaluate factors that influence treatment choices including utilization of cytoreductive surgery and HIPEC among practicing physicians who regularly see patients with peritoneal metastases. The study was performed via a mail survey of medical oncologists and surgeons in Virginia, Maryland and DC.
The survey questions evaluated ease of access to HIPEC centers, prior experience with referral to a HIPEC center, clinical scenarios and knowledge regarding outcomes of CRS and HIPEC.
RESULTS: The survey was mailed to 2297 physician addresses of which 143 were undeliverable. We received 167 surveys: 87 physicians reported they did not treat patients with GI cancers while 80 respondents completed the survey questions: 64 surgeons and 16 oncologists. The majority of responding physicians practice in a community setting (80%): 42% in a non teaching facility and 43% in a teaching facility. Two thirds of physicians see <5 patients with peritoneal metastases a year and 40% report there is no HIPEC expert easily available for their patients. The most common reason for non referring a patient for HIPEC evaluation was lack of access to a HIPEC expert (58%). The most common indication for referral to a HIPEC center was appendix cancer, especially low grade (80%). A large number of respondents would not consider referral to a HIPEC center for patients with mesothelioma and significantly underestimate the survival of patients after CRS and HIPEC, especially for colon cancer with limited peritoneal disease and mesothelioma.
CONCLUSIONS: Referral to a HIPEC center is underutilized among community physicians in practice. Difficulty in access to HIPEC experts is the most common cause for lack of referral followed by a perception of insufficient evidence for this treatment approach. Lack of familiarity with data regarding outcomes also contributes to referral patterns and treatment choices.

P808

SAFETY AND EARLY OUTCOMES DATA AFTER CYTOREDUCTIVE SURGERY WITH PERITONECTOMY PROCEDURES AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY IN PATIENTS WITH PERITONEAL SURFACE MALIGNANCIES FROM A SPECILAZED CENTER OF TURKEY

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BACKGROUND: Peritoneal metastases (PM) were considered to be a final stages of intraabdominal and primary peritoneal cancers with a short period of survival. Cytoreductive Surgery (CRS) with peritonectomy procedures and hyperthermic intraoperative intraperitoneal chemotherapy (HIPEC) are increasingly applied in the management of PM worldwide. Here, we report early outcome and safety data in 55 patients with peritoneal surface malignancies underwent to treatment in a specialized center of Turkey.
METHODS: A prospective data collected on all patients undergoing CRS with peritonectomy and HIPEC between 2013-2016.
RESULTS: In total 51 patients (33 with colorectal cancer (CRC), 15 patients with gastric cancer (GC), 3 patients with OC) underwent CRS with peritonectomy procedures and HIPEC, of which 15 (30%) had complete cytoreduction (CC-0) and 36 (70%) had CC-1,2 and -3. And, 3 year survival is 14 out of 30 (42%) in patients with CRC and 2 out of 15 (13%) in patients with GC and 2 out of 3 (54%) in patients with OC. Overall postoperative Grade III-IV morbidity and mortality were not noted.
CONCLUSIONS: Management of PM in highly specialized center with trained surgeon and anesthiologist and intensive care is safe and feasible option with potential benefits. Training in management of PM is essential to avoid unneccessary morbidity and mortality in these group of patients.

P809

MEXICAN NATIONAL EFFORT TO INTEGRATE CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY INTO THE MANAGEMENT OF GASTROINTESTINAL AND GYNECOLOGIC CANCER

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BACKGROUND: Global efforts to expand the use of cytoreductive surgery (CRS) and hyperthermicintraperitoneal chemotherapy (HIPEC) are being continuously reported in the peer-reviewed literature. The methodology by which to accomplish this goal has not yet been defined. In 2007, at the request of several Mexican oncologic surgeons, a yearly workshop to explore the use of CRS and HIPEC in Mexico was initiated. This yearly meeting has continued for six years with subsequent workshops in Merida, Toluca, Mexico City, again Oaxaca, and in April 2014, Guadalajara.
METHODS: N/A.
RESULTS: The initial plan organized a workshop that brought together experienced and published American surgeons into a direct interaction withthe Mexican surgeons who specifically requested an exploration of CRS and HIPEC in their regional cancer hospitals. A two-day meeting was initiated in 2007 in Oaxaca, Mexico. There was a full day devoted to live surgery with video transmission that emphasized the surgical technology of peritonectomy and visceral resections to complete the cytoreductive surgery. A second day explored the clinical science supporting HIPEC. Currently, these five regional programs are providing a high level of care for peritoneal surface malignancy patients in Mexico, performing 10-20 CRS plus HIPEC procedures per center per year with a morbidity of less than 20% and nearly 0% mortality.
CONCLUSIONS: Collaborative efforts of experienced surgeons with committed Mexican surgeons have resulted in a national program in CRS and HIPEC in Mexico. The effort is ongoing and expanding into a coordinated national program with standardized treatment paradigms and prospective data accumulation.

P810

THE PERITONECTOMY PATIENT TRACKER: A JOURNEY TO STREAMLINE PERITONECTOMY CLINICAL WORKFLOWS AND INCREASE RAPID ACCESS TO INFORMATION

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BACKGROUND: The Peritonectomy unit at St. George Hospital was faced with the challenge of centralising and recording Peritonectomy patients' information for Multi-Disciplinary Team Meeting (aka Tumour Board) purposes. This led to the establishment of a project aimed at streamlining clinical data collection & retrieval processes, to increase quality, efficiency, and real-time accessibility to Peritonectomy patients' information. The clinical team leveraged IT specialists [iCIMS] agile methods to review, analyse, and streamline clinical workflows in order to identify bottlenecks and increase staff efficiency and patient safety. A clinical design team of eight different clinical roles from the unit was established to work closely with iCIMS clinical analysts to deliver what is now known as the Peritonectomy Patient Tracker.
METHODS: 1. Analysis of the unit's current overall workflows and Multi-Disciplinary Meeting life-cycle: a. Preparation: Search & Collation. b. Presentation: Live meeting data collection. c. Post-Coordination: Post-meeting work allocation & follow-up. 2. Production of a thorough process analysis including maps that identified current bottlenecks (delays and risks) with strategies to overcome them. 3. Establishment of a Peritonectomy application skeleton (electronic system). 4. Identification of gaps in data collection & data retrieval (*i.e.* lack of access to critical information by different clinical roles), mainly Ms, to incorporate into the new environment. 5. Workflow & data flow design iterations - a highly dynamic, iterative process to achieve the target standard set by the clinical design team. This included weekly to fortnightly meetings with clinical staff to collectively design the "user experience" (screen designs), test it, then revise it as needed. This was facilitated by iCIMS methodology of user controlled design and a design platform that translated designs into executable code in an automatic manner. 6. Validation by a statutory body (Cancer Institute NSW) to ensure best practice and auditability of information. 7. User-acceptance testing. 8. Back-office Go-Live. 9. Multi-Disciplinary Meeting Go-Live.
RESULTS: 1. Peritonectomy Process analysis. 2. Production of Peritonectomy Patient tracker (IT application).
CONCLUSIONS: The project was not solely about producing an IT system, but was a holistic approach to the complete clinical "user-experience" encompassing workflow, streamlining the practice, and improving the work processes. The project was able to eliminate a number of gaps in availability of information and increase rapid point-of-care access. It also enabled centralisation of information for meetings and enabled live-data capture of meeting outcomes and semi-automatic post-processing of action items.
Next steps: The system has been commissioned and is used to facilitate streamlined practice and collect data that was not previously readily accessible for analytics and auditing. This will enable more research from a patient clinical outcomes perspective as well as a clinical-user perspective to provide opportunities for work practice improvements.

P811

A SURGICAL TRAINEE'S EXPERIENCE AT THE PERITONEAL MALIGNANCY INSTITUTE AT THE MATER MISERICORIDIAE UNIVERSITY HOSPITAL, DUBLIN IRELAND

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BACKGROUND: Peritoneal malignancy treatment centres have been established in European countries with populations similar to that of Ireland (Denmark 5.5million; Finland 5.3 million; Norway 4.9 million) and have clearly demonstrated both the need for, and feasibility of, establishing such national units. In Ireland it is estimated that approximately 100 patients annually may benefit from assessment, while up to 40 patients per year may be candidates for cytoreductive surgery and HIPEC. To cater for the treatment needs of patients with peritoneal malignancy in Ireland, and in order to ensure optimal cancer outcomes, a National Centre for the treatment of patients with peritoneal surface malignancy was established at the Mater Misericordiae University Hospital in Dublin.The first case of surgical cytoreduction with HIPEC in Ireland was successfully completed at the Mater Hospital in June 2013.Since then, 80 cases have been completed thus far. The centre was built on the existing international collaboration with the Peritoneal Malignancy Institute in Basingstoke UK. The establishment of a national peritoneal malignancy centre in Ireland not only supports the national agenda of improving survival for patients with cancer as outlined in the 'National cancer forum strategy for cancer control in Ireland 2006', but also provides an economically viable means of improving access for patients to world class treatment within Ireland.
Out of the 80 cases, one surgical trainee has been working within the unit for last 2 years out of the 3 and has operative experience of over 35 cases within the 80 done. This has given ample opportunity to learn the complexities of open cytoreductive surgery, allowing for expeirence obtained, in general, colorectal, upper GI/hepatobiliary and pelvic surgery. This is a unique opportunity for trainees in general to obtain such unique operative experience, and allows for better understanding and appreciation in open surgery involving a multi modal specialities. There is a European Working Tine Directive that has cut down hours spent by surgical trainees in the week to 48 hours. A HIPEC case allows for access to numerous operations in the one sitting, and hence is extremely fruitful. The various operations will be presented in table format, over the cases done. As this institute has progressed over time the case load too is increasing and from within Ireland more cases are being referred. This has allowed for and

necessitated in the establishment of a database, directory for HIPEC referrals and cases, of varying primary origins for example colorectal, appendiceal etc. This gives ample opportunity for the teams within the unit to keep track of the data, audit, reerach retrospectively and prospectively, especially now that we are in a time frame where certain patient groups can be followed up and survival rates and targets can be monitored.
METHODS: N/A.
RESULTS: N/A.
CONCLUSIONS: Overall this unit, has expanded in terms of case load per year and is getting busier. 80 cases to date have been operated on, with no intraop or post op inpatient stay mortalities to note. The surgical trainee has been allowed to continue work there for a 3rd consecutive year, and that will help establish a good infrastructure in relation to operative training, research and data publication for the institute. As we move into minimally invasive surgery as a preset approach, cytoreductive surgery/HIPEC allows for overall complex open surgical training, in short time frame.

P812

KNOWLEDGE TRANSLATION AND THE MANAGEMENT OF PERITONEAL SURFACE MALIGNANCY

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BACKGROUND: This paper presents an analysis of the unique variables that define knowledge translation (KT) in the management of peritoneal surface malignancy (PSM) using the Ottawa Model of Research Use (OMRU).
METHODS: The OMRU is a conceptual framework, designed to plan and guide KT interventions. The three pillars of the framework include: assessing barriers and supports; monitoring KT intervention implementation; and evaluating adoption and outcomes. The first pillar represents a targeted situational analysis, which includes assessment of the evidence-based innovation, the potential adopters, and the policy environment. It assumes a non-linear, non-sequential process by which research may be applied in practice, taking contextual factors and the dynamic interactions between involved parties into consideration.
RESULTS: A broad-themed analysis for KT specific to the diagnosis, treatment and management of PSM reveals numerous unique barriers and supports that require special consideration. The evidence-based innovations in the field, which include cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) are now widely supported by the literature for certain indications. However, there exists considerable inertia amongst all levels of the referral system, which still view PSM as inoperable and act as a barrier to appropriate evaluation and treatment. Furthermore, the relatively low-incidence of disease challenges the production of high quality randomized control data. The practice environment in Nova Scotia has created a set of perverse incentives that act as an economic barrier to timely patient care and scale-up of service delivery. Access as a function of geography also creates unique challenges in our setting. Monitoring intervention implementation and evaluating adoption and outcomes must feed back into research generation and program design in an intentional, goal-directed manner.
CONCLUSIONS: The most efficient translation of knowledge into action involves tailoring KT strategies to relevant barriers and supports. The OMRU is a useful framework for assessing, monitoring and evaluating the unique barriers and supports to knowledge translation in the diagnosis, treatment and recovery of patients with peritoneal surface malignancies.

P813

CYTOREDUCTIVE SURGERY AND HEATED INTRA-PERITONEAL CHEMOTHERAPY FOR PERITONEAL SURFACE MALIGNANCIES: EARLY EXPERIENCE OF A PUBLIC HEALTHCARE INSTITUTION IN SINGAPORE

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BACKGROUND: Historically, patients with peritoneal surface malignancies face a dismal prognosis with palliative chemotherapy alone. CRS/ HIPEC have gained increased traction among oncologists as an acceptable treatment since its introduction in early 2000s. In Singapore, CRS/HIPEC is gradually gaining acceptance as a treatment modality for PSM in recent years. As CRS/HIPEC is a lengthy and extensive procedure, the challenges in its introduction lie with the careful selection of patients and the development of a close collaboration between the different medical, surgical, nursing and allied health specialists in a multi-disciplinary team.
METHODS: To review the case selection of the first cohort of patients who were intended for or underwent CRS/HIPEC at our institution as well as their outcomes in terms of the postoperative morbidity and survival to date. This is a retrospective review of all the CRS/HIPEC cases performed over a 53-month period from 1st January 2012 to 31st May 2016 in a public tertiary healthcare institution in Singapore. Suitable patients were identified in a multi-disciplinary meeting and referred to the surgical oncology team for consideration of CRS/HIPEC.
RESULTS: 14 patients were identified to be suitable for CRS/HIPEC. Six patients had peritoneal metastasis from a primary colorectal adenocarcinoma, five patients had pseudomyxoma peritonei, two patients had primary peritoneal serous carcinoma and one patient had malignant peritoneal mesothelioma. The patients were predominantly female (57.1%) with a mean age of 62.5 years old (29-71 years old). The average waiting time from tumour board decision for CRS/HIPEC to the actual surgery was 109 days (4-232 days). Five patients received pre-operative chemotherapy before HIPEC. HIPEC was postponed for three patients due to initial difficulties in procuring appropriate equipment, unavailability of surgical intensive care beds in one case, and one patient having neutropenic sepsis just prior to initial planned surgery date. Two patients underwent exploratory laparotomy or diagnostic laparoscopy without further CRS/HIPEC, four patients underwent CRS only and eight patients received both CRS and HIPEC. The peritoneal carcinoma index (PCI) score ranged from 3 to 39 for the 11 patients who underwent CRS. The average operative timings for CRS and HIPEC was 9hrs 6 mins (5hr 30 mins-11hr 25 mins). The mean length of hospital stay for patients who underwent both CRS and HIPEC was 30 days (6-83 days). Five of these patients (46%) experienced postoperative morbidity and these were further classified (Clavein-Dindo) as grade 2 (1), grade 3 (3) and grade 4 (1). There were no postoperative mortalities. Four patients subsequently passed away due to disease progression. To date, the longest survival time for a patient post cytoreductive surgery is 29.2 months.
CONCLUSIONS: There were significant challenges in the introduction of CRS/HIPEC at our institution. These were mainly related to concerns of patient safety issues, availability of equipment and overall low acceptance of HIPEC procedure by medical colleagues. Malignant mucinous neoplasm was the most common indication for CRS/HIPEC. With increased patient experience and the introduction of operative safety protocols, CRS/HIPEC has now become a safe and accepted treatment for patients with peritoneal surface malignancies in our hospital.

P814

INTESTINAL OBSTRUCTION FROM PERITONEAL CARCINOMATOSIS...TO DO OR NOT TO DO? A VALIDATION STUDY OF THE UCDCCC NOMOGRAM

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BACKGROUND: Increasing emphasis is placed on the necessity and appropriateness of palliative surgical care for patients with advanced malignancies. There is a lack of evidence regarding predictive factors and outcomes after abdominal surgery in these patients to guide therapeutic decisions.
METHODS: This analysis sought to characterize adverse outcomes (mortality, complications and institutional discharge) and to identify fac-

tors independently associated with 30-day mortality, amongst patients who have undergone palliative surgery for intestinal obstruction from peritoneal metastases. We sought to validate the use of the UC Davis Comprehensive Cancer Centre (UCDCCC) nomogram to predict risks of 30-day morbidity and mortality for patients with disseminated malignancy undergoing surgical intervention in our population.

RESULTS: Patients with peritoneal metastases who underwent surgery for intestinal obstruction from January 2000 to May 2016 were included. The following factors were studied: age, gender, race, site of primary malignancy and metastases, comorbid diseases, procedure acuity, operative procedure type, prehospital location and functional status, preoperative chemotherapy, preoperative radiotherapy, presence of significant weight loss, steroid use, need for transfusions, smoking status, Eastern Cooperative Oncology Group (ECOG) status, presence of ascites, bleeding disorder, dyspnea, impaired sensorium, pneumonia, sepsis, septic shock, preoperative hematocrit, total white blood cell count, preoperative albumin, preoperative creatinine, presence of active disease, postoperative complications, unplanned reoperation and readmission, duration of in-hospitalization, discharge location and in-hospital mortality. Continuous and categorical variables are analyzed using independent t-test and Fisher's exact test respectively. Logistic regression models using stepwise model selection was performed. The nomogram was validated using concordance index and Hosmer and Lemeshow tests to evaluate the model's extent of discrimination and level of fit. 208 palliative operations for intestinal obstruction secondary to peritoneal metastases were included for analysis. Overall median survival was 101.5 days post- operatively. Pre- operative variables such as low ECOG status and high pre- operative albumin were significant predictors of lower 30-day mortality. Presence of ascites and higher pre- operative hematocrit suggested a potential prognostic role in predicting 30-day mortality. On multivariate analysis, low ECOG status and high pre- operative albumin remained statistically significant. Post- operative variables significantly associated with mortality include respiratory and cardiac complications and duration of in-hospitalization. Analysis of the UCDCCC nomogram showed that the concordance index for our data set was 0.70. The Hosmer and Lemeshow test was not significant at 0.995, indicating good model fit.

CONCLUSIONS: Good ECOG status and high pre- operative albumin levels were independently associated with favorable post- operative outcomes. Patients with these favorable prognostic factors should be considered for surgical management in spite of advanced disease.

P815

OUTCOMES OF CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR PATIENTS WITH PERITONEAL SURFACE MALIGNANCY: THE PHILIPPINE EXPERIENCE

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BACKGROUND: Malignant neoplasms are among the leading causes of mortality across all age groups in the Philippine health landscape. The burden of disseminated peritoneal disease is further compounded by a still developing health infrastructure system, and lack of an integrated approach to treatment. Despite improvements in surgical management and chemotherapeutic interventions, the Philippine experience in cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) remains modest.

METHODS: A retrospective study was performed at the Philippine General Hospital (PGH) - a tertiary government hospital, and The Medical City (TMC) - a tertiary private hospital, describing outcomes in 35 patients presenting with peritoneal dissemination of a primary disease undergoing CRS and HIPEC. - To identify demographic profile of patients who have undergone CRS-HIPEC. - To describe morbidity and mortality rates of the procedure. - To identify targets of oppurtinty to improve safety and clinical outcomes of the procedure in the Philippine setting.

RESULTS: Patients in this study had a mean age of 56.9 years (32-75 years); and were predominantly female (71%). Thirty-two patients (91.4%) had undergone a previous operation related to the primary disease. Histopathologic diagnoses included pseudomyxoma peritonei seen in 11 out of 25 females (44%) and mucinous adenocarcinoma of ovarian origin in 10 patients; whereas most male patients presented with advanced-stage colorectal cancers (70%). All patients in the study were primarily managed by a colorectal surgeon (MJL); moreover, a medical oncologist, surgical intensivist, anesthesiologist, and gynecologic oncologist comprised the multidisciplinary team (T). Mean operative time was 6.9 hours (4-13 hours); wherein peritoneal cancer index (PCI) score on average was reported at 15.6 (range, 0-39) and completion of cytoreduction (CC) scores were mostly 0 (80%). Average postoperative length of stay was 11.8 days (5-36 days); while intensive care unit (ICU) confinement had a mean of 3 days (2-7 days). Mandatory ICU admission was observed for the first 10 patients; while, subsequent admissions (5 of 25, 25%) were based on the clinical judgment of the intensivist. Operative morbidity was reported in 6 patients; most of these were Grade II and III morbidities. A single 30-day mortality was reported in a patient with septic shock from an intra-abdominal abscess as the cause of death.

CONCLUSIONS: Cytoreductive surgery and HIPEC are playing a more central role in the management of peritoneal surface malignancy (PSM) in the country. Accruing experience in this procedure and associated perioperative care is in its early stages. Our study demonstrated that CRS and HIPEC can be safely performed in the country, with an T approach at the core of management. The authors of this study recommend a multicenter case review of patients treated with CRS and HIPEC. It is thought that demonstrating acceptable morbidity and mortality rates through a multivariate study allows for further studies to focus on efficacy of current treatment protocols and treatment strategies in PSM. Furthermore, outcomes from these studies may substantiate a call for policy and action from the local health sector.

P816

FAST-TRACK PROGRAM IN CRS-HIPEC: WHAT CAN WE EXPECT?

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BACKGROUND: Since Sugarbaker's publication in 1995 about the surgical treatment of peritoneal carcinomatosis the approach for the peritoneal dissemination of pathologies have changed from non-committal attitude toward the diagnosis of peritoneal carcinomatosis to a much more active attitude leading to more aggressive surgery being carried out, including cytoreductive surgery (CRS) and intraoperative hyperthermic intraperitoneal chemotherapy (HIPEC). These combined strategies allows for most patients to return to baseline or better levels of functioning and long-term survival. Despite these good outcomes, it remains an extended surgery that features important perioperative morbidity (0-40%) and mortality rates (up to 10%) besides long periods of hospital stay and about three months of surgical recovery, Fast-track surgery is a multimodal package of techniques designed to accelerate recovery, reduce morbidity and shorten convalescence to ultimately improve outcomes and reduce costs.

METHODS: - To evaluate morbidity and mortality differences between both groups. - To analyse complications rates differences between both groups. - To evaluate hosptal stay and UCI stay differences between both groups.

RESULTS: Data analysis showed relevant differences between both treatment strategies. The period of hospital stay decreased from an average of 21 days on Group A to 10 days on Group B. Also decreased the period of ICU stay: 100% of Group A's patients stayed more than 48 hours, *versus* 50% of Group B's. Morbidity was generally more prevalent and severe on group A's patients (Grades I-II 40%, grade III

20%, grade IV 40%) than on group B's (Grades I-II 6,25%, grade III 12,5%, grade IV 12,5% and grade V 6,25%). Finally, the average of early hospital readmission (less than 30 days) varied from 20% on Group A to 12% on Group B.
CONCLUSIONS: Fast-track strategies applied to CRS/HIPEC have good results on postoperative outcomes as it reduces morbidity, decreases ICU and hospital stay and prevents hospital readmission. Thus, it takes important benefits to patients at the same time that reduces costs and make it feasible even on low funding health systems.

P817

IMPLEMENTATION OF A REFERENCE CENTER IN PERITONEAL DISEASES IN A CITY OF SOUTHERN BRAZIL

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BACKGROUND: The expansion and consolidation of cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) in the treatment of peritoneal carcinomatosis leads to the need of teams able to perform this treatment. The familiarity of a multidisciplinary team with new peritoneal treatment techniques allows the maximum benefit regarding survival and disease-free time with the reduction of morbidity and mortality to acceptable levels. This has led to Peritoneal Surface Oncology Group (PSGOI) and the European Society of Surgical Oncology (ESSO) to encourage regulation and establishment of specialized reference centers for the treatment of peritoneal carcinomatosis.
METHODS: Describe the implementation of peritoneal disease treatment center in Complex of Santa Casa of Porto Alegre and relate the first 10 treated cases.
RESULTS: We present the first 10 cases operated in our center and epidemiological data of our patients. We have 5 cases of pseudomyxoma peritoneal, 1 mesothelioma, 2 recurrent ovarian cancer and 1 metastatic gastric carcinoma. Surgical time average was 10 hours and 56 minutes, bleeding was 1444ml, hospital stay was 22,7 days and we have one death.
CONCLUSIONS: A multidisciplinary team and the interaction with experienced centers seem to be the key points for a safe transition to the formation of an experienced team in the treatment of peritoneal carcinomatosis.

P818

CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR PERITONEAL SURFACE MALIGNANCIES. INITIAL EXPERIENCE AT A REGIONAL CANCER CENTRE IN INDIA

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BACKGROUND: Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) has only recently gained popularity in India.
METHODS: The purpose of this study is to document the initial experience of CRS and HIPEC in a regional cancer centre in India.
RESULTS: CRS and HIPEC was performed on 29 patients (PMP-13, PM- 2, CRC-11 and ovary-3). The results are presented in three groups- Group 1 (consisting of PMP and PM), Group 2 (peritoneal metastasis from CRC) and Group 3 (peritoneal metastasis from ovarian cancers). The median age of the patients was 55 years (range 36-68), 45 years (range 32-72) and 50 years (35-61) in Groups 1, 2 and 3 respectively. The median duration of surgery/ median blood loss was 12 hours (range 6-17)/ 1800ml (range 200-6600 ml); 8 hours (range 5-10)/ 700ml (range 100-1400) and 6 hours (range 4-12)/ 1200ml (range 300-3200ml) in Groups 1, 2 and 3 respectively. The median PCI in Group 1 was 29 (range 0-39), in Group 2 was 8 (range 4-24) and in Group 3 was 6 (range 2-14). A CCS-0 cytoreduction was achieved in 66.6% in Group 1and 100% of patients in Groups 2 and 3. The median hospital stay was 18 days (range 10-54), 13 days (range 10-30) and 15 dys (range 9-29) in Groups 1, 2 and 3 respectively. The incidence of grade 3-4 morbidity was 20% in Group 1 and 0% in Groups 2 and 3 whereas the 30-day post-operative mortality was 13.3%, 9% and 0% in Groups 1, 2 and 3 respectively. While no patient in Groups 1 and 3 had a recurrence, 6 patients (54.5%) of patients in Group 2 experienced a recurrence (lung-1, supraclavicular node-1, bone marrow-1, spleen-1 and peritoneum-2). The median overall survival in Group 1 was 12 months (range 2-44) and in Group 2 was 10 months (range 4-19).
CONCLUSIONS: CRS and HIPEC is feasible in a low resource setting. In our early experience, the procedure had a higher incidence of complications when performed for PMP and PM when compared to CRC or ovarian metastasis. With increasing experience, we hope to reduce the complication rates.

AO121

ECONOMICAL FEASIBILITY OF CYTOREDUCTIVE SURGERY AND HIPEC IN THE SUS' CONTEXT

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BACKGROUND: The CS/HIPEC is performed in our country for over 15 years, especially in private and philanthropic surgical services. Few public efforts for performing the method have been made. The largest concerns in the context of SUS seams to be low founding, that prevents hospitals and teams proper remuneration, the difficulty in acquiring needed inputs to perform the procedure, and the lack of excellence services able to carry it out.
METHODS: N/A.
RESULTS: From early March 2015 to August 2016, twenty consecutive patients underwent the procedure. Analysis showed that bills could be charged an average of 13 surgical codes (ranging from 7 to 16), with an average remuneration for the hospital of US$ 12,500 dollars (ranging from US$ 7,812 to 14,060 dollars). On the other hand, the direct spending on inputs (perfusion kit, staplers, advanced bipolar scalpel, pneumatic boots, sensors, thermometers, and medications), had an average cost of 17 thousand reais. Also, since SUS is the hospital's unique financial source, we contacted several supplier companies in order to get necessary products reasonably priced. So, they've been supporting us with equipments' loan and donation (Wendy Med®, Edwards®, Ethycon).
CONCLUSIONS: We demonstrated that even considering the discrepancy between SUS payment table and commercial prices, it's possible to perform CRS/HIPEC in public hospitals avoiding any institutional financial loss, since they are carried out in hospitals prepared and qualified to perform such complex procedures.

AO125

WORLDWIDE AWARENESS OF ORGANIZATION AND STRUCTURE OF REGIONAL/NATIONAL PERITONEAL SURFACE ONCOLOGY PROGRAMS-A WEB REVIEW

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BACKGROUND: Peritoneal surface oncology is a very sub-specialized area of surgical oncology involving gastro-intestinal and gynecological malignancies. The number of centers providing this service is very limited. Surgeons wanting to enhance their knowledge and skills look for educational programmes.

METHODS: We aim to inquire into the presence of such programmes on the internet.
RESULTS: There were two major training programmes that were found. 1. Asian peritoneal surface oncology training - Asian School of peritoneal surface oncology (A joint venture of the PSOGI). 2. European society of peritoneal surgical oncology training programme - European Society of Surgical Oncology. The details of the programmes were well described, including the centers providing training, Trainers, activities involved, Log book and the milestones to be achieved as a part of the programme.
CONCLUSIONS: The availability of structured programmes on peritoneal surface oncology is limited. However, within the available programmes the details are well described. It is therefore important to create an awareness about the presence of such programmes nationally and internationally.

NURSING ABSTRACTS

Quality of Life

P900

PATIENT INVOLVEMENT IN CYTOREDUCTIVE SURGERY AND HYPERTERM INTRAPERITONEAL CHEMOTHERAPY

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BACKGROUND: Health care is currently undergoing a paradigm shift towards a more patient centred trajectory. As part of a larger study we have investigated the professional perspectives of patient involvement and pathways in relation to cytoreductive surgery (CRS) and Hyperterm Intraperitoneal Chemotherapy (HIPEC) in peritoneal carcinosis of colorectal and ovarian origin. This treatment is characterised by its complexity and extensiveness, and by the risk of developing treatment related complications. Besides the serious diagnosis, patients and relatives must furthermore cope with much information and uncertainty of whether the HIPEC treatment is at all possible. Patient involvement is a collective term of a clinical practise based on patient preferences. Basic values are to support patients in making decisions concerning their health and treatment in an informed manner, and to integrate these in their every day life conduct.
METHODS: The overall objective was to identify possibilities and barriers of patient involvement in this clinical pathway.
RESULTS: As the aim of the study was to gain insight into health care professional perspectives of a specific clinical area in a small group of patients, a number of focus group interviews were performed with strategically selected surgeons and nurses from relevant departments. The data generation took place during early 2016. Two of the authors (HVT and LS) conducted and moderated the interviews, which followed a semi-structured interview guide. The interviews were digitally recorded, transcribed verbatim, and the text subsequently analysed using meaning condensation ad modum Kvale. A number of two focus-group interviews were performed with staff from two surgical university hospital departments: one colorectal and one gynaecological. The colorectal department represents a national centre for CRS and HIPEC, with ten years of experience and 200 completed HIPEC treatments at the time of the interview. From this two surgeons and three nurses participated. The gynaecological department had recently implemented protocol CRS and HIPEC, and had completed seven HIPEC treatments at the time of the interview. From this department two surgeons and two nurses participated. The main findings dealt with similarities and differences in identifying possibilities and barriers of patient involvement, being CRS and HIPEC expert or novice, respectively.
CONCLUSIONS: In relation to CRS and HIPEC the lengthy diagnostic process, the severe and difficult symptoms, the challenging treatment pathway, and significant psychosocial needs place special demands on the healthcare professionals, who are taking care of the patients and their families. Highly specialised biomedical knowledge, carefully designed patient pathways, and basic human understanding are required. Principles of patient involvement and shared decision-making were being put under pressure prior to the surgery, and further research is needed in this area, including staffs' communication skills and willingness to share decisions.

Rehabilitation

P1000

CHANGES IN FORCED VITAL CAPACITY IN PATIENTS UNDERGOING CYTOREDUCTIVE SURGERY FOR PERITONEAL MALIGNANCY

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BACKGROUND: Cytoreductive surgery (CRS) has the potential to cause diaphragmatic dysfunction, particularly after diaphragmatic peritonectomy and/or HIPEC. Patients with diaphragmatic dysfunction may have lower forced vital capacity (FVC), both in head-up and supine, head-down positions. Compared to head-up, head-down position can reduce lung compliance due to abdominal loading of the diaphragm.
METHODS: To identify differences in pre and post-operative FVC in patients who have undergone CRS in both head-up and head-down positions. Furthermore, to establish whether FVC was affected between patients whom had diaphragmatic peritonectomies (Pd) and those who had not (Pn).
RESULTS: Twenty consecutive patients were included for analysis, with a mean age of 59.3 (? 14.8); of which 65% were female. All patients had CRS and HIPEC. Eleven patients had Pd, either left (n=1), right (n=4), or bilateral (n=6). Median (IQR) VAS score was 0 (0-0) pre-operatively, 3 (0-8) on day one post-operatively and 0 (0-4) on day of discharge. There was no significant difference between median FVC between head-up and head-down position (P=0.22). Median FVC saw a significant decrease between pre-operative (2.75 L;1.27-4.99) and day one post-operative (1.23L;0.61-1.88) measurements in head up (P=0.0002) and head-down (2.66L;1.43-4.57 to 1.06L;0.42-2.12; (P=0.0002) positions. Median FVC remained significantly less at discharge in head-up (P=0.0013) and head-down (1.69L;078-2.59)(P=0.0003) positions when compared to pre-operative measurements. Median FVC on day one post-operatively was significantly lower than discharge median FVC for head-up (P=0.0001) and head-down (P=0.0006). Delta FVC measurements were non-significantly increased when comparing pre-operative (0.01L;-0.36-0.43) to day 1 post-operative (0.14L;-0.77-0.33) (P=0.37), pre-operative to discharge (0.07L;-0.19-0.50) (P=0.52), and non-significantly decreased between day 1 post-operative compared to discharge (P=0.51). Comparisons between Pd and Pn groups showed no significant difference between median VAS scores (P=0.80). There was no significant difference between the Median FVC of the Pd and Pn groups in head-up (P=0.17) and the head-down position (P=0.96) However, delta median FVC was significantly greater in the Pd when compared to the Pn groups (P=0.0016).
CONCLUSIONS: A significant decrease in FVC between day one post-operatively and at discharge, compared to pre-operatively, indicating that FVC does not recover to pre-operative status upon discharge. Although there was no significant difference in median FVC between head-up and head-down position, delta FVC was significantly higher in the Pd group, suggesting that diaphragmatic function in this cohort may be compromised, particularly with increased abdominal loading of the diaphragm in head-down position.

Nutrition

P1100

NUTRITION STATUS AS A PREDICTOR FOR POST-OPERATIVE OUTCOMES IN PATIENTS UNDERGOING CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY: A SNAP SHOT

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BACKGROUND: Malnutrition is associated with an increased risk of post-operative complications, morbidity and length of stay (LOS) in patients undergoing major surgery. Malnutrition is known to be prevalent in patients undergoing surgery for abdominal malignancies. Few studies have examined nutrition status in patients undergoing cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC). Patients undergoing CRS and HIPEC for peritoneal surface malignancy between February 2016 and June 2016 at St. George Hospital, Sydney Australia were invited to participate in this study. Pre-operative nutrition assessment was conducted as part of multidisciplinary work-up procedures. Assessment included weight, height, hand grip strength (HGS) and subjective global assessment (SGA). SGA is a validated assessment tool to assess nutrition status. HGS was measured using a dynamometer (Jamar Plus Digital) and compared to predicted values for age, gender and body mass index (BMI). Less than 85% of predicted values on both hands was considered decreased strength. Post-operative outcomes were obtained from the St. George Peritonectomy Unit's prospective database. Post-operative complications were graded according to Clavien-Dindo.
METHODS: The objectives of this study are to report the nutrition status of patients undergoing CRS and HIPEC and investigate baseline nutritional parameters as predictors for post-operative complications, morbidity and re-admission.
RESULTS: A total of 36 patients were included in this study. Baseline weight and SGA scores were available for all 36 patients and baseline HGS available for 26 patients. The prevalence of pre-operative malnutrition using SGA was 40%, patients with colorectal and appendix cancers were more likely to be malnourished than those with disseminated peritoneal adenomucinosis (DPAM), ovarian cancer and mesothelioma. Pre-operative weight and BMI were similar between groups with >90% of patients within or above the healthy weight range (BMI >18.5kg/m2), this does not account for body composition, abdominal distension or ascites. The median peritoneal cancer index (PCI) in the well-nourished group was 12.5 (IQR 6-27) and the median PCI in the malnourished group was 13.5 (IQR 10-28). A higher proportion of malnourished patients (45%), compared to well-nourished patients (27%) had hand grip strength less than 85% of predicted values. Higher rates of major morbidity were seen in malnourished patients (50%) than in well-nourished patients (37%). The median LOS in the malnourished group was 20.5 days (IQR 14-30), and 15 days (IQR 11-23) in the well-nourished group. Re-admission and return to theatre rates were higher in the malnourished group (29%, 43% respectively), compared to 9% for both variables in the well-nourished group.
CONCLUSIONS: Malnutrition is common in patients undergoing CRS and HIPEC for peritoneal surface malignancy. This study provides a snap shot of baseline nutrition status and potential links to higher morbidity, length of stay and readmission rates in malnourished patients. Although study numbers were small, this study is ongoing and increasing enrolment may show statistically significant differences. Further research into nutritional monitoring, rate of nutrition decline in the post-operative period and effectiveness of nutrition intervention are warranted.

P1101

PARENTERAL NUTRITION REQUIREMENTS IN PATIENTS HAVING CYTOREDUCTIVE SURGERY AND HYPERTHERMIC INTRAPERITONEAL CHEMOTHERAPY FOR THE TREATMENT OF PERITONEAL MALIGNANCY

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BACKGROUND: There is currently no agreed consensus as to the best route for nutrition support after CRS. The strategy in our centre has always been to give routine PN, commenced on the day after surgery for all patients, continued until oral intake is adequate. The rationale is based on the extensive nature of the surgery and the effects on gastro-intestinal tract function of organ resection, peritonectomy and hyperthermic intraperitoneal chemotherapy (HIPEC) with a resultant ileus.
METHODS: The aim of the study was to assess and compare the need for, and duration of, PN for patients being treated for peritoneal malignancy by CRS and HIPEC in a high volume surgical unit from 1st April 2013 to the 31st March 2015. The percentage of patients who had PN for less than 5 and 7 days was recorded. Comparisons were made between duration of PN and tumour site (appendix, colorectal, mesothelioma and other). A comparison was also made between the duration of PN and completeness of CRS (complete CRS *vs* major tumour debulking). This retrospective study also investigated the relationship between baseline nutritional assessment and duration of postoperative PN.
RESULTS: 324 patients had CRS between 1st April 2013 and 31st March 2015. Of these, 8 patients were excluded from the study. 16% had a major tumour debulking and 84% had a complete cytoreduction. 77% of patients had disease of appendiceal origin, 13% had colorectal peritoneal metastases (CPM), 5% had mesothelioma and 5% had other types of tumour. The median duration of PN was 9 days (range 2-87 days). Of the patients reviewed in the study only 3% were on PN for less than 5 days. 14% of patients were on PN for less than 7 days. There was no difference in duration on PN between the different tumour sites. Patients having complete CRS received PN for a median duration of 9 days, compared with 11 days for patients having major tumour debulking. Not statistically significant (p-value 0.073). Patients who had a Mid Upper Arm circumferences (MUAC) <23.5cm received PN for a median of 11.5 days compared with those >23.5cm who received PN for a median of 9 days. Not statistically significant (Mann-Whitney U test: 0.06).
CONCLUSIONS: Although we still do not know the best timing and route of delivery for perioperative nutrition in this patient group, this study, despite being retrospective does demonstrate some findings that may help us come to a consensus. Firstly it is interesting that very few patients (3%) were found to have PN for less than 5 days. The significance of five days is that, in the United Kingdom, the national guidelines indicate PN where the consequent intestinal failure is likely to last 5 days or longer (NICE, 2006). It was somewhat surprising that there was no difference between duration of PN and site of tumour. It was hypothesised that the colorectal peritoneal metastases (CPM) patients may need PN for a shorter period than those with classic Pseudomyxoma Peritonei (PMP). This lack of difference may be due to the relatively small amount of patients who have CPM in this cohort. Two factors that may increase the duration of PN include having a major tumour debulking rather than a complete cytoreduction and having a MUAC<23.5cm. To conclude, in this cohort, PN was required for an appropriate time period for most patients. Future clinical trials should investigate the possible use of enteral nutrition in specific groups undergoing CRS and HIPEC.

P1102

THE IMPACT OF OPTIMAL NUTRITION IN PATIENTS UNDERGOING CRS AND HIPEC

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BACKGROUND: Selected patients with peritoneal carcinomatosis are treated with Cytoreductive Surgery (CRS) and Hyperthermic Intraperitoneal Chemotherapy (HIPEC). Poor nutrition in these patients may increase complication rates and prolong hospital stay. The optimal peri-operative nutrition regime for patients undergoing CRS and HIPEC remains debatable.
METHODS: The aim of our study was to evaluate the impact of peri-operative nutritional status of our patients on post-operative recovery; paving the argument for the development of an optimal nutrition regime for patients undergoing CRS and HIPEC. Patients who underwent CRS and HIPEC between April 2001 and Feburary 2016 were stratified based on pre-operative albumin levels and body mass index (BMI). Outcome measures analyzed include morbidity rates (Clavien-Dindo grades I-V), duration of intensive care unit (ICU) and hospital stay. Normal, suboptimal, low and very low levels of albumin were defined as >35, 26-35, 22-25 and =21 g/L respectively.
RESULTS: During the study period, 214 patients underwent CRS and HIPEC. The median pre-operative albumin was 40 (12-51) g/L, and the median BMI was 24.6 (14.9-38.4) kg/m2. The median length of ICU stay and hospitalization was 1 (range 0-76) and 14 (range 6-188) days respectively. Post-operatively, 49 patients (23%) suffered from high-grade morbidity (Clavien-Dindo III-V). Acute kidney injury (AKI) was the most common high grade complication (n=44). Underweight patients (BMI <18.5) had a higher chance of AKI (p=0.039). In addition, pre-operative albumin level is a significant predictor of post-operative complications; there was an overall significant increase in complication rates (Clavien-Dindo I-V) with decrease in pre-operative albumin levels (p=0.027).
CONCLUSIONS: Peri-operative nutritional status is a good predictor of post-operative complications. Optimization of nutrition is critical to improve the outcome in patients undergoing CRS and HIPEC.

Cytoreductive Surgery and Hipec Nurse's Research

P1200

LONG TERM EFFECTS OF BOWEL FUNCTION FOLLOWING CYTOREDUCTIVE SURGERY

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BACKGROUND: Formal telephone follow up at one, three and twelve weeks frequently involve discussion about bowel function.The study will provide evidence to format information leaflets and establish the need for a bowel function clinic April 2008 to March 2014 revealed 792 entries in the database. Excluding the 97 multiple entries and deceased patients a total of 299 patients were surveyed. Any who were an inpatient were excluded.
METHODS: To obtain information about long term post operative bowel function by asking patients to complete four questionnaires. To collate the information provided in a meaningful way using established questionnaires and reporting methods.
RESULTS: Patients identified several areas of concern: Ongoing constipation or diarrhoea that was considered disabling. Continuing tiredness and difficulty concentrating. Financial constraints that were continuing as a result of their surgery. Body image and dissatisfaction with their body, or embarrassment due to the stoma caused patients to feel less attractive generally and were dissatisfied with their body. Ostomists also reported sore skin and leakage from the stoma pouches. Forty three patients do not have satisfactory relief from their bowel function. A third have their bowels opened more than three times a day. Half needed to change their diet and a third feel unable to socialise. Few patients replied to questions about sexual intercourse of those responding males had difficulty in getting or maintaining an errection and females reported pain with intercourse.
CONCLUSIONS: The development of comprehensive information leaflets and pre-discharge discussion with patients about ongoing bowel function. Identification of patients requiring more specialist follow up relating to small bowel bacterial overgrowth or bile salt malabsorption.

P1201

POSTOPERATIV NAUSEA AFTER CYTOREDUCTIVE SURGERY AND HYPERTHERMIC CHEMOTHERAPY TREATMENT - FOCUSING ON CARE AND ENHANCED QUALITY OF CARE

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BACKGROUND: This review considers patients undergoing advanced abdominal surgery, when heated chemotherapy is rinsed in the peritoneal cavity affects the patients recovery. Longer postoperative care is expected for these patients in comparison to patients undergoing other surgery. Cytoreductive surgery [CRS] with Hyperthermal Intraperitoneal Chemotherapy [HIPEC] as a treatment has been implemented in Karolinska University Hospital since autumn 2012.
METHODS: To study the postoperative careflow on ward in patients undergoing CRS and HIPEC to enhance and streamline care measures and achieve better quality of care and clinical outcomes. A care registry was started to register data from the time on the ward and included all patients and had 35 variables.This was a prospective study with consecutive selection. All 138 patients who were admitted in the ward and were planned for CRS and HIPEC from 2012-09-13 to 2015-11-03 were included. After exclusion, according to the exclusions criteria (no HIPEC-treatment or a minor local treatment in wound cavity) resulted in a loss of 28 patients.
RESULTS: A total of 110 patients were audited, 61 women and 49 men. The median age was 60 years and the median length of stay was 16 days. The results showed that the majority (83,6%) of the patients who underwent CRS and HIPEC were affected by nausea in the postoperative phase. There is a statistical significance between the gender where women were more affected then men, P<0,002 (Pearson Chi-Square test). 31 patients did not recieve treatments for nausea according to local guidelines. 24 of these patients belonged to the group that were affected of nausea. Independent of nausea, the bowl movements started again during the first postoperative days (average postoperative day [POD] 3; median POD 2) in the majority of the patients. We could see a difference between how early the patients could self administer oral medication depending on if they were affected by nausea or not. The median value showed a 3 days difference (POD 11; POD 8).
CONCLUSIONS: Compliance to follow local guidelines for prevention and treatment of nausea should be thoroughly persued on the ward for every patient. Preoperative preparations with focus on nausea should be considered for these patients. Verbal and written information to the patients before admitted to the ward contributes to better understanding and patient awareness before the postoperative phase. Local guidelines for ward personel with focus on specific care measures, to prevent and relieve nausea, also enhancing the possibility to self-care.

P1202

PREOPERATIVE STOMA MARKING. INDIVIDUAL PROCEDURE IN FOUR QUADRANTS AS A QUALITY CHARACTERISTIC

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BACKGROUND: Cytoreductive surgery (CRS) with subsequent hyperthermic intraperitoneal chemotherapy (HIPEC) may require the creation of a protective or even permanent stoma. Since it is not always possible to create a stoma in the lower abdominal quadrants, stoma localisation sites both in the lower and upper quadrants must be marked prior to surgery, taking into account the route via the rectus abdominis muscle. The effects of preoperative stoma marking were analysed in our patient population.
METHODS: A retrospective analysis was conducted to evaluate preoperative stoma marking in hospitalised patients who had received consultation at the Hospital of the Order of St. John of God Regensburg. The analysis covered the period between May 2014 and May 2016. Preoperative stoma marking of the abdomen was controlled in standing, seated, lying, and bent-forward patient position, and has been an integral part of the preoperative preparation of elective patients. Data collection and analysis were based on findings identified by clinical specialist nurses for wound, ostomy, and continence, on patient chart information, and on surgery reports.
RESULTS: A total of 267 patients were diagnosed with colorectal cancer, including 42 cases of Pseudomyxoma peritonei; 442 patient cases included malignant neoplasms, ovarian diseases, and peritoneal diseases. In 244 cases, CRS and HIPEC were performed and a stoma created. For these patients, the clinical specialist nurses for wound, ostomy, and continence spent a total time of 249.3 hours on preoperative stoma marking and consultation. The most common intestinal stomas were protective ileostomas, followed by stomas of the descending colon. No problems occurred during postoperative care, and no surgical complications of the created stomas were observed.
CONCLUSIONS: Preoperative stoma marking and patient information are significant quality characteristics in patient care and form a basis for educational action in patient care aiming at the self-care of patients. Moreover, stoma site identification contributes to the prophylaxis of stoma creation failures, care issues, and complications. Thus, stoma care has a considerable impact on the patient's quality of life.

Relevant Nursing Cases

P1300

REVIEW OF PRE-OPERATIVE ITU VISITS

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BACKGROUND: Patient preoperative visits to Intensive Care were established four years ago amended two years ago.All patients between April 2014 and March 2016 a total 359 patients were identified. Within this cohort of patients there were 30 deaths and a sixteen year old who was omitted from the study due to age. A total of 328 questionnaires were posted, with a stamped, addressedm envelope included for the return of the questionnaire. All of the replies were documented in a spread sheet and the replies collated.
METHODS: To review the current practice of discussion followed by a visit to ITU for patients and their relatives. To identify any benefits to the patient of visiting the Intensive Care Unit pre-operatively. The provision of information leaflets/booklets is welcomed by patients as it allows learning at a slower pace.
RESULTS: A total of 328 questionnaires were posted, with 184 returned (56.09%). 103 patients visited ITU pre- operatively, Seven were unable to visit as the unit was too busy and 10 patients declined a visit. One hundred patients found the visit beneficial with sufficient time being allowed for any questions from patients or relatives. Very few (25) could remember their stay in ITU fully, and 31 had no recollection of their ITU stay at all, 18 had little memory of the stay. Patients reported that it helped to reduce anxiety about the unit and the knowledge provided much needed reassurance of where they would wake following the surgery. Meeting members of the ITU team added to the patients feelings of confidence and safety and many patients felt more comfortable with an ITU stay knowing that their relatives were also included in their care. Six patients did not find the visit helpful but did not elaborate on this. A copy of the Guide for Patients was given to 85 patients, and both patients and family members found this helpful.
CONCLUSIONS: A visit to the Intensive care unit is helpful for both patients and their relatives. It helps to reduce stress and provides some reassurance about the machines and the unit generally and the level of care provided. The timing and length of the visit are adjusted to the requirements of the patient and as a recent alternative, photographs of the department have been produced and are discussed with the patient and relatives over coffee in the relatives room, if the unit is too busy for patients to enter the unit. The effectiveness of this will be reviewed at the next audit.

P1301

SUPPORTING THE COMPLEX PATIENT FROM A DISTANCE: EXPERIENCES OF THE CNS TEAM - A CASE EXAMPLE

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BACKGROUND: 46 Year old female had a laparoscopic appendicectomy for adenoma in February 2010. She was referred to Basingstoke and had a complete cytoreduction in March 2010 for a low grade Pseudomyxoma Peritonei. Her first surveillance scan a year later revealed low attenuation material in the right lower abdominal wall, and by September 2011 there was widespread recurrence. The disease remained stable following systemic chemotherapy and the patient requested further surgery. Following a period of intense consultation with the patient and her family she had a major tumour debulking in May 2013. This involved a re-do ileocolic anastomosis, excision of mesenteric mass and excision of the mass adherent to stomach. An excision of abdominal wall was repaired with a biological mesh. During the admission she had a prolonged ileus and an anastomotic leak which was treated with the insertion of a radiological drain (removed September) and antibiotics. Several admissions both locally and at the specialist centre followed, a venting gastrostomy was attempted and home TPN was commenced in 2014. A line infection and an abdominal abscess requiring drainage as well as a palpable lump in her abdomen and a nephrostomy for renal failure increased the family's distress. Abdominal pain, vomiting, bowel obstruction and abdominal sepsis provoked further admission locally. The patient was asked if she would like to be resuscitated in the event of cardiac arrest. She was transferred to Basingstoke for further input and had surgery for two abdominal fistulae. A large jelly filled abscess cavity was evacuated and the fistulae converted into one. Small bowel contents drained from the fistula and into a wound management bag. There was further operative intervention requiring wound debridement and the application of a VAC dressing. Discharge was 10 weeks later when she returned home with community and palliative care support. A large wound management bag was applied as the tumour fistulated further through the abdominal wall. Her husband and mother were very supportive and provided both physical and practical help wherever and whenever required. They too required help and support throughout the protracted care pathway and at times became distressed by some of the events that occurred. Socialising was reduced due to the increasing changes in body image. The patient was reluctant to leave the house in case of leakage from the wound management bag in a public place and she became house bound and dependent on friends and family for support. The CNS team were regularly updated, via telephone calls and emails, with photographs included as the difficulty of managing the fistulating tumour became progressively more complex and several outpatient appointments to discuss the complexity of care were required. The local palliative care team provided great support for both the patient and her family and the District Nursing team helped with wound management.
METHODS: N/A.
RESULTS: N/A.
CONCLUSIONS: It is imperative that services recognise the importance of providing Specialist Nursing care throughout the whole patient pathway. A team approach to this is recommended in order to optimise patient care post discharge.