

# Perforated pyometra is a misleading cause of acute abdomen in elderly women: case report and review of literature

Matteo Nardi,<sup>1</sup> Paola Fugazzola,<sup>2</sup> Giacomo Crescentini,<sup>1</sup> Filippo Paratore,<sup>1</sup> Lucia Morganti,<sup>1</sup> Nicola Zanini,<sup>1</sup> Gian Marco Palini,<sup>1</sup> Luigi Veneroni<sup>1</sup>

<sup>1</sup>General Surgery Department, Infermi Hospital, Rimini; <sup>2</sup>General Emergency and Trauma Surgery Department, Papa Giovanni XXIII Hospital, Bergamo, Italy

## Abstract

Even if acute abdomen is associated with gastrointestinal (GI) perforation in more than 90% of cases, spontaneously perforated pyometra is a rare and misleading cause that gynecologists and general surgeons should suspect in elderly postmenopausal women. We report one case of diffuse peritonitis caused by spontaneous uterine perforation. A 94-year-old postmenopausal female was admitted to emergency department with signs of diffuse peritonitis and seven days history of abdominal pain. Abdominal contrast-enhanced CT-scan showed a large amount of ascites and a small amount of intraperitoneal free-air. One hour after the admission septic shock developed and emergency laparotomy was performed for suspected GI perforation. During laparotomy about 1500 mL of purulent, malodorous but not-fecaloid fluid was found in peritoneal cavity, without evidence of GI perforation. A 10 mm perforation on the anterior part of the uterine fundus was found. A total abdominal hysterectomy with a bilateral salpingo-oophorectomy was performed. Patients died on postoperative day four despite intensive care for multi-organ failure due to septic shock. The hysto-pathology examination showed absence of cancer. Pyometra perforation is a rare cause of acute abdomen with a not negligible mortality and it should be considered in the differential

diagnosis of acute abdomen, especially in elderly patients. The aim of the study is to report our personal experience and a review of the literature of spontaneous perforation of pyometra in patients with no evidence of malignancy.

## Introduction

Pyometra is an uncommon condition defined as an accumulation of purulent material in the uterine cavity with a reported incidence that ranges from 0.1-0.5% to 13.5% in elderly postmenopausal women.<sup>1,2</sup> Normally it causes vaginal discharge, lower abdominal pain and postmenopausal bleeding. However more than 50% of cases are asymptomatic.

Occlusion of cervix drainage associated with atrophy of the genital tract, benign or malignant tumors are the proposed basic mechanisms of spontaneous uterine perforation in peritoneal cavity [0.01-0.05%].

Spontaneous pyometra perforation, causing pneumoperitoneum and peritoneal ascites, is an interesting and misleading cause of acute abdomen.

Gastrointestinal (GI) perforation accounts for more than 90% of acute abdomen and pneumoperitoneum,<sup>2-5</sup> while pneumoperitoneum due to pyometra perforation is recognized in less than 30% of cases.<sup>6,7</sup> Pyometra is usually an intraoperative diagnosis. It is rarely recognized preoperatively due to the presence of pneumoperitoneum that limits ultrasonography (US) accuracy and to the small size of uterine perforation. Malvadkar *et al.* reported transvaginal US for preoperative diagnosis as a simple and economic technique to overcome the traditional sonography limits.

The treatment consists of hemodynamic resuscitation, usually necessary due to sepsis, emergency laparotomy, ascites sampling for microbiological analysis, peritoneal lavage, hysterectomy and drainages.

## Case Report

A 94-year-old woman with a seven days history of diffuse abdominal pain was admitted in the emergency dept. Neither nausea nor vomit was present. She had a history of hypertension and hypercholesterolemia and no previous surgical interventions. The patient's gynaecologic history was unremarkable, and there was no recent or past history of postmenopausal bleeding or vaginal discharge. At the physical examination, her abdomen was distended and showed muscle rigidity, with positive Blumberg and

Correspondence: Paola Fugazzola, General Emergency and Trauma Surgery Department, Papa Giovanni XXIII Hospital, Piazza OMS 1, 24127 Bergamo, Italy.  
E-mail: paola.fugazzola@gmail.com

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Rovsing signs. Bowel sounds were hypoactive. There was no palpable mass. She was hemodynamic instable with tachycardia.

The body mass index was 22. Laboratory studies demonstrated a white blood cell count of  $4350 \times 10^6/L$  and a CRP value of 235.39 mg/dL (normal range  $<0.3$  mg/dL). Abdominal X-ray and US showed pneumoperitoneum and large amount of peritoneal fluid. The computed tomography (CT) scan showed a little amount of free intraperitoneal air and diffuse free-fluid, most represented in right iliac region, associated with dilatation of upper small intestine and bilateral pleural reactive fluid (Figures 1 and 2).

Patient's history, clinical examination and imaging were suggestive for GI perforation. After prompt resuscitation and intravenous antibiotics administration (amoxicillin+clavulanic acid and metronidazole), laparotomy was performed. The presence of free air and purulent fluid (1500 mL) as well as diffuse peritonitis was confirmed. GI tract, gall bladder, and liver were normal. Peritoneal fluid samples for microbiological examination were taken.

During peritoneal exploration a 10 mm perforation on the fundus of the uterus was found. Hysterectomy, bilateral salpingo-oophorectomy and abundant peritoneal lavage were performed. A tube drainage was placed.

After surgery the patient was admitted to the intensive care unit for underlying septic shock.

*Morganella morganii* and *Escherichia coli* were found in peritoneal fluid cultures and piperacillin/tazobactam was given according to the antibiogram.

A subsequent revision of the CT-scan images showed a fluid-filled uterus (Figure 2).

Histological examination confirmed pyometra with no evidence of malignancy or cervical stenosis.

Despite intensive treatment, patient's general conditions did not improve during post-operative period. On postoperative day four the patient developed multi-organ failure irresponsive to the treatment and died.

## Discussion and Conclusions

Senile cervicitis, leiomyoma, cervix carcinoma, forgotten intrauterine device, surgical complications and radiation are the most common causes of uterine drainage modifications.<sup>6-9</sup>

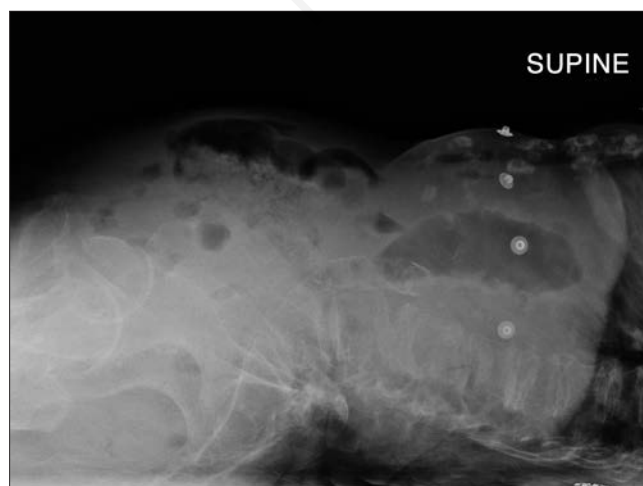


Figure 1. Abdominal X-ray performed at patient's admission.

Malignant disease is present in 35% of cases.<sup>6-9</sup> Only in 10% of cases patients present gynaecological symptoms of altered uterine drainage before pyometra perforation.<sup>4,10</sup> When perforation occurs patients report acute abdominal pain, vomiting, and fever. Generalized peritonitis (40-50%) and GI perforation (30-40%) are the most common preoperative diagnoses in patients with pyometra perforation, with radiological findings of pneumoperitoneum present in only half the cases.

However GI perforation remains the most common cause of pneumoperitoneum in 85-95% of cases.<sup>10,11</sup>

Systematic review of literature demonstrates that spontaneous perforation of pyometra is a difficult and rare preoperative diagnosis (18.2%). It is associated with a high postoperative mortality that exceeds 27.3%<sup>5-7,12-15</sup> and it occurs especially in elderly women (median age: 71.7 years old).



Figure 2. A-C) Images from computed tomography scan performed at patient's admission showing a little amount of free intraperitoneal air and diffuse free-fluid, associated with dilatation of upper small intestine.

In these patients a multidisciplinary approach is mandatory:<sup>4-7,12-15</sup> prompt fluids resuscitation, antibiotics administration, and radiological investigation are the basic steps of the initial management.

Abdominal X-ray often demonstrates pneumoperitoneum and intestinal distension and it should be followed by CT scan. A trans-

vaginal US (that could show fluid accumulation in utero) could help the diagnostic process.

The presence of pneumoperitoneum in these patients could be due to the passage of air through the genital canal or to the presence of gas forming organisms such as *Escherichia coli* and *Bacteroides fragilis*.<sup>4</sup> Table 1<sup>16-42</sup> shows bacterial populations iso-

**Table 1. Bacterial cultures isolations in patients with pyometra perforation: review of literature.**

No.	Authors - Publication year - Reference no.	Age	Preoperative diagnosis	Bacterial culture
1	Hansen - 1985 - 9	67	GI perforation	UN
2	Bui - 1989 - 16	73	GI perforation	<i>Staphylococcus intermedius</i>
3	Sussman - 1989 - 17	85	Peritonitis	<i>Escherichia coli</i>
4	Rasmussen - 1991 - 18	82	GI perforation	<i>E. coli, Bacteroides vulgaris</i>
5	Kaneko - 1994 - 19	56	GI perforation	<i>E. coli, Bacteroides fragilis</i>
6	Kimura - 1994 - 20	72	Peritonitis	-
7	Ikematsu - 1996 - 21	80	GI perforation	<i>E. coli</i>
8	Inui - 1999 - 2	86	GI perforation	<i>E. coli</i>
9	Nakao - 2000 - 22	86	Pyometra perforation	<i>Clostridium sphenoides</i>
10	Chan - 2000 - 23	76	Acute diverticulitis	<i>E. coli</i>
11	Iwase - 2001 - 24	69	Peritonitis	Anaerobes
12	Iwase - 2001 - 24	89	Pyometra perforation	<i>E. coli</i>
13	Yildizhan - 2006 - 5	92	GI perforation	<i>E. coli, B. fragilis</i>
14	Geranpayeh - 2006 - 7	63	GI perforation	Negative
15	Nuamah - 2006 - 8	79	GI perforation	UN
16	Chan - 2006 - 25	73	Pyometra perforation	<i>Klebsiella pneumoniae, Streptococcus viridans</i>
17	Tsai - 2006 - 26	40	Peritonitis	UN
18	Saha - 2008 - 27	60	GI perforation	<i>Staphylococcus aureus</i>
19	Li - 2008 - 15	69	GI perforation	<i>B. fragilis</i>
20	Izumi - 2010 - 28	83	Pyometra perforation	<i>Bacteroides diastonis</i>
21	Ou - 2010 - 12	54	Peritonitis	UN
22	Ou - 2010 - 12	81	Peritonitis	UN
23	Ikeda - 2013 - 11	81	GI perforation	<i>E. coli</i>
24	Ikeda - 2013 - 11	93	GI perforation	<i>K. pneumoniae, Enterococcus faecalis</i>
25	Ikeda - 2013 - 11	74	Pyometra perforation	<i>E. coli, Staphylococcus epidermidis</i>
26	Ikeda - 2013 - 11	79	Acute appendicitis	<i>E. coli</i>
27	Ikeda - 2013 - 11	66	Pyometra perforation	<i>K. pneumoniae</i>
28	Lim - 2011 - 29	89	GI perforation	<i>E. coli</i>
29	Sahoo - 2011 - 30	50	GI perforation	UN
30	Shapey - 2012 - 13	84	GI perforation	UN
31	Hagiya - 2013 - 31	86	Pyometra perforation	<i>Actinomyces</i>
32	Mallah - 2013 - 32	78	Incarcerated hernia	UN
33	Mallah - 2013 - 32	61	Rupture of ovarian abscess	UN
34	Abu-Zaid - 2013 - 14	63	Pyometra perforation	<i>Streptococcus constellatus</i>
35	Choudhary - 2013 - 41	65	Peritonitis	UN
35	Palmer - 2013 - 35	60	GI perforation	UN
36	Patil - 2013 - 33	74	ND	UN
37	Chauhan - 2014 - 40	66	GI perforation with peritonitis	<i>E. coli</i>
38	Kitai - 2014 - 10	66	GI perforation	<i>E. coli, B. fragilis</i>
39	Yamada - 2015 - 4	70	GI perforation	<i>E. coli, B. fragilis</i>
40	Uno - 2015 - 34	90	GI perforation	<i>E. coli, Prevotella</i>
41	Yin - 2016 - 36	67	Peritonitis	<i>S. epidermidis</i>
42	Malvadkar - 2016 - 37	65	Pyometra perforation with peritonitis	UN
43	Singh - 2016 - 40	60	GI perforation with peritonitis	<i>S. aureus</i>
44	Nardi - 2016 - Our case	94	Peritonitis	<i>Morganella morganii, E. coli</i>

**Table 2. Site of uterine perforation in spontaneously perforated pyometra.**

Perforation site	Total patients (44)
Fundus	72.7%
Anterior	9%
Posterior	6.8%
Unknown	11.3%

lated in patients with pyometra perforation. In most cases cultures showed the presence of *E. coli* (38.6%).

The perforation site is the uterine fundus in most cases (72.7%) (Table 2).

Surgical management always consists in a total abdominal hysterectomy with or without bilateral salpingo-oophorectomy, drainage and irrigation of pelvic and abdominal cavity, postoperative intensive care support, and broad-spectrum antibiotics.<sup>5-7,12-15</sup>

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