Case Report

Damage control surgery for spontaneous perforation of pyometra with septic shock: a case report

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Background: Although spontaneous perforation of pyometra is very rare, it sometimes causes severe peritonitis, leading to lethal conditions. Damage control surgery reportedly improves the survival of critically ill patients; however, there has been no report describing damage control surgery for ruptured pyometra.

Case presentation: An 83-year-old postmenopausal woman with generalized peritonitis and septic shock was admitted and underwent emergency laparotomy. Abbreviated surgery was carried out because of progressing septic shock, and planned reoperation was carried out 2 days after the initial surgery. Histopathological examination revealed the perforation of pyometra with no evidence of malignancy. The patient was discharged on the 32nd postoperative day in stable condition.

Conclusion: We report a case of spontaneous perforation of pyometra with severe septic shock successfully treated by damage control surgery. Damage control surgery is a useful treatment option for hemodynamically unstable patients with diseases in the field of obstetrics and gynecology.

Key words: Case report, peritonitis, emergency surgery, elderly woman, open abdomen management

INTRODUCTION

SPONTANEOUS PERFORATION OF pyometra is a very rare condition, which sometimes causes severe sepsis and septic shock, leading to lethal conditions.[1,2] Although damage control surgery (DCS) reportedly improves the survival of critically ill patients,[3] there has been no report describing DCS for ruptured pyometra. Here, we report a case of spontaneous perforation of pyometra with septic shock that was successfully treated with DCS.

CASE PRESENTATION

AN 83-Year-old postmenopausal woman was admitted to the emergency department because of fever and diffuse abdominal pain. The patient had a history of hypertension. Her gynecological history was unremarkable, and there was no history of postmenopausal bleeding or vaginal discharge. She appeared acutely ill, and her body temperature was 38.9°C. Her pulse rate and blood pressure were 146 b.p.m. and 88/35 mmHg, respectively. Oxygen saturation was 100% without administering supplemental oxygen, and the respiratory rate was 20 breaths/min. Physical examination revealed rebound tenderness, muscular rigidity in the lower abdomen, and distention. Vaginal examination showed no cervical or vaginal anomalies, vaginal discharge, or detectable pelvic mass. Laboratory studies on admission were as follows: white blood cell count, 6,930/μL; hemoglobin, 8.3 g/dL; C-reactive protein, 9.61 mg/dL; and procalcitonin, 41.00 ng/mL. The serum lactate level increased to 82.0 mg/dL in arterial blood gas analysis. In this patient, a vasopressor was administered for septic shock in the emergency room following fluid resuscitation. Computed tomography (CT) revealed a large amount of ascites in the abdominal cavity, and free air was mainly detected in the upper abdomen. In addition, CT imaging showed a fluid-filled uterus with small air bubbles in the uterus cavity and perforation at the fundus on the right side (Fig. 1).

Emergency laparotomy was performed for generalized peritonitis with septic shock. Approximately 1,000 mL purulent fluid was detected in the peritoneal cavity. A 2 × 1-cm-sized perforation was observed in the uterine fundus (Fig. 2).

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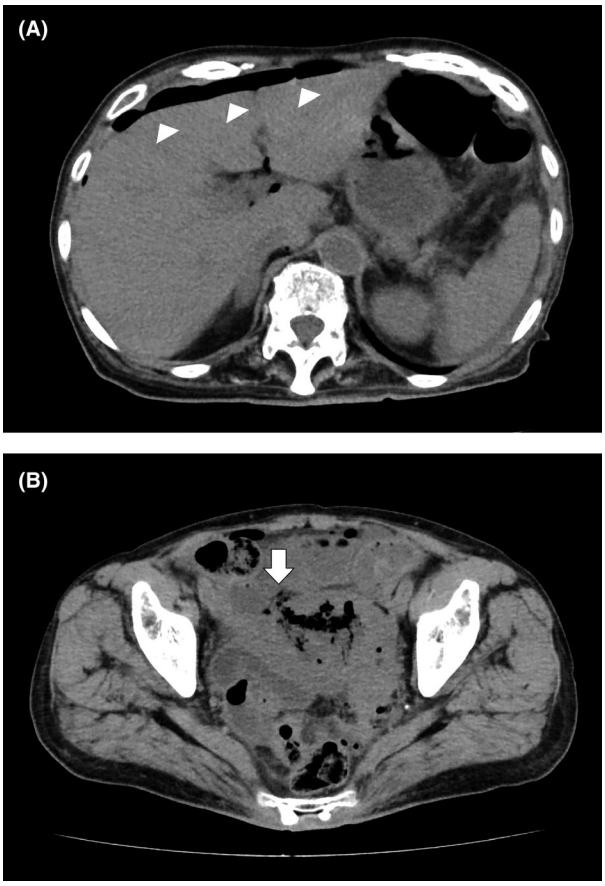

Fig. 1. Computed tomography (CT) images of an 83-year-old woman with spontaneous perforation of pyometra. A, CT image shows the presence of a large amount of fluid within the abdominal cavity and free intraperitoneal air (white arrowheads), mostly in the upper abdomen. B, CT image shows a fluid-filled uterus with small air bubbles in the uterus cavity and perforation at the fundus (white arrow) on the right side.

The mean arterial pressure was approximately 65 mmHg even when 0.4 μg/kg/min intraoperative norepinephrine was given together with red blood cell bolus, we undertook DCS. In the initial surgery, a direct suture of the uterine perforation, decontamination in the abdominal cavity, and temporary abdominal closure using ABThera (Kinetic Concepts, San Antonio, TX, USA) were rapidly carried out. The operation time of the initial surgery was 43 min, and there was minimal intraoperative bleeding. At the end of the initial surgery, 0.5 μg/kg/min norepinephrine and 0.03 U/min vasopressin were given to maintain blood pressure. Planned reoperation was carried out 2 days after the initial surgery because the vasopressor was no longer needed, and the hemodynamics were stable following the open abdomen management, prompt resuscitation, and administration of i.v. antibiotics in the intensive care unit. Consequently, total hysterectomy, bilateral salpingo-oophorectomy, and definitive abdominal closure were carried out, and decontamination of the abdominal cavity was achieved. *Proteus mirabilis* was cultured from the pus in the abdominal cavity, and *Prevotella intermedia* was cultured from the blood. Histopathological examination revealed pyometra with no evidence of malignancy. The postoperative course is shown in Fig. 3. The patient recovered uneventfully and was discharged on the 32nd postoperative day in stable condition.

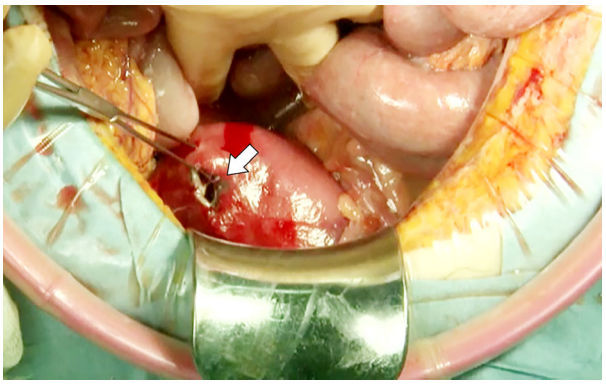

Fig. 2. Intraoperative findings in an 83-year-old woman with spontaneous perforation of pyometra, showing approximately 1,000 mL of purulent fluid in the peritoneal cavity. A perforation measuring 2 × 1 cm in size is observed in the uterine fundus (white arrow). There are no findings suggestive of malignancy in the uterine body or cervix. The sigmoid colon partially adheres to the uterus; however, there are no other abnormal findings in the gastrointestinal tract, gallbladder, and liver.

DISCUSSION

PYOMETRA IS DE fined as an accumulation of pus in the uterine cavity caused by inadequate drainage of endometrial secretions through the cervix.[1] It has been reported to account for 0.1%–0.5% of all gynecological admissions and 13.6% of disorders of elderly postmenopausal women.[4,5]

The frequency of spontaneous perforation of pyometra is 0.01%–0.05%, indicating that it is a very rare condition. It is reported to occur at a site of degenerative or necrotic change after pyometra, which develops due to the impairment of natural drainage through the cervix.[4] Yin *et al.* reported 81 cases of spontaneous perforation of pyometra between 1949 and 2015.[6] In this report, abdominal pain, fever, and vomiting were observed in 78 (96.3%), 36 (44.4%), and 25 (30.8%) cases, respectively. Gynecological symptoms, including purulent vaginal discharge (7.4%), genital bleeding (3.7%), and lower abdominal pain (3.7%), occurred in

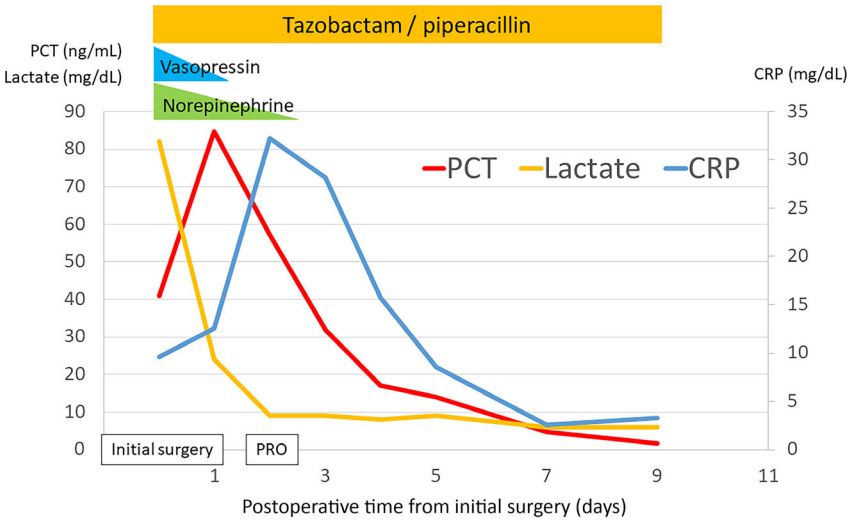

Fig. 3. At initial surgery for an 83-year-old woman with spontaneous perforation of pyometra, 0.4 μg/kg/min epinephrine was given to maintain intraoperative hemodynamics, and 0.5 μg/kg/min norepinephrine and 0.03 U/min vasopressin were given at the end of surgery. Planned reoperation (PRO) was carried out 2 days after the initial surgery. Vasopressin is no longer needed before PRO, and norepinephrine treatment was completed after PRO. Intravenous antibiotics were continued until 9 days after initial surgery. The patient was discharged on the 32nd postoperative day in stable condition. CRP, C-reactive protein; PCT, procalcitonin.

only 10 cases (12.4%). Interestingly, of the 76 preoperative diagnoses, the correct diagnosis was established in only 16 cases (21.1%); therefore, this report shows the difficulty of preoperative diagnosis of pyometra. The most prevalent preoperative misdiagnoses of perforation of pyometra were gastrointestinal tract (47.4%), pneumoperitoneum (44.7%), and generalized peritonitis (39.5%). Therefore, general and acute care surgeons should consider the perforation of pyometra as a differential diagnosis of acute abdomen in elderly women. The mortality rate for spontaneous perforation of pyometra is reported to be as high as 22%–40%.[6–8] Most of the patients died of septic shock and multiple organ failure. Thus, the treatment of pyometra perforation is often carried out for fatal and critically ill patients. Therefore, new strategies are required to reduce the associated high mortality.

Staged laparotomy is designed to ensure immediate survival of selected trauma patients.[3] Damage control surgery is a well thought-out strategy that prioritizes recovery of physiological conditions above definitive organ repair or anatomic reconstruction[3]; however, the definitive indications and effects of DCS on severe peritonitis are still under discussion. If source control is unachievable or patients cannot tolerate long surgery due to unstable hemodynamics with septic shock requiring high-dose norepinephrine, DCS should be undertaken, avoiding definitive surgery to save the patient's life. Damage control surgery, as an abbreviated surgery, for panperitonitis can help achieve reliable and rapid decontamination by performing source control with simple tactics and effective drainage of the peritoneal cavity with control of effluent.[9] In this case, the patient was preoperatively diagnosed with septic shock; therefore, we rapidly undertook source control with simple techniques to decontaminate the abdominal cavity and temporary abdominal closure in the initial surgery. Intraoperatively, the uterine tissue around the perforation was necrotic, and it was considered difficult to repair the suture alone or treat it with drainage alone. After performing aggressive resuscitation to improve the physiological condition, definitive surgery (total hysterectomy and bilateral salpingo-oophorectomy) and definitive abdominal closure were undertaken as a planned reoperation.

Moreover, this case report is, to the best of our knowledge, the first report of DCS being carried out for pyometra with severe septic shock. It has been suggested that DCS has some effect on improving fascial closure and reducing the risk of abdominal compartment syndrome.[3,9,10] However, most of these reports have shown effects on gastrointestinal peritonitis and acute pancreatitis. As far as we know, there have been no reports describing DCS for severe peritonitis with septic shock due to pyometra perforation. We believe that the initial abbreviated surgery facilitated improved physiological condition, including septic shock, and contributed significantly to saving the patient's life.

CONCLUSION

WE EXPERIENCED A case of spontaneous perforation of pyometra with severe septic shock

successfully treated by DCS. The effectiveness of DCS for severe peritonitis with septic shock remains uncertain; however, it could similarly be a useful management for hemodynamically unstable patients with diseases in the field of obstetrics and gynecology. Acute care surgeons should always consider DCS as a useful treatment option for spontaneously ruptured pyometra in severe peritonitis.

DISCLOSURE

Approval of the research protocol: N/A.
Informed consent: Informed consent was obtained from patient.
Registry and the registration no. of the study/trial: N/A.
Animal studies: N/A.
Conflict of interest: None.

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