Case Report

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Minimally Invasive Approach to Benign Postmenopausal Pyometra and Spontaneous Uterine Rupture

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Abstract

Pyometra, the accumulation of pus in the uterus, is typically associated with cervical occlusion and malignancy. Rarely, pyometra progresses to spontaneous uterine rupture (SUR) and sepsis, which carries high morbidity and mortality. Definitive management is surgical, typically laparotomy and hysterectomy. We present a case of pyometra in a 65 year-old female. Despite cervical patency and absence of malignancy, her pyometra progressed to SUR and septic shock. She was successfully managed with a staged minimally invasive approach consisting of laparoscopic abdominal washout and drain placement followed by total laparoscopic hysterectomy. Though laparotomy has been the primary approach to pyometra complicated by spontaneous uterine rupture, a laparoscopic approach may be considered.

Keywords: Pyometra; Spontaneous uterine rupture; Total laparoscopic hysterectomy

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Introduction

Pyometra, defined as an accumulation of purulent material in the uterine cavity, occurs in 0.01-0.05% of gynecologic patients [1-7]. It most commonly occurs in elderly women, age 60 and older, with an incidence of 13.6% in this population [3,7,8]. The incidence increases with age 19.1% of pyometra occur in the eighth decade and 33.3% in the ninth decade [7]. While malignant cervical occlusion is the most common etiology of pyometra [2-5], the reported percentage of pyometra attributable to malignancy is extremely variable from 3.5% to 60% [1,4-6]. It has been suggested that the incidence of other benign causes may be increasing [4,6]. The most common non-malignant causes of pyometra include leiomyomas, polyps, history of cervical surgery, radiation cervicitis, atrophic cervicitis, puerperal infections, and congenital cervical anomalies [1-7]. Additionally, pyometra is more common in women with disabilities or with limited mobility likely due to an ascending bacterial infection in the setting of poor hygiene [7]. The classic presentation includes vaginal discharge, lower abdominal pain, and uterine enlargement [3-5]. However, fewer than 30% of cases present this way, and more than 50% of patients are asymptomatic [4,6,9]. A rare, life-threatening complication of pyometra is spontaneous uterine rupture (SUR) [1-7]. This has been attributed to necrotic and degenerative changes occurring in the uterine wall in response to the pyometra [3]. We present a case of benign SUR in the setting of pyometra without cervical occlusion.

Case Report

A 65-year-old G3P3 female with a BMI of 22.9 kg/m^2 presented to her emergency department with acutely worsening periumbilical pain of two weeks duration, with nausea and constipation. Her medical history was notable for nonischemic cardiomyopathy status post biventricular pacemaker and implantable cardioverter defibrillator placement, nonobstructive coronary artery disease, functional paraplegia, and methamphetamine use. Her surgical history was significant for cholecystectomy and bilateral tubal ligation. She denied vomiting or fevers. Evaluation was significant for leukocytosis of 22,000 K/μL, C-reactive protein of 12 mg/L, and urinalysis positive for leukocyte esterase. Her hemoglobin, lactate, lipase, and amylase were within normal limits. Computed tomography (CT) of the abdomen and pelvis showed a distended endometrial canal with an 8.7 cm stripe concerning for malignancy. She was discharged to home on cephalexin for treatment of a urinary tract infection and referral

for outpatient gynecology work-up. She returned the following day for worsening abdominal pain. Repeat CT abdomen and pelvis revealed a thickened endometrium of 6.6 cm with concern for malignant infiltration of the fundal endometrium and a small amount of ascites. She was admitted for further evaluation and pain control. That evening, she developed intractable abdominal pain, and a repeat CT scan was performed which demonstrated interval decompression of the uterus from the first and second CT, concerning for uterine rupture. Abdominal x-rays were negative for pneumoperitoneum. A bedside pelvic exam and endometrial biopsy were attempted, but they were unsuccessful due to pain. Repeat labs were significant for leukocytosis of 13,300 K/µL, hemoglobin 11.6 gm/dL, lactic acid elevation to 3.7 mmol/L, AST of 97 U/L, ALT of 72 U/L, lactate dehydrogenase of 326 U/L, CK-MB of 9.4 ng/mL. She was transferred to a tertiary care institution for suspected SUR and management by the gynecologic oncology service.

During the transfer, the patient became hemodynamically unstable. Upon arrival, her blood pressure was 60/30 mmHg with tachycardia to 105 bpm, and she was in respiratory distress. She was afebrile. She was immediately sedated and intubated. Pressors and broad-spectrum antibiotics were started (piperacillin-tazobactam and vancomycin). She was admitted to the surgical intensive care unit (ICU) for stabilization.

The differential initially included cardiogenic and septic shock, with hemorrhagic shock lower on the differential as her hemoglobin was stable from the preceding day at 13.1 gm/dL. A bedside echocardiogram on ICU admission showed an estimated ejection fraction of 50 percent. Blood and urine cultures were collected. A COVID-19 test was negative. Repeat CT of the abdomen and pelvis confirmed a decompressed uterus when compared to images from the outside CT scans, as well as small to moderate volume abdominopelvic fluid concerning for hemoperitoneum, ascites, or infection. A pelvic exam revealed no vaginal discharge, suggesting that the intrauterine fluid collection previously seen had not been evacuated through the cervix. Given these findings, the patient was determined to be in septic shock; presumably as a result of SUR. Operative management was initially deferred in order to allow stabilization with resuscitation in the ICU.

On hospital day (HD) 2, the patient underwent diagnostic hysteroscopy, dilation and curettage, diagnostic laparoscopy, abdominal washout, and drain placement. Cervical dilators were easily passed through the cervix, and once dilated to a 25 Pratt, copious amounts of purulent discharge was evacuated from the uterus. Hysteroscopy was unable to demonstrate a site of perforation, but rapid loss of hydrodistension was noted, thus heightening suspicion for perforation. Upon laparoscopy, white purulent fluid was present throughout the pelvis and fibrinous deposits diffusely coated all intraperitoneal surfaces **(Figure 1).** Inspection of the uterus revealed a small posterior wall perforation with a surrounding subserosal hematoma **(Figure 2).** Given the degree of intra-abdominal inflammation and presumed morbidity associated with concurrent hysterectomy, decision was made to defer hysterectomy until source control was improved and inflammation reduced following drain placement and antibiotic administration. After completion of the laparoscopic washout, the patient returned to the ICU. On HD3/post-operative day (POD) 1, her pressors were weaned, and she was extubated. Her leukocytosis improved. Her blood cultures were without bacterial growth. Peritoneal cultures obtained at the time of diagnostic laparoscopy were notable for growth of *Escherichia coli* and *Actinomyces turicensis.* Thus, Vancomycin was discontinued on HD4/POD2. She was transferred out of the ICU on HD5/POD3, and pathology from the dilation and curettage returned with evidence of inflammation and tissue necrosis but without evidence of malignancy.

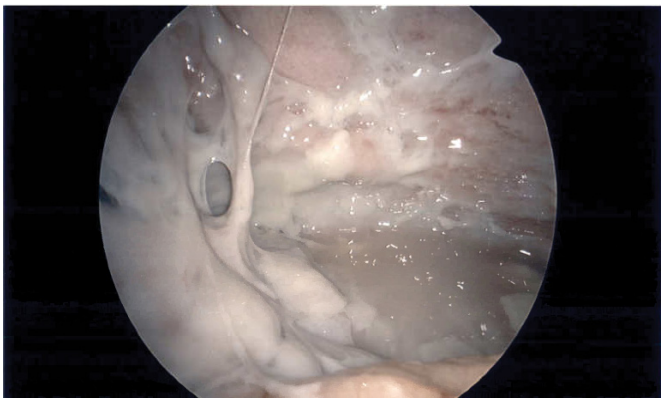

Figure 1 Laparoscopy on HD2 showing purulent fluid was present throughout the pelvis and fibrinous deposits diffusely coated all intraperitoneal surfaces.

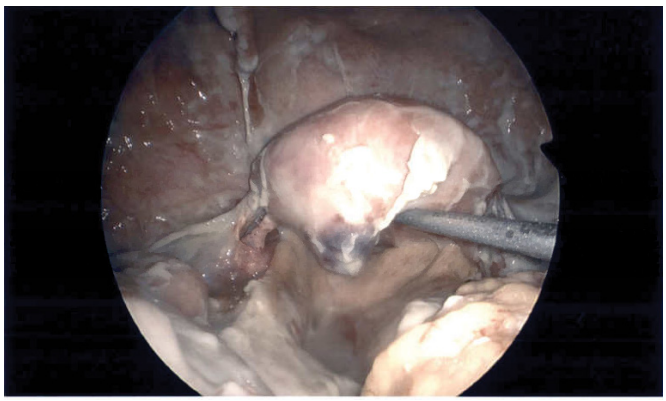

Figure 2 Laparoscopy on HD2 revealing a small posterior wall perforation with a surrounding subserosal hematoma.

Despite prior daily improvement in the patient's leukocytosis, fever curve, blood pressures and pain, she acutely decompensated on HD6/POD4. She was found unresponsive by nursing and was transferred back to the ICU with recurrent hypotension requiring multiple pressors for stabilization. She was again intubated, and vancomycin was re-started. Her lactic acid, which had been normal throughout her admission, had risen to 18 mmol/L, and her hemoglobin had dropped to 5.8 gm/dL. A CT angiogram of the chest, abdomen and pelvis was remarkable for a large right-sided retroperitoneal hematoma with active

extravasation. She then underwent embolization of the right L5 and internal iliac arteries performed by interventional radiology. Additionally, a right-sided chest tube was placed to manage a pneumothorax noted on chest imaging, which was suspected to be a complication of central line placement. Labs were also notable for an INR of 2.2 and elevated transaminases with an AST of 460 U/L and ALT of 207U/L (from 65 U/L and 48 U/L, respectively); these were suggestive of coagulopathy and shock liver. This acute decompensation was attributed to worsening sepsis and hemorrhage. Despite embolization and blood product resuscitation, the patient was persistently hypotensive. Thus, her source control was determined to be inadequate with the drain, and the decision was made to proceed with hysterectomy. She underwent total laparoscopic hysterectomy and bilateral salpingectomy on HD7/POD5. At the time of her procedure, resolution of the purulent and fibrinous material coating the peritoneum was noted **(Figure 3),** in additional to the large right sided retroperitoneal hematoma. Adjacent to the hematoma was a markedly dilated and dusky appearing cecum with a serosal rent. The umbilical incision was extended to further examine the cecum, and general surgery was consulted intraoperatively. General surgery decompressed the cecum by creating a full thickness defect and performed a double layer closure. Normal caliber, healthy appearing bowel was noted proximal and distal to the cecum, so the cecal dilation was felt to be reactive due to the large right-sided retroperitoneal hematoma. The patient's abdomen was left open, and an Abthera dressing was placed with plans for re-exploration in 24-48 hours to re-examine the cecal repair and viability of the bowel.

Following the hysterectomy, the patient's condition improved. On HD9/POD7/POD2, pressors were fully weaned, and vancomycin was again discontinued. She was taken to the operating room for abdominal closure and re-examination of her cecum. The site of prior cecal repair was intact, and the bowel was healthy in appearance. The fascia was closed primarily. The patient was then extubated on HD10/POD8/POD3 and transferred out of the ICU on HD12/POD10/POD5. Pathology from the hysterectomy returned showing evidence of acute endomyometritis, serositis, and extensive tissue necrosis; no malignancy was identified. Antibiotics were discontinued HD13/POD11/POD6. The patient's chest tube was removed on HD21/POD19/POD14. She was discharged to a long-term acute care hospital for continued rehabilitation on HD25/POD23/POD18 to complete her recovery. She returned to clinic approximately 2 months later and was back to her usual state of health.

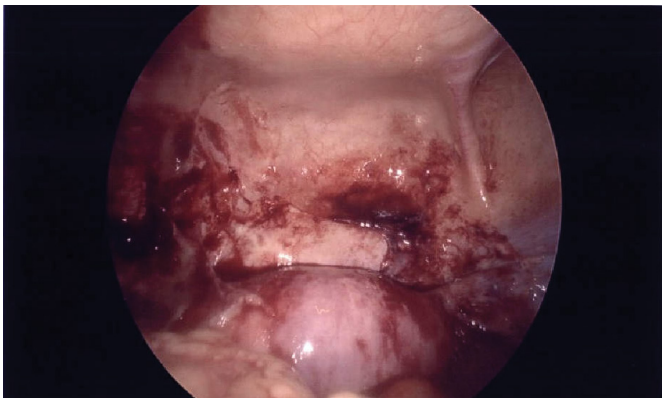

Figure 3 Laparoscopy on HD7 showing resolution of the purulent and fibrinous material coating the peritoneum.

Discussion

Pyometra is the accumulation of purulent material in the uterine cavity. It typically results from cervical outlet obstruction. Cervical outlet obstruction can be sequelae of malignant and benign pelvic tumors, pelvic radiation, cervical procedures, dilation and curettage, cervicitis, and congenital cervical anomalies [1-7]. However, as our case report shows, pyometra may also occur with a patent cervix. The risk of developing pyometra increases with age and in women with disabilities or limited mobility [3,7]. The risk also increases in the setting of gynecologic malignancies, which are the most common cause of pyometra [1,4-6]. Importantly, the clinical suspicion for malignancy must be high in an elderly patient with pyometra. It is unknown at this time whether history of cardiovascular disease, diabetes, or rheumatoid arthritis increases the risk of pyometra, although they are documented multiple times in the literature [2,4,7,9]. While it is a rare occurrence, pyometra can result in the life-threatening complication of SUR if left untreated.

Pyometra is asymptomatic in 50% of patients, and symptomatic patients most commonly endorse symptoms, such as fever, vaginal discharge, lower abdominal pain, and uterine enlargement [3-6,9]. Less commonly reported symptoms include hypotension and new-onset ascites [10]. Laboratory tests will often show significant leukocytosis [2,5-7,10]. Multiple diagnostic imaging modalities have been used in cases of pyometra complicated by SUR. Concerning findings include an abdominal X-ray showing pneumoperitoneum, ultrasound showing free fluid in the abdomen and pelvis or an enlarged uterine body with fluid or gas, and CT abdomen and pelvis showing air or fluid in the uterine or abdominal cavities [1-4,6,7].

Current management for patients with pyometra, with or without SUR, involves exploratory laparotomy and eventual total abdominal hysterectomy [1-5,9,10]. Here, we describe a staged minimally invasive approach. Because the patient's abdomen was significantly distended, we performed an open laparoscopic entry technique during both procedures to mitigate the risk of an unrecognized bowel injury and vascular injury. We encountered inflamed and distended bowel due to her peritonitis. The majority of the patients in prior case reports received bilateral salpingo-oophorectomy at the time of their total abdominal hysterectomy. However, it is not known at this time whether or not bilateral salpingo-oophorectomy is necessary for current management of pyometra. This patient's ovaries were densely adherent to the retroperitoneum due to inflammation from infection. We thus omitted the oophorectomy portion of the procedure in the interest of minimizing operative time and morbidity in an already critically ill patient. Ultimately, the cornerstone of treatment rests on identification of pyometra by imaging and management via surgical intervention to achieve source control. While we

attempted to obtain source control with a laparoscopic abdominal washout and drain placement, this ultimately proved insufficient, and the patient required a hysterectomy in order to recover.

Conclusion

Our case emphasizes the possibility of pyometra without cervical occlusion. Though our patient did not ultimately have a cancer, the suspicion for malignancy should be high. Consideration should be given to management via total hysterectomy, and though the literature describes a laparotomy as the primary approach, a laparoscopic approach may be considered.

Conflict of Interest

The authors declare no conflict of interest.

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Ethical Approval

This case report was reviewed by the Institutional Review Board at the University of Iowa. It was determined that our report did not meet the regulatory definition of human subjects and did not require review and approval by the IRB.

Data Availability

The authors confirm that the data supporting the findings of this study are available within the article. Further data is available on request from the corresponding author.

Acknowledgement

No other participants other than the listed authors provided manuscript assistance.

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