Spontaneous uterine rupture secondary to pyometra in a cervical cancer patient: A case report*

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ABSTRACT

Pyometra, an accumulation of pus within the uterine cavity, is a rare gynecologic disease with an incidence of 0.01-0.5% among all gynecologic patients and 13.6% among elderly gynecologic patients.[1] Pyometra in itself is rare, much so is uterine rupture occurring secondary to it. No local data reporting incidence of ruptured pyometra in the Philippines has been published. This is a case of a 63-year-old Gravida 5 Para 5 (5-0-0-4), with Cervical Endometrioid Adenocarcinoma Stage IIIB, presented with abdominal pain. Whole abdominal Computed Tomography scan revealed pneumoperitoneum. Initial assessment was pneumoperitoneum probably secondary to ruptured viscus. The patient underwent exploratory laparotomy which revealed ruptured pyometra. Subsequent management included drainage, culture guided antibiotics, radiotherapy and brachytherapy. Spontaneous rupture of pyometra is a serious medical condition which requires an accurate diagnosis in order to arrive in appropriate surgical and medical management. However, pre-operative diagnosis is difficult despite the presence of advanced imaging techniques, hence high level of suspicion is warranted in identifying this condition.

Keywords: uterine rupture, ruptured pyometra, cervical carcinoma

INTRODUCTION

Pyometra is a rare gynecologic occurrence. It comprises 0.01-0.5% among all gynecologic patients and 13.6% among elderly gynecologic patients.[1] Pyometra in itself is rare, much so is uterine rupture occurring secondary to it. Lui et al. (2015) conducted a retrospective review of women diagnosed to have pyometra from January 2003 to December 2010. There were 57 patients identified and reviewed. Of the 57, not a single patient led to spontaneous uterine rupture.[3] To date, there are only approximately 50 cases of ruptured pyometra that are published in English literature, of which around 9 cases have a concomitant cervical carcinoma, our index patient being the 10th reported case. Pyometra is the accumulation of pus within the uterine cavity which is commonly caused by a blockage or compromise in the outflow tract of the uterus. The accumulated pus within the uterus causes gradual enlargement of the organ that will lead to thinning of its wall and less frequently, subsequent spontaneous rupture may follow. This is usually manifested as generalized peritonitis among most patients who develop this sequela.[9] Among the reported cases, genital tract malignancies and the consequences of its management, specifically radiotherapy, has been shown to be the most common cause of pyometra.[3] The clinical manifestations of pyometra range from gynecologic presentation to non-specific symptoms. In the rare event that pyometra is complicated by spontaneous rupture, clinical presentation becomes more non-specific. Once ruptured, abdominal pain and subsequently, acute abdomen follows. Due to the non-specific nature of the clinical manifestations of ruptured pyometra, a vast number of differential diagnoses may be entertained; this makes accurate pre-operative diagnosis more difficult. With abdominal pain being the most common chief complaint, the differential diagnosis would be based on other causes of a surgical acute abdomen. Among patients reported to have perforated pyometra secondary to cervical carcinoma, as much as 60% were pre-operatively diagnosed with generalized peritonitis, half of which including the index patient was misdiagnosed to have ruptured viscus. Only 30% of the reported cases were correctly diagnosed preoperatively with ruptured pyometra. Pneumoperitoneum was seen in as much as 40% of the cases, which includes the index patient. This further poses confusion in diagnosing ruptured pyometra because 85-90% of cases of pneumoperitoneum was reported to be associated with gastrointestinal perforation.[17] Because of low index of suspicion and because of non-specific manifestations similar to other more common disease entities, in most cases, it is only intraoperatively that ruptured pyometra is diagnosed. Due to a challenging preoperative diagnosis of pyometra, choice of appropriate diagnostic modalities could help in accurately identifying this catastrophic event. Computed Tomography of the whole abdomen and Ultrasonography

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are some of the diagnostic modalities that can be utilized in diagnosing ruptured pyometra. However, despite the presence of advanced imaging techniques, accurate pre-operative diagnosis of ruptured pyometra remains to be challenging. Hence, a high index of suspicion among post-menopausal patients presenting with abdominal pain and with a history of genital tract occlusion could aid in diagnosing ruptured pyometra pre-operatively. Once a diagnosis of acute abdomen is established, an immediate laparotomy must be performed. The definitive management of ruptured pyometra is total abdominal hysterectomy with or without bilateral salpingo-oophorectomy, thorough peritoneal lavage and drainage, and prompt antibiotic coverage.[15,18] However, total abdominal hysterectomy is not always possible, especially in cases that are complicated by malignancy. In such cases, copious peritoneal lavage and toilette, drainage and prompt antibiotic coverage should be strictly done. The success of the management of ruptured pyometra depends on the clinical presentation of the patient upon admission, the underlying cause of the rupture and co-morbidities present in the patient. In the case report of Saha et al (2008), it was noted that as much as 73% of cases of ruptured pyometra not associated with any malignancy had a favorable prognosis for survival while only 33% of cases associated with malignancy survived.[19] Among the cases of ruptured pyometra with associated cervical carcinoma that underwent peritoneal lavage and drainage, 75% (3 out of 4, including the index patient) had a favorable outcome for survival. Among those who were managed with hysterectomy with or without bilateral salpingo-oophorectomy, 50% (3) had an unmentioned outcome, while only 17% (1) had a favorable outcome for survival.

Review of PubMed/Medline and Herdin using the keywords uterine rupture + pyometra and hand search through archives of Philippine Obstetrics and Gynecology Society yielded no local data discussing pyometra or its spontaneous rupture in the Philippines. Hence we present a case of such with the subsequent management undertaken.

CASE REPORT

This is a case of a 63-year-old Gravida 5 Para 5 (5-0-0-4), menopause for 18 years, who came in due to abdominal pain that started 2 days prior to consulting. The patient is a newly diagnosed case of Cervical Endometrioid Adenocarcinoma Stage IIIB, one month prior to consultation, initially presented as post-menopausal bleeding. Internal examination revealed a cervix converted into a nodular mass with central excavation, involving the anterior middle third of the vagina, small corpus, with fixed parametria. Cervical tissue biopsy was done, which revealed endometrioid adenocarcinoma. The patient underwent Computed Tomography scan of the whole abdomen, which showed mild left hydronephrosis (Appendix A). She was undergoing laboratory examinations as part of her clearance for a planned radiation therapy when she experienced generalized abdominal pain, crampy in character, non-radiating, with increasing severity, from pain score of 5/10 to 10/10, associated with episodes of high-grade fever and vomiting. No changes in bowel movement nor urinary symptoms were noted. The patient has no other co-morbidities nor history of previous surgery. There was no known history of malignancy or any heredofamilial illnesses in the family. She is a non-smoker and not an alcoholic beverage drinker. She had regular monthly menstruation since the age of 18, using up to 2 pads per day, lasting for 3 days and experienced menopause at the age of 45. She had one monogamous sexual partner and did not have history of oral contraceptive pill use. All of the five pregnancies were carried to term, delivered by normal spontaneous delivery with no fetal and maternal complications.

At the Emergency Department, the patient had generalized abdominal pain, a pain score of grade 10/10, with the following vital signs: normotensive at 120/70 mmHg, tachycardic at 120 beats per minute, slightly tachypneic at 23 cycles per minute and afebrile at 36.8 degree Celsius. Physical examination revealed normal systemic physical examination findings, the abdomen was soft but with guarding and generalized direct tenderness. Diagnosis during that time was acute abdomen.

Work-up for identification of the cause of acute abdomen was done. Complete blood count showed hemoglobin of 13.3 g/dl and white blood count of 9,730 mm^3 (Appendix B). Blood chemistry showed normal serum creatinine, blood urea nitrogen, serum electrolytes, lipase and amylase (Appendix C). Urinalysis showed urinary tract infection (Appendix D). A scout film of the abdomen was also performed which showed pneumoperitoneum (Appendix E). The patient then underwent Computed Tomography Scan of the whole abdomen with intravenous contrast which revealed moderate pneumoperitoneum of indeterminate etiology (Appendix F), for which an initial assessment of pneumoperitoneum probably secondary to ruptured viscus was made.

The patient was started on an intravenous antibiotic (piperacillin-tazobactam) and underwent exploratory laparotomy by the General Surgery service with an intraoperative referral to Gynecologic Oncology service. Intraoperatively, purulent intraperitoneal discharge was noted, which was evacuated and subsequently sent to the laboratory for gram stain and culture and sensitivity.

Culture studies of the purulent intraperitoneal discharge showed few growth of *Corynebacterium* species sensitive to azithromycin, benzylpenicillin, clindamycin, erythromycin, linezolid, cotrimoxazole and tetracycline (Appendix G). There was a note of the presence of peritoneal carcinomatosis. Biopsy of the omentum was done which showed fibrofatty tissues with focal acute and chronic inflammation, negative for malignancy. Upon inspection of the pelvic organs, the following findings were seen: a necrotic ruptured area at the fundus of the uterus about 2cm in size (Appendix I) with the presence of intrauterine purulent discharge (pyometra), dilated left fallopian tube, normal right fallopian tube and bilateral ovaries, and fixed right parametrium. The intra-operative diagnosis then was ruptured uterus secondary to pyometra. With these intra-operative findings, Gynecologic Oncology service proceeded with peritoneal toilette and drainage. Total abdominal hysterectomy was not performed due to fixed parametrium. Intrauterine purulent discharge was collected and subjected to culture studies which showed few growth of Extended Spectrum Beta Lactamase positive *Escherichia coli* sensitive to amikacin, cefoxitin, colistin, ertapenem, gentamicin, imipenem and tazobactam-piperacillin, and carbapenemase positive *Pseudomonas aeruginosa* sensitive to amikacin, cefepime, ceftazidime, ciprofloxacin, colistin and gentamicin (Appendix H). Peritoneal toilette was done by copious washing of the peritoneal area. Jackson-Pratt drains were placed in the subcutaneous layer, subhepatic area, anterior and posterior uterus and uterine cavity (Appendix J) for continuous drainage.

Immediately postoperation when results of the culture studies are not yet available, the patient was referred to Infectious Disease service who increased the dose of intravenous piperacillin-tazobactam to 4 grams every 6 hours and started the patient with intravenous fluconazole 40 mg once a day and intravenous metronidazole 500 mg every 8 hours. The patient was able to tolerate the procedure and was asymptomatic until day 2 post-operation, she had an episode of dyspnea and on examination, was tachypneic at 26 breaths per minute and hypoxemic with an oxygen saturation of 79%. On auscultation, fine crackles were noted in bilateral lung fields and on chest x-ray, pulmonary congestion and hazy opacities on left lower lung were seen, from which consideration of hospital acquired pneumonia was made. The patient was then transferred to Intensive Care Unit. Oxygen saturation subsequently improved to 97% with oxygen support via nasal canula maintained at 2 liters per minute and administration of intravenous furosemide. On the third post-operative day, serosanguinous output was continued to be drained from the Jackson-Pratt drains, the highest volume of which coming from the one inserted in the anterior uterus. Chest ultrasound was also done which revealed a progression of bilateral pleural effusion, for which increase in the dosage of furosemide was made, 40 mg every 12 hours. On the day 3 post-operation, a shift of antibiotic from piperacillin-tazobactam to meropenem 1 gram intravenous every 8 hours was made. Oral ciprofloxacin 750mg intravenous every 12 hours was also started. fluconazole and metronidazole were continued. The patient remained stable and transferred to a regular room on the fourth post-operative day. There was continuously decreasing output from the hepatic Jackson-Pratt drain in the subsequent days, hence it was removed. On the seventh post-operative day, oral fluconazole and metronidazole were completed for a 7-day course. The result of the culture studies of the intrauterine purulent discharge revealed Extended spectrum beta lactamase positive *Escherichia coli* sensitive to ertapenem and carbapenemase positive *Pseudomonas aeruginosa* sensitive to ciprofloxacin, hence intravenous meropenem (day 5) was shifted to intravenous ertapenem 1 gram every 24 hours, which was subsequently completed for a 10-day course. Oral ciprofloxacin was completed for a 14-day course. The remaining Jackson-Pratt drains had continuously decreasing output, hence were subsequently removed. The patient was referred to Radiology Oncology service for radiation therapy which started after the infection has been resolved. Patient completed 33 sessions of radiotherapy and underwent 3 sessions of Brachytherapy during admission. She was discharged after 73 hospital days improved with the discharge diagnosis of: Cervical Endometrioid Adenocarcinoma Stage IIIB, Acute Abdomen secondary to Pneumoperitoneum secondary to Ruptured Pyometra, Complicated Intraabdominal Infection, resolved, Hospital Acquired Pneumonia, resolved, s/p Cervical Biopsy (March 2016), s/p Exploratory Laparotomy, Evacuation of Intraabdominal Abscess, Peritoneal Toilette, Insertion of Uterine and Peritoneal Drains, Excision Biopsy of Omentum (March 21, 2016), s/p Radiotherapy x 33 sessions (May 2016), s/p Brachytherapy x 3 sessions (May 2016).

CASE DISCUSSION

With an incidence of 0.01-0.5% among all gynecologic patients, pyometra is a rare gynecologic disease entity.[1] Incidence increases with advancing age, up to 13.6% among elderly patients.[1] In a case report conducted by Yildizhan et al. (2006), 22 cases of spontaneous uterine rupture secondary to pyometra from 1980-2004 were reviewed. Out of the 22 patients, 20 (91%) were of postmenopausal age.[2] Pyometra in itself is rare, much so is uterine rupture occurring secondary to it. Lui et al. (2015) conducted a retrospective review of women diagnosed

to have pyometra from January 2003 to December 2010. There were 57 patients identified and reviewed. Of the 57, not a single patient led to a spontaneous uterine rupture.[3] To date, there are only approximately 50 cases of ruptured pyometra that are published in English literature, of which around 9 cases have a concomitant cervical carcinoma, our index patient being the 10th reported case. Review of PubMed/Medline and Herdin using the keywords uterine rupture + pyometra and hand search of journals in the library of Philippine Obstetrics and Gynecology Society yielded no local data discussing pyometra or its spontaneous rupture.

Table 1 summarizes 9 previously reported cases of ruptured pyometra secondary to cervical carcinoma with the addition of the index case.[4-11] Out of the 10 cases, 9 (90%) are of postmenopausal age (52 to 80 years old) and only 1 (10%) is of premenopausal age (34 years old). All of the 10 (100%) cases presented with abdominal pain as the chief complaint. Only 3 (30%) cases were correctly diagnosed with ruptured pyometra pre-operatively. Generalized peritonitis was pre-operatively diagnosed in 6 (60%) of the cases while in 3 (30%) cases, including the index patient, pre-operative diagnosis of ruptured viscus was made. Pneumoperitoneum was also seen in 4 (40%) of the cases, which includes the index patient. The point of rupture identified in the uterine fundus was seen among 7 (70%) of the reported cases. 1 (10%) case had a point of rupture in the left cornual area, 1 (10%) in the posterior uterine wall and the other 1 (10%) in the anterior uterine wall.

Pyometra is tbhe accumulation of pus within the uterine cavity which is commonly caused by a blockage or compromise in the outflow tract of the uterus. Although abnormalities that interfere with the drainage of the uterus can result to pyometra, it does not always necessarily develop secondary to obstruction at the cervical os.[12] The accumulated pus within the uterus causes gradual enlargement of the organ that will lead to thinning of its wall and less frequently, subsequent spontaneous rupture may follow. This is usually manifested as generalized peritonitis among most patients who develop this sequela.[9] Among the reported cases, genital tract malignancies and the consequences of its management, specifically radiotherapy, has been shown to be the most common cause of pyometra.[3] As with the index patient whom on internal examination revealed a cervix that is converted into a nodular mass, blockage of the genital outflow tract caused by this cervical carcinoma could have predisposed the patient in developing pyometra. Aside from malignancies, benign conditions such as endometrial polyp and leiomyoma may also cause accumulation of pus in the uterus. Other causes such as infection, as in senile cervicitis and endometritis, cervical occlusion after surgery and forgotten intrauterine device have been reported to be seen among patients with pyometra.[13]

The clinical manifestations of pyometra range from gynecologic presentation to non-specific symptoms. The triad of the disease includes purulent vaginal discharge, fever, and lower abdominal pain.[12] However, up to 50% of patients with pyometra may also be asymptomatic.[14] In the rare event that pyometra is complicated by spontaneous rupture, clinical presentation becomes more non-specific. In this sequela, the most predominant clinical manifestations reported include abdominal pain, fever and vomiting.[15] Once ruptured, abdominal pain and subsequently, acute abdomen follows. Having non-specific symptoms contributes to the difficulty of diagnosing ruptured pyometra pre-operatively. Ou et al. (2010) conducted a retrospective study of 20 patients diagnosed with pyometra between 1998-2008, 14 of which have early-drainage pyometra and 6 have perforated pyometra. A review of literature was also conducted which yielded additional 30 cases of perforated pyometra. Of the 20 patients with pyometra, 80% presented with abdominal pain, 45% with fever and 25% were reported to have vaginal discharge. Of the 36 with perforated uterus, 97% had a chief complaint of abdominal pain, 31% had fever and 10% had vomiting.[16] On the report of Yildhizan et al. (2006) mentioned above, cases of spontaneous rupture of pyometra included in the report most commonly presented with abdominal pain (95.5%), vomiting (41%),nausea (9.1%) and fever (9.1%).[2] Referring back to table 1, all of the reviewed cases of ruptured pyometra secondary to cervical carcinoma had a chief complaint of abdominal pain. This includes the index patient, who aside from abdominal pain also manifested the reported non-specific symptoms of ruptured pyometra, which are fever and vomiting.

Less than 10% of the patients with ruptured pyometra present with gynecologic symptoms such as vaginal bleeding and vaginal discharge.[8] Due to the non-specific nature of the clinical manifestations of ruptured pyometra, a vast number of differential diagnoses may be entertained; this makes accurate pre-operative diagnosis more difficult. With abdominal pain being the most common chief complaint, the differential diagnosis would be based on other causes of a surgical acute abdomen. Among the 22 cases of ruptured pyometra described in the report of Yildizhan et al. (2006), the pre-operative diagnosis that was most commonly made included generalized peritonitis (47.4%), pneumoperitoneum (47.4%), and gastrointestinal tract perforation (36.8%).[2] Ruptured pyometra was considered in just 3 (15.8%) cases.[2] Among patients reported to have perforated pyometra secondary to cervical carcinoma, as much as 60% were pre-operatively diagnosed with generalized peritonitis,

Table 1. Cases of Sponataneous Uterine Rupture secondary to Pyometra among Cervical Cancer Patients

CASE	YEAR	AGE	CHIEF COMPLAINT	PRE-OPERATIVE DIAGNOSIS	POINT OF RUPTURE	MANAGEMENT	OUTCOME
1	1993	67	Abdominal Pain + Genital Bleeding	Generalized Peritonitis, Perforated Pyometra, Pneumoperitoneum	Fundus	Supravaginal Hysterectomy with Bilateral Salpingo-oophorectomy	Alive [4]
2	2000	34	Abdominal Pain	Generalized Peritonitis	Left cornual region	Peritoneal Lavage and Drainage	Alive[5]
3	2000	72	Abdominal Pain	Generalized Peritonitis	Fundus	Peritoneal Lavage and Drainage	Expired [5]
4	2005	52	Abdominal Pain	Generalized Peritonitis	Posterior portion of uterine segment	Subtotal Hysterectomy	Expired[6]
5	2006	80	Abdominal Pain	Perforated Sigmoid Diverticulum	Fundus	1.Repair of rupture with peritoneal lavage 2.Total Abdominal Hysterectomy with Bilateral Salpingo-oophorectomy	- [14]
6	2007	60	Abdominal Pain	Perforated Viscus, Pneumoperitoneum, Generalized Peritonitis	Fundus	Total Abdominal Hysterectomy with Bilateral Salpingo-oophorectomy	-[8]
7	2009	60	Abdominal Pain	Perforated Pyometra	Fundus	Peritoneal Lavage and Drainage	Alive [9]
8	2013	Postmenopausal	Abdominal Pain	Perforated Pyometra, Pneumoperitoneum	Fundus	Total Abdominal Hysterectomy	-[10]
9	2014	70	Abdominal Pain	Generalized Peritonitis	Anterior Uterine Wall	Total Abdominal Hysterectomy with Bilateral Salpingo-oophorectomy	Expired [11]
10	2016 (index patient)	63	Abdominal Pain	Pneumoperitoneum probably secondary to ruptured viscus	Fundus	Peritoneal Lavage and Drainage	Alive

half of which including the index patient was misdiagnosed to have ruptured viscus. Only 30% of the reported cases were correctly diagnosed preoperatively with ruptured pyometra. Pneumoperitoneum was seen in as much as 40% of the cases, which includes the index patient. This further poses confusion in diagnosing ruptured pyometra because 85-90% of cases of pneumoperitoneum was reported to be associated with gastrointestinal perforation.[17] Hence, the diagnosis of ruptured viscus was initially considered in the index patient. Pneumoperitoneum may be caused by gas-forming organisms present in the discharge, such as Escherichia coli, which grew in the culture studies of the intrauterine abscess collected from the index patient. Another possible explanation of the free intrauterine gas could be from the passage of air through the genital canal to the peritoneal cavity.[18] Because of low index of suspicion and because of non-specific manifestations similar to other more common disease entities, in most cases, it is only intraoperatively that ruptured pyometra is diagnosed, as what occurred in the index patient.[19]

Due to a challenging preoperative diagnosis of pyometra, choice of appropriate diagnostic modalities could help in accurately identifying this catastrophic event. Ruptured pyometra commonly mimics clinical presentation of diseases of gastrointestinal origin, hence imaging studies are done to identify which among the patients have surgical acute abdomen. Since the most common site of uterine perforation in ruptured pyometra is at the fundus, axial Computed Tomography images may not suffice in the identification of uterine breach in such location. In 1 of the 3 cervical cancer cases correctly diagnosed with ruptured pyometra preoperatively, sagittal and coronal reformats in multi-detector computed tomography was utilized to identify the site and size of the uterine breach. This technique was also able to demonstrate the intra-abdominal collections and was helpful in staging the cervical cancer of the patient.[9] Another imaging that can be utilized is ultrasonography. Abdominal ultrasonography has high sensitivity in identifying pyometra, however, it is not able to demonstrate breach in the uterus in the event of uterine perforation. In addition, the presence of pneumoperitoneum causes limited sonographic window, which further decreases the utilization of abdominal ultrasonography in such cases.[20] However, in a case reported by Malvadkar et al. (2016), an ultrasonography accurately diagnosed the patient with uterine perforation secondary to pyometra. The limitation of the imaging technique in diagnosing ruptured pyometra was overcome with the use of Dynamic Transvaginal Ultrasonography, which demonstrates real-time movement of the

endometrial and peritoneal collections through the defect in either direction. It was the first and only reported case of ruptured pyometra that was accurately diagnosed pre-operatively with the use of a simple Dynamic Transvaginal Ultrasound.[13]

In the index patient, an abdominal x-ray was initially done, which revealed pneumoperitoneum. Multi-detector Computed Tomography scan of the whole abdomen was then performed which also identified moderate pneumoperitoneum, however, of indeterminate etiology. This led to a pre-operative consideration of ruptured viscus. This case proves that despite the availability of advanced imaging facilities, an accurate pre-operative diagnosis of ruptured pyometra may still be difficult. In the absence of gynecologic symptoms, it is worth note taking that gynecologic ultrasonography still plays an important role in the diagnosis of pyometra and in some extent, its rupture.

Once a diagnosis of acute abdomen is established, an immediate laparotomy must be performed. In most cases, diagnosis of ruptured pyometra is only made intraoperatively when findings of intraperitoneal purulent discharge and uterine perforation are observed. The definitive management of ruptured pyometra is total abdominal hysterectomy with or without bilateral salpingo-oophorectomy, thorough peritoneal lavage and drainage, and prompt antibiotic coverage.[15,18] However, total abdominal hysterectomy is not always possible, especially in cases that are complicated by malignancy. In such cases, copious peritoneal lavage and toilette, drainage and prompt antibiotic coverage should be strictly done. The aim of peritoneal toilette is to mechanically remove as many contaminants as possible to reduce the severity of infection and limit host responses. In the case report of Yildhizan et al. (2006), 21 out of the 22 cases of ruptured pyometra reviewed in the report underwent laparotomy, 1 patient was unstable to undergo the said procedure. Total abdominal hysterectomy was done to 18 of the cases, while drainage was the management for the other 4.[2] Among the reported cases of ruptured pyometra with cervical carcinoma reviewed in this case report, 4 (40%) cases underwent peritoneal lavage and drainage, which includes the index patient, while the other 5 (50%) underwent hysterectomy. One of the cases reported was initially managed by repairing the point of rupture and by doing peritoneal lavage. However, infection was not controlled and the patient eventually underwent another operation where a hysterectomy was subsequently performed. In all of the cases, appropriate antibiotic coverage was administered.

The index patient underwent laparotomy for an initial diagnosis of acute abdomen secondary to pneumoperitoneum probably secondary to ruptured viscus. The service of General Surgery initiated the procedure and when ruptured pyometra was identified intraoperatively, Gynecologic Oncology service continued the procedure. The right parametrium was found to be fixed, hence, total abdominal hysterectomy was not done. Instead, evacuation of intraabdominal abscess, peritoneal toilette, and continuous drainage through an insertion of uterine and intraperitoneal drains were performed. Broad spectrum antibiotics were initially started and when the result of the culture studies of the abscess became available, medications were shifted to culture-guided antibiotics. Once the patient was stable and infection was controlled, the underlying cause of the pyometra was treated. She completed sessions of radiotherapy and underwent brachytherapy for her cervical carcinoma.

The success of the management of ruptured pyometra depends on the clinical presentation of the patient upon admission, the underlying cause of the rupture and co-morbidities present in the patient. In the case report of Saha et al (2008), it was noted that as much as 73% of cases of ruptured pyometra not associated with any malignancy had a favorable prognosis for survival while only 33% of cases associated with malignancy survived.[19] Among the cases of ruptured pyometra with associated cervical carcinoma that underwent peritoneal lavage and drainage, 75% (3 out of 4, including the index patient) had a favorable outcome for survival. Among those who were managed with hysterectomy with or without bilateral salpingo-oophorectomy, 50% (3) had an unmentioned outcome, while only 17% (1) had a favorable outcome for survival. The index patient who was pre-operatively diagnosed with cervical carcinoma was managed by doing peritoneal lavage and drainage. Once ruptured pyometra was managed and infection was controlled, the patient underwent sessions of radiotherapy and brachytherapy to address the underlying cause of the pyometra, which is cervical carcinoma. The patient tolerated both the procedure for ruptured pyometra and the radiotherapy and brachytherapy for cervical carcinoma. She was discharged improved and recovered.

SUMMARY AND CONCLUSION

Ruptured pyometra is a rare condition but once present, can be a catastrophic gynecologic emergency, wherein prompt and accurate determination is important in order to provide appropriate management. Incidence increases among women belonging to postmenopausal age group. Genital tract malignancies and disorders which occlude its outflow tract predispose women in acquiring pyometra. In the rare event that pyometra causes a spontaneous uterine rupture, non-specific symptoms follow, abdominal pain being the most common

manifestation. Despite the presence of advanced imaging techniques, accurate pre-operative diagnosis of ruptured pyometra remains to be challenging. Hence, a high index of suspicion among post-menopausal patients presenting with abdominal pain and with a history of genital tract occlusion could aid in diagnosing ruptured pyometra pre-operatively. In the absence of gynecologic symptoms and presence of high index of suspicion among this group of patients, note that gynecologic imaging techniques such as transvaginal ultrasonography could still play a major role in identifying this disease entity. Despite the fact that the index patient was only diagnosed with ruptured pyometra post-operatively, she was still managed appropriately and was discharged improved and recovered. This was made possible by the presence and coordination of the different services attending to her, namely: Gynecologic Oncology, General Surgery, Infectious Disease Service, Cardiology, Pulmonology and Radiologic Oncology. Hence, in addition to a high index of suspicion leading to an accurate pre-operative diagnosis of ruptured pyometra, a multi-disciplinary approach in treating ruptured pyometra, its sequela and its underlying cause, is necessary to achieve successful management. ■

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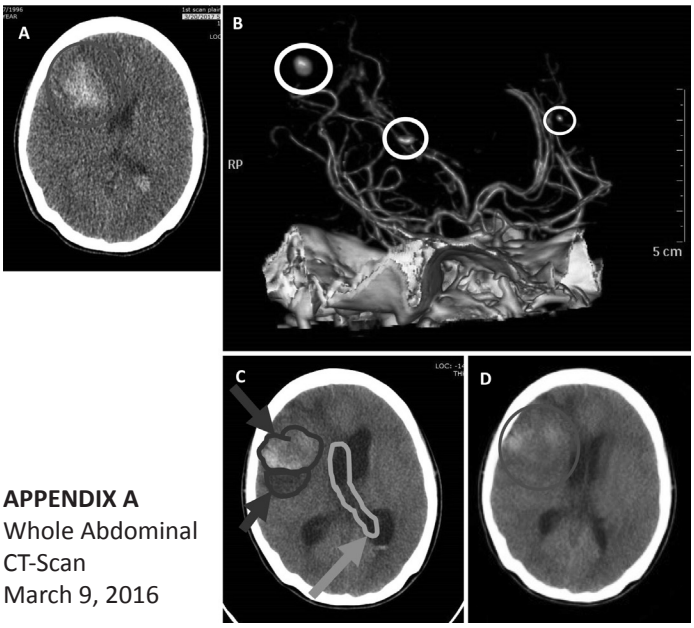


APPENDIX A
Whole Abdominal
CT-Scan
March 9, 2016

A.Axial view cervical level and B. Coronal view cervical level. Marked by the dotted lines is an enhancing soft tissue mass at the cervical region extending into the uterine cavity measuring 3.5 x 3.5 x 5.3 cm likely representing the patient's known neoplasm. C. Coronal View. Marked by the blocked arrow is a mild hydronephrosis on the left kidney

FINDINGS:
There is an enhancing soft tissue mass at the cervical region extending into the uterine cavity measuring 3.5 x 3.5 x 5.3 cm (AP x T x CC). Adjacent fat stranding densities are seen. There is narrowing of the cervical lumen with retained fluid distending the uterine cavity. There is a enhancing nodule in the LEFT pelvic side wall measuring 2.1 x 1.8cm, likely representing a lymph node.
The posterior urinary bladder wall is seen abutting the cervical mass with mild wall thickening. The rest of the urinary bladder wall is not thickened. No filling defects withinthe urinary bladder lumen.
There are prominent sized to marginally enlarged lymph nodes in both inguinal regions exhibiting a fatty hilum. The largest measure (short axis diameter) 1.1 cm in the left and 1.2 cm in the right. Subcentimeter lymph nodes are appreciated in the para-aortic, aortocaval and mesenteric regions. No enlarged paraaortic and mesenteric lymph nodes.

IMPRESSION:
ENHANCING SOFT TISSUE MASS IN THE CERVICAL REGION EXTENDING TO THE LOWER UTERINE SEGMENT LIKELY REPRESENTING THE PATIENT'S
KNOWN NEOPLASM WITH ADJACENT INFLAMMATORY / INFILTRATIVECHANGES
ENLARGED LYMPH NODE, LEFT PELVIC SIDE WALL
FOCAL WALL THICKENING IN THE POSTERIOR URINARY BLADDER ABUTTING
THE CERVICAL MASS
MILD LEFT HYDRONEPHROSIS
PROMINENT TO MARGINALLY ENLARGED INGUINAL LYMPH NODES WITH FATTY HILUM
POST-INFLAMMATORY / INFECTIOUS CALCIFICATION IN THE LIVER
MALROTATED LARGE BOWELS; NON-OBSTRUCTIVE BOWEL GAS PATTERN
ATHEROSCLEROTIC VESSEL DISEASE
DEGENERATIVE OSSEOUS AND DISK CHANGES
LIPOMA AT THE RIGHT TENSOR FACIA LATA

APPENDIX B. Complete Blood Count. March 21, 2016

TEST	RESULT	UNIT	REFERENCE INTERVAL
Hemoglobin	13.3	g/dl	11.6 - 15.5
Hematocrit	40.4	%	36.0 - 47.0
Red Blood Cell Count	4.46	mil/mm^3	4.20 - 5.40
White Blood Cell Count	9,730	mm^3	4800 - 10800
Differential Count			
Neutrophil(s)	34	%	40 - 74
Lymphocyte(s	14	%	19 - 48
Eosinophil(s)	0	%	0 - 7
Monocyte(s)	6	%	3 - 9
Basophil(s)	0	%	0 - 2
Stabs	34	%	2 - 6
Myelocyte	4	%	
Metamyelocyte	8	%	
Platelet Count	588,000	/mm^3	150000 - 400000
MCV	91	fl	82 - 98
MCH	30	pg	28 - 33
MCHC	33	%	32 - 38
RDW	12.7	%	11.0 - 14.0

APPENDIX C. Clinical Chemistry. March 21, 2016

TEST	RESULT	UNIT	REFERENCE INTERVAL
Creatinine	0.99	mg/dL	0.55 - 1.02
Blood Urea Nitrogen	20	mg/dL	7 - 18
Magnesium	1.9	mg/dL	1.8 - 2.4
Ionized Calcium	1.09	mmol/L	1.00 - 1.30
Lipase	127	u/L	73-393
Amylase	39	u/L	25/115

APPENDIX D. Urinalysis. March 21, 2016

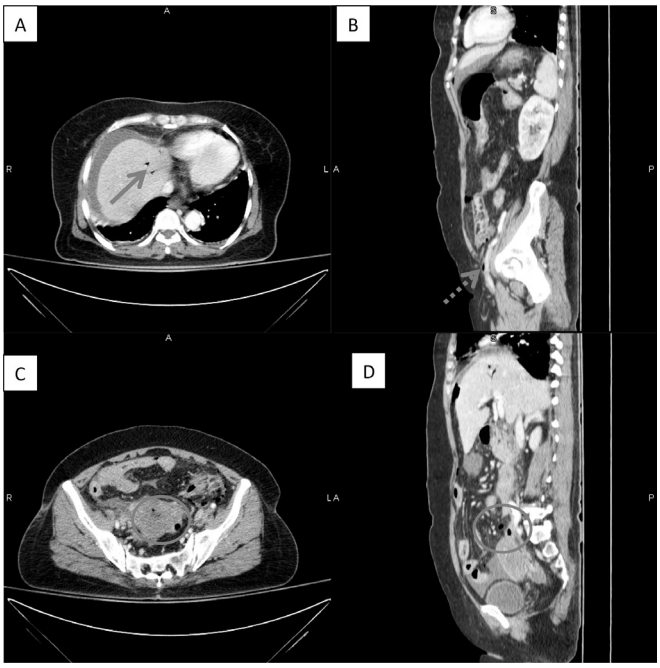
TEST	RESULT	UNIT
MACROSCOPIC/ CHEMICAL EXAMINATIONS		
Color	Dark yellow	
Transparency	Slightly hazy	
Glucose	Negative	
Bile	Moderate (2+)	
Ketone	Trace	
Specific Gravity	>/=1.030	
pH (reaction)	5.0 (Acidic)	
Protein	30 mg/dL (1+)	
Urobilinogen	1.0 E.U./dL	
Nitrites	Negative	
Blood	Large (3+)	
Leukocytes	Small (1+)	
URINE SEDIMENT ANALYSIS BY MANUAL MICROSCOPY		
Red Blood Cells	5-6	/HPF
White Blood Cells	9-10	/HPF
Epithelial Cells	Occasional	
Casts	0-1	
Bacteria	Occasional	

APPENDIX E. Abdominal X-ray Flat and Upright
March 21, 2016

Findings:
Bowel gas pattern is non-obstructive and nonspecific.
There is no evidence of organomegaly.
Small crescent-shaped lucency is noted at the RIGHT subdiaphragmatic region seen on the upright view.
Mild degenerative changes of the lumbar spine are seen.

Impression:
SMALL CRESCENT-SHAPED LUCENCY AT THE RIGHT SUBDIAPHRAGMATIC REGION
IS OF CONCERN FOR **PNEUMOPERITONEUM**

APPENDIX F. Whole Abdominal CT-Scan with Contrast
March 21, 2016



A.Axial view hepatic level. Marked by the solid arrow are air locules in the hepatic area. B. Coronal view external iliac vessel level. Marked by dotted arrow is a small air collection just anterior to the external iliac veins distally. C. Axial view uterine level and D. Coronal view uterine level. Marked by the solid circle are air locules noted superior to the uterine body.

Findings:
There is new finding of moderate pneumoperitoneum. Moderate abdomino-pelvic ascites is likewise seen.
Minimal air is detected at hepatic segments VIII, IV and II. Air locules are further noted in the porta hepatis and in the region of the ligamentum teres. Small air collection is noted just anterior to the bilateral external iliac veins distally.
The size of the cervix is smaller now with axial diameters of 4.0 x 3.3 cm (previously 5.0 x 4.1 cm, re-measured in the prior study using approximately the same planes).
The uterine body is larger since the prior study having a craniocaudal diameter of 7.9 cm (previously 5.9 cm). The uterine body is also heterogeneous with air locules superiorly.
The colon is mostly collapsed. Appendix is intact. There is wall thickening of the small bowel in the RIGHT side. No pneumatosis appreciated.
The LEFT pelvic side wall nodule / lymph node is slightly smaller measuring 1.8 x 1.7 cm (previously 2.1 x 1.8 cm). The hepatic calcifications are unchanged. There are no focal lesions in the kidneys, adrenal glands, pancreas, gallbladder and spleen.
The RIGHT anterior hip intramuscular lipoma is unchanged.
No bony destruction.
Included lung / chest shows trace posterior gutter effusion.

Impression:
MODERATE PNEUMOPERITONEUM OF INDETERMINATE ETIOLOGY
MODERATE ABDOMINO-PELVIC ASCITES
MINIMAL INTRA-HEPATIC AIR POSSIBLY PERIBILIARY IN ORIGIN DUE TO ABSENCE OF PNEUMATOSIS
NON-SPECIFIC SMALL AIR COLLECTION ANTERIOR TO THE BILATERAL EXTERNAL ILIAC VEINS DISTALLY. INTRALUMINAL VESSEL AIR IS NOT EXCLUDED
SMALLER SIZE OF THE CERVIX
LARGER SIZE OF THE UTERINE BODY; HETEROGENEITY MAY RELATE TO EDEMA
SMALL BOWEL WALL THICKENING IN THE RIGHT SIDE CAN BE REACTIVE INFLAMMATION DUE TO THE SURROUNDING ASCITES. PRIMARY ENTERITIS IS NOT RULED-OUT
SLIGHTLY SMALLER LEFT PELVIC SIDE WALL NODULE / LYMPH NODE
UNCHANGED HEPATIC CALCIFICATIONS AND RIGHT ANTERIOR HIP INTRAMUSCULAR LIPOMA

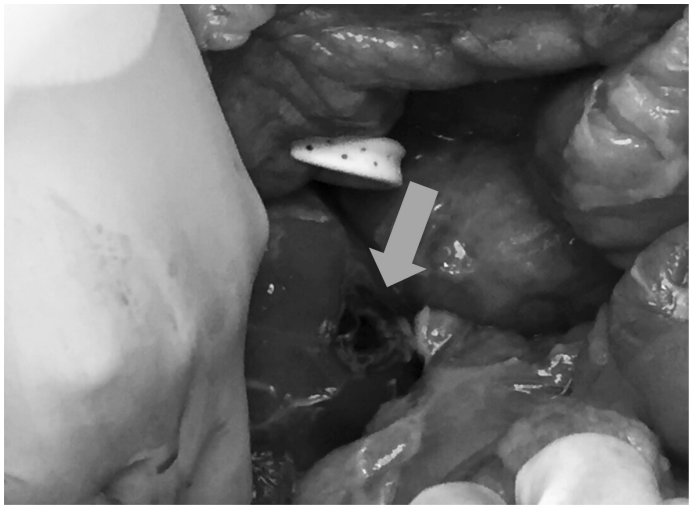
APPENDIX G. Culture and Sensitivity: Intraperitoneal Abscess
March 21, 2016

Culture / Organism 1	Corynebacterium species Few growth
AZITHROMYCIN	SENSITIVE
BENZYLPENICILLIN	SENSITIVE
CLINDAMYCIN	SENSITIVE
ERYTHROMYCIN	SENSITIVE
LINEZOLID	SENSITIVE
SULFAMETHOXAZOLE TRIMETHOPRIM	SENSITIVE
TETRACYCLINE	SENSITIVE

APPENDIX H. Culture and Sensitivity: Intrauterine Abscess
March 21, 2016

Culture / Organism 1	Escherichia coli Few growth
AMIKACIN	SENSITIVE
AMOXYCLAV	INTERMEDIATE
AMPICILLIN	RESISTANT
CEFEPIME	RESISTANT
CEFOTAXIME	RESISTANT
CEFOXITIN	SENSITIVE
CEFTRIAXONE	RESISTANT
CEFUROXIME	RESISTANT
CIPROFLOXACIN	RESISTANT
COLISTIN	SENSITIVE
ERTAPENEM	SENSITIVE
GENTAMICIN	SENSITIVE
IMIPENEM	SENSITIVE
MEROPENEM	RESISTANT
SULFAMETHOXAZOLE-TRIMETHOPRIM	RESISTANT
Culture / Organism 1	Pseudomonas aeruginosa Few growth
AMIKACIN	SENSITIVE
CEFEPIME	SENSITIVE
CEFTAZIDIME	SENSITIVE
CIPROFLOXACIN	SENSITIVE
COLISTIN	SENSITIVE
GENTAMICIN	SENSITIVE
IMIPENEM	RESISTANT
MEROPENEM	RESISTANT
TAZOBACTAM PIPERACILLIN	INTERMEDIATE

APPENDIX I



Pointed by the block arrow is the point of rupture of the uterus in the fundal area

APPENDIX J

Jackson Pratt Drain inserted inside the uterus through its point of rupture