

Pyometrium as an Early Indicator of Cervical Squamous Cell Carcinoma: A Systematic Review

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Abstract

We present the case of an 81-year-old G5P5 Caucasian female who presented to the emergency room for lower abdominal pain, bloating, and green-colored vaginal discharge for the past 3 weeks. A computed tomography of the abdomen and pelvis showed markedly distended endometrial cavity containing fluid and small air bubble concerning for cervical stenosis versus endometrial neoplasm/endometritis suggestive of pyometra. Dilation and curettage was performed with endometrial curette, of which pathology revealed endometritis and detached fragments of squamous cell carcinoma, which showed positive staining with p16, p63, and high Ki67, which is consistent with cervical HPV-related squamous cell carcinoma. The endometrial tissue seen was negative for malignancy. The patient underwent total hysterectomy with bilateral salpingo-oophorectomy and pelvic/para-aortic lymph node dissection, and postoperative recovery was complicated by postoperative ileus which led to a small bowel obstruction. Pyometrium is uncommon, however often presents in postpartum or postmenopausal women and has an 80% association with malignancy. After thorough review of 80 case reports of women with pyometrium, we highlight the importance of considering gynecological malignancy as an underlying cause of pyometra in postmenopausal women, and the importance of early diagnosis in attempt to decrease rates of spontaneous perforated pyometra.

Keywords: Pyometrium; Squamous cell carcinoma; Postmenopausal; Uterine perforation; Spontaneous perforated pyometrium

Introduction

Pyometra, or pyometrium, is defined as the accumulation of

pus in the uterine cavity due to an interference with drainage and occurs in 0.1-0.2% of all gynecological patients and 12.6% of elderly gynecological patients [1]. Pyometrium is uncommon, but is usually associated with advanced endometrial or cervical cancer. Pyometrium typically presents in postpartum or postmenopausal women with malodorous purulent vaginal discharge, bleeding, and pelvic pain, but can also be asymptomatic [2]. Manifestation of pyometrium is thought to be caused by the accumulation of pus in the uterine cavity resulting from bacteria ascending through the cervical canal with interference with its natural secretion drainage due to cervical stenosis [3]. It is imperative that in postmenopausal women diagnosed with pyometra gynecological malignancy be considered as an underlying cause until proven otherwise. Additionally, early diagnosis of pyometrium may decrease rates of spontaneous perforated pyometra (SPP). Although presentation of SPP predominantly presents with abdominal pain, vomiting and fever, there are no specific symptoms, making diagnosis difficult [4]. Here we describe a case of a postmenopausal female with pyometrium who was found to have underlying cervical squamous cell carcinoma. Additionally, we provide, to our knowledge, an original systematic review of case reports of pyometra focused on presenting symptoms, pathological results, and complications.

Case Report

Investigations

The patient was an 81-year-old G5P5 Caucasian female with a history of dementia, alcoholic hepatitis, anemia, hypertension, chronic obstructive pulmonary disease, gastroesophageal reflux disease, irritable bowel syndrome, gastritis, and dyslipidemia. Obstetrical history was significant for menopause at the age of 50 and normal pap smears, although she could not recall the date of her last pap smear. The patient presented to the emergency room for lower abdominal pain, bloating, and green-colored vaginal discharge for the past 3 weeks.

Diagnosis

A computed tomography (CT) of the abdomen and pelvis showed a markedly distended endometrial cavity containing

Manuscript submitted September 25, 2022, accepted October 24, 2022
Published online December 30, 2022

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doi: <https://doi.org/10.14740/jcgo830>

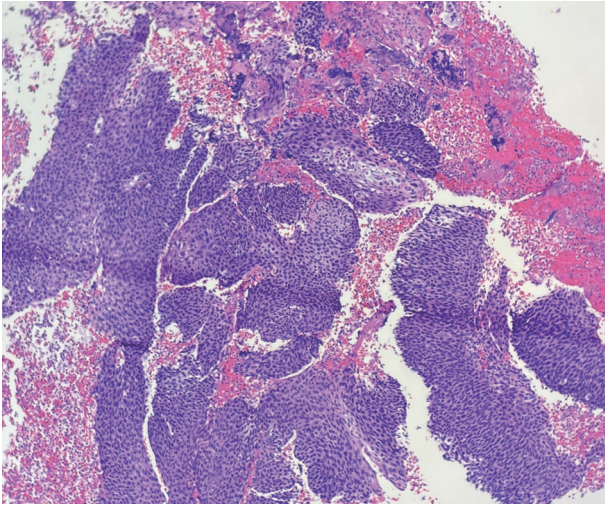


Figure 1. Multiple detached fragments of squamous cell carcinoma in the curettage material (H&E, × 10). H&E: hematoxylin and eosin.

fluid and small air bubble concerning for cervical stenosis versus endometrial neoplasm/endometritis suggestive of pyometra. The patient underwent dilation and curettage with endometrial curette, of which pathology revealed abundant acute purulent inflammation consistent with clinical diagnosis of pyometra, and glandular epithelium with numerous plasma cells consistent with endometritis and multiple detached fragments of squamous cell carcinoma, which showed positive staining with p16, p63, and high Ki-67, that was consistent with cervical human papillomavirus (HPV)-related squamous cell carcinoma (Figs. 1-4). The endometrial tissue seen was negative for malignancy.

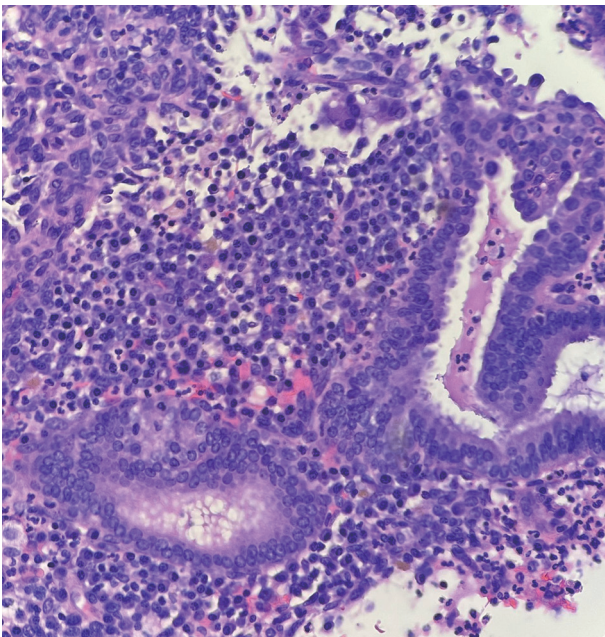


Figure 2. Fragments of glandular epithelium with numerous plasma cells in the curettage material (H&E, × 40). H&E: hematoxylin and eosin.

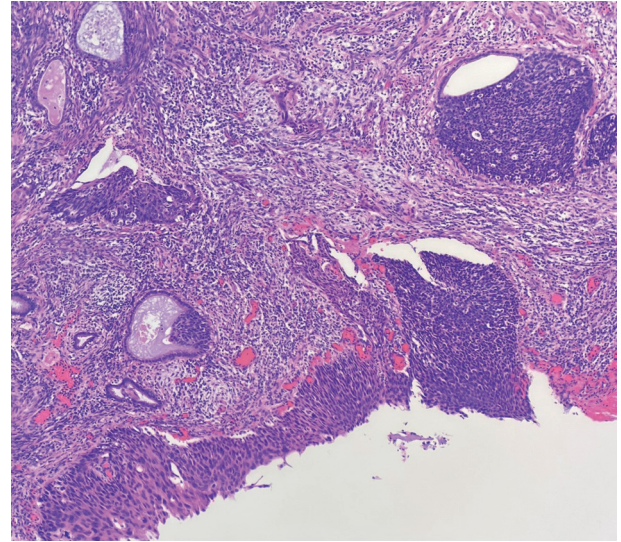


Figure 3. Residual minute microscopic focus of squamous cell carcinoma, hysterectomy material (H&E, × 10). H&E: hematoxylin and eosin.

Treatment

The patient underwent robotic-assisted total hysterectomy with bilateral salpingo-oophorectomy and sentinel, pelvic, and para-aortic lymph node dissection. Pathology revealed residual minute microscopic cervical squamous cell carcinoma (pT1a1 pN0) HPV associated in background of extensive high grade squamous intraepithelial lesion with glandular involvement and severe acute, histiocytic and plasmocytic inflammation consistent with endometritis. Based on various factors, including tumor, node and metastasis (TNM) staging, adjuvant

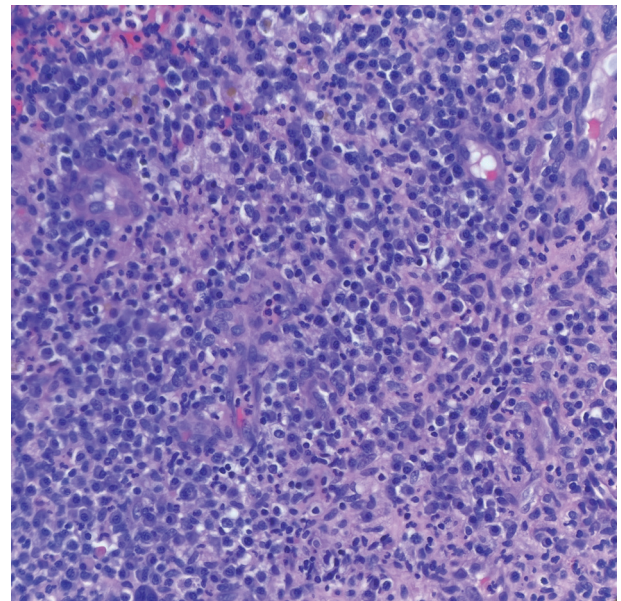


Figure 4. Endometrium with severe acute, histiocytic and plasmocytic inflammation, hysterectomy material (H&E, × 40). H&E: hematoxylin and eosin.

treatment with radiation and chemotherapy was not deemed necessary.

Follow-up and outcomes

Postoperative recovery was complicated by postoperative ileus which led to a small bowel obstruction. The patient removed her own nasogastric tube on multiple occasions which led to acute hypoxemic respiratory failure and intubation. Additionally, the patient formed a new right lateral abdominal wall hernia that contained incarcerated small bowel. The patient returned to the operating room for a diagnostic laparotomy with small bowel resection and reduction of the hernia. Following hernia repair, the patient was discharged to a skilled nursing facility.

Methods and Search Strategy

We conducted an electronic-based search using the database PubMed. The medical subject heading of “pyometrium” was used. The search was limited to trials in humans and published in the English language from the 1990s to present day. We manually searched the reference lists of identified studies. We included all original case report articles and excluded pediatric cases.

Results

Our search yielded 698 citations with exclusion criteria of non-English articles and date of completion prior to 1990s (Fig. 5). After excluding articles in non-humans, we obtained 206 articles. After eliminating pediatric cases, 113 articles remained. After further exclusion of articles that were abstracts only, picture only articles, articles that the authors were unable to obtain or not related to pyometra, 74 articles were eligible for review. Additionally, five articles reported on multiple cases, leading to the grand total of 80 patient case reports analyzed. Raw data are available in Table 1 [5-75].

Discussion

Pyometrium has a reported incidence of 0.01-0.05% in all gynecological patients; however, this occurs more frequently in postmenopausal women, with an incidence of 13.6% in women over 60 years old [4]. The pooled average age of patients in our study population was 66 years (range 21-102 years). Of patients diagnosed with cancer, the average age of patients was 64.5 years (range 38-102). In patients not diagnosed with malignancy, the average age was 66.5 years (range 21-93 years). It has previously been shown that in younger patients, there is an increased incidence of pyometrium in those with diabetes, congenital cervical anomalies, cervicitis, large submucosal uterine fibroids, cervical cancer, recent vaginal surgery, or injection drug use [2]. When looking at possible risk fac-

tors of pyometra within the cases we analyzed, majority of the patients were multiparous; however, a majority of the studies did not report on the previous medical history of their patient, making it difficult to compare risk factors to those previously identified in the literature.

Known common presenting symptoms of pyometrium include abdominal pain, vomiting, nausea, and fever [9]. The most common presenting symptom within the cases we analyzed was abdominal pain, with 63.2% of patients exhibiting this complaint. The list of differential diagnosis of abdominal pain is vast and includes but is not limited to appendicitis, inflammatory bowel disease, diverticulitis, constipation, acute urinary retention, nephrolithiasis, ovarian torsion, pelvic inflammatory disease and complications of pregnancy including ectopic pregnancy [8]. Additional presenting symptoms within the cases we analyzed included vaginal bleeding and discharge, weight loss, constipation, vomiting, fever, and low back pain.

Diagnosis of pyometrium is traditionally made via imaging modalities including ultrasound (US), CT, or magnetic resonance imaging (MRI), which are required for confirmation or for evaluation of possible complications [5]. Findings from imaging suggestive of pyometra can include uterine enlargement and dilation, accumulation of discharge, and free air. Of the cases we analyzed, 93.6% of them used either US, CT, or MRI for diagnosis of pyometrium. Alternative methods of diagnosis included abdominal X-ray or exploratory laparotomy.

Pyometra has previously been reported to be associated with malignancy in 35% of cases in which pyometra was present [8], however this reported frequency has decreased to 13.6% in the last decade due to progress of cancer screening and diagnosis. Of cases reported, all the cases were diagnosed as squamous cell carcinoma of the cervix besides one reported by Vyas et al 2009 that was reported to be adenocarcinoma of the cervix [6].

Pyometra is often due to a polymicrobial cause, including both aerobic and anaerobic organisms [77] with the most common microorganisms including *E. coli*, *Streptococcus* spp., *Bacteroides fragilis* and *Peptostreptococcus anaerobius* [78]. Of the case reports we analyzed, there was a wide variety of causative microbes including *Tuberculosis*, *Escherichia*, *Pseudomonas*, *Fusobacterium*, *Enterococcus*, *Pneumococcus*, *Clostridium*, *Sphenoides*, *Streptococcus*, *Staphylococcus*, *Bacteroides* and *Actinomyces*. The microbes we identified were similar to those previously reported on.

Current literature supports basic pyometra treatment with transcervical drainage, irrigation of uterine cavity, and antibiotic therapy with emergency surgical intervention in cases of SPP [4]. In a previous case review of pyometra, treatment with hysterectomy was completed in 82% of cases [9]. Majority (61.6%) of the cases analyzed in our study were treated with hysterectomy. Of those treated with hysterectomy, 72.9% also underwent concurrent bilateral salpingo-oophorectomy. Average age of those treated with hysterectomy was 68.6 years old with a range of 23 to 92 years old. Additionally, only 9% of those treated with hysterectomy had diagnosis of squamous cell carcinoma of the cervix, with the rest having benign findings. Alternative treatment methods included antibiotic therapy and drainage of the pyometra.

Table 1. Characteristics of All Studies Included in the Systematic Review

Reference number	Author	Patient age	Workup	Treatment	Pathology	Complications	Outcome
[5]	Zarour et al, 2021	68	CT, EMB, D&C	Total hysterectomy	No malignancy	Not ruptured	Lived
[7]	Saini et al, 2020 (case 1)	28	US, MRI	Staging laparotomy	Culture: Tuberculosis	Not ruptured	Lived
[7]	Saini et al, 2020 (case 2)	21	MRI pelvis	Staging laparotomy	Culture: <i>Tubercle bacilli</i> , dysgerminoma	Not ruptured	Lived
[8]	Walthall et al, 2021	80	CT abd/pelvis, US pelvis EMB, D&C	Abx	No malignancy	Not ruptured	Lived
[9]	Yildizhan et al, 2006	92	CXR, CT abd, laparotomy	TAH and BSO	No malignancy	Ruptured	Lived
[10]	Uno et al, 2016	90	CT, TVUS, laparotomy	TAH and BSO	No malignancy	Ruptured	Lived
[3]	Sirha et al, 2013	37	US, CT pelvis	TAH	No malignancy	Not ruptured	Lived
[11]	Tay et al, 2019	92	CT, TVUS	Abx, endometrial pipette drainage	X	Not ruptured	Lived
[12]	Huang et al, 2018	72	TVUS, CT, laparotomy	TAH and BSO, abx	No malignancy	Ruptured	Lived
[13]	Ikematsu et al, 1996	80	CT, laparotomy	TAH	No malignancy	Ruptured	Lived
[14]	Reis et al, 2016	27	Pelvic US	Abx, endometrial pipette drainage	X	Not ruptured	Lived
[4]	Yazawa et al, 2020 (case 1)	88	CT, laparotomy	TAH and BSO, resection sigmoid colon	No uterine malignancy, adenocarcinoma sigmoid colon	Ruptured	Died POD 189 d/t peritonitis and pneumonia
[4]	Yazawa et al, 2020 (case 2)	93	CT	Transcervical drainage, laparoscopic irrigation and drainage	X	Not ruptured	Lived
[15]	Sala et al, 2021	75	TVUS	D&C, abx	No malignancy	Not ruptured	Lived
[16]	Konishi et al, 2016	64	Colposcopic cervical biopsy, MRI, CT	Laparotomy, peritoneal lavage and drainage	Squamous cell carcinoma of the cervix	Ruptured	Lived
[17]	Chisthti et al, 2019	77	TVUS, MRI, chest CT	TAH and BSO, TV drainage, abx	Ziehl stain: acid fast bacilli, no malignancy	Not ruptured	Lived
[18]	Hagiya et al, 2015	80	CT	TV drainage, abx	Culture: <i>E. coli</i>	Not ruptured	Lived
[19]	Kutuk et al, 2013 (case 1)	71	CT abd, laparotomy	X	No malignancy	Ruptured	Lived
[19]	Kutuk et al, 2013 (case 2)	75	CT, laparotomy	TAH and BSO	No malignancy	Ruptured	Lived
[19]	Kutuk et al, 2013 (case 3)	68	CT abd/pelvis, TVUS, laparotomy	TAH and BSO	No malignancy	Ruptured	Died due to sepsis
[20]	Gul et al, 2019	35	TVUS, MRI	Needle evacuation	No malignancy	Not ruptured	Lived

Table 1. Characteristics of All Studies Included in the Systematic Review - (continued)

Reference number	Author	Patient age	Workup	Treatment	Pathology	Complications	Outcome
[21]	Shapey et al, 2012	84	CT, laparotomy	TAH	No malignancy	Ruptured	Lived
[22]	Gatongi et al, 2009	72	TVUS, hysteroscopy, EMB, Pipelle EMB	Abx	Culture: <i>Mycobacterium tuberculosis</i>	Not ruptured	Lived
[23]	Pankaja et al, 2014	74	MRI, hysteroscopy with drainage of pyometra and EMB	Abx	No malignancy	Not ruptured, diverticular mass with colouterine fistula	Lived
[24]	Kroon et al, 2016	65	CT, laparotomy	TAH	Squamous cell cervical carcinoma (prior to pyometra)	Ruptured	Lived
[25]	Gupta et al, 2012	50	CT abd	Drainage, abx	Culture: positive cocci in pairs and short chains	Not ruptured	Lived
[26]	Yahmadi et al, 2014	79	CT, laparotomy	TAH with BSO, abx	No malignancy	Not ruptured	Lived
[27]	Stunell et al, 2011	64	CT, laparotomy	TAH with BSO	No malignancy	Not ruptured	Lived
[28]	Kim et al, 2010	80	TVUS, CT, MRI, laparotomy	TAH with BSO, abx	No malignancy	Ruptured	Lived
[29]	Lodhi et al, 2011	32	TVUS, MRI, laparotomy	Subtotal hysterectomy	No malignancy	Not ruptured	Lived
[6]	Vyas et al, 2009	60	TVUS, CT	Pigtail drainage, abx	Previously diagnosed adenocarcinoma of the cervix	Ruptured	Lived
[30]	Shahid et al, 2006	80	TVUS, CT, laparotomy	TAH and BSO	Cervical carcinoma with secondary pyometra	Ruptured	Lived
[31]	Chan et al, 2006	64	CT, TVUS	Transrectal aspiration, LEEP	Squamous epithelial fragments with severe dysplasia CIN III and VAIN III	Not ruptured	Lived
[32]	Yang et al, 2006	64	CT abd	D&C, cervical biopsy, abx	Squamous cell carcinoma with stromal invasion and staging IVa	X	X
[33]	Chen et al, 2011	68	US abd, X-ray abd, laparotomy	TAH and BSO	No uterine malignancy, adenocarcinoma of the colon	Ruptured	Lived
[34]	Cheung et al, 2011	102	CT, Pap smear, cervical Bx	Radiation therapy	Stage IB cervical cancer, pyometra after radiation treatments	Not ruptured	Died
[35]	Hofmann et al 2003	29	US abd	Abx, EMB, aspiration	No malignancy	Not ruptured	Lived
[36]	Lee et al, 2007	60	CXR, laparotomy	TAH with BSO, abx	Pyometra with poorly differentiated cervical squamous cell carcinoma	Ruptured	Lived

Table 1. Characteristics of All Studies Included in the Systematic Review - (continued)

Reference number	Author	Patient age	Workup	Treatment	Pathology	Complications	Outcome
[37]	Zidi et al, 2003	75	Pelvic US	TAH with BSO	No malignancy	Not ruptured	Lived
[38]	Chan et al, 2005	84	TVUS	Hysteroscopy, uterine curettage, abx	Granulomatous inflammation, Ziehl-Nelson: acid fast bacilli	Not ruptured	Lived
[17]	Chishty et al, 2019	77	MRI pelvis, TVUS, CT chest	TLH with BSO, abx	Ziehl-Nelson stain: acid fast bacilli, no malignancy	Not ruptured	Lived
[39]	Razquin et al, 1993	52	Cervical biopsy	TLH with BSO	Squamous cell carcinoma in situ of the cervix associated with squamous cell carcinoma <i>in situ</i> of the endometrium	X	X
[40]	Kaneko et al, 1994	56	Laparotomy	TLH with BSO	No malignancy	Ruptured	Lived
[41]	Iwase et al, 2001 (case 1)	69	Pelvic US, CT, laparotomy	TAH	Culture: anaerobes, no malignancy	Not ruptured	Died due to organ failure
[41]	Iwase et al, 2001 (case 2)	89	CT, laparotomy	TLH with BSO	Culture: <i>E. coli</i> , no malignancy	Ruptured	Died due to acute coronary syndrome
[42]	Amin-Hanjani et al, 1995	47	X	Intrauterine drain, abx	No malignancy	Not ruptured	Lived
[44]	Dharmadhikari et al, 2007	44	Abd US, abd XR, laparotomy	TLH with right salpingo-oophorectomy and left salpingectomy with omentectomy, abx	No malignancy	Not ruptured	Lived
[44]	Kim et al, 2008	38	X	Hysterectomy, IUD removal, abx, patient declined hysterectomy	Cervical cancer	X	Died due to cervical cancer progression
[45]	Tai et al, 2007	79	Abd XR, abd US, CT abd	IUD removal, D&C, abx	Cultures: pseudomonas aeruginosa	Not ruptured	Lived
[46]	Sam et al, 1999	60	TVUS	Endometrial curetting, D&C, antibiotic therapy	Two fetal bone fragments found in endometrial cavity, culture: <i>E. coli</i> , no malignancy	X	X
[47]	Urushidani et al, 2020	73	US abd, CT abd	Drainage via vagina	Culture: <i>Fusobacterium nucleatum</i> , no malignancy	Not ruptured	Lived
[48]	Larkin et al, 2010	81	CT abd, laparotomy	Hartmann's procedure	X	Not ruptured	Lived
[49]	Emergui Zrihen et al, 2017	69	TVUS, laparotomy	Peritoneal lavage, Abx	No malignancy	Ruptured	Lived

Table 1. Characteristics of All Studies Included in the Systematic Review - (continued)

Reference number	Author	Patient age	Workup	Treatment	Pathology	Complications	Outcome
[50]	Noack et al, 2006	69	US, CT pelvis	Cervical dilation and drainage	No malignancy, culture: Enterococcus and <i>P. magnus</i>	Not ruptured	Died due to peritonitis with signs of systemic inflammation Lived
[51]	Nikkhah-Abyaneh et al, 2010	43	CT abd, MRI pelvis, laparoscopy and hysteroscopy	TLH, abx	Culture: vancomycin-resistant enterococci, no malignancy	Not ruptured	Lived
[52]	Dogan-Ekici et al, 2007	67	TVUS	EMB, TAH with BSO	No malignancy	Not ruptured	X
[53]	Hurst et al, 2013	60	CT abd	D&C, abx	Invasive squamous cell carcinoma	X	X
[54]	Shukla et al, 2012	65	CT abd	TAH and BSO	Culture: <i>Enterococcus faecalis</i> , no malignancy	X	X
[55]	Yasa et al, 2015	72	CT abd	Transabdominal drainage, TAH with BSO, upper vaginectomy, abx	Culture: <i>Escherichia coli</i>	Not ruptured	Lived
[56]	Nakao et al, 2000	86	Abd XR, US, CT, laparotomy	Supravaginal hysterectomy	Culture: <i>Clostridium sphenoides</i> , no malignancy	Ruptured	Lived
[57]	Orum et al, 2017	64	TVUS, CT abd	Abx, transvaginal drainage	Culture: <i>T. praecox</i> and <i>C. hastiforme</i> , no malignancy	Not ruptured	Lived
[58]	Inui et al, 1999	88	CXR, laparoscopy	TLH with BSO	Cultures: <i>E. coli</i> , no malignancy	Ruptured	Lived
[59]	Choudhary et al, 2014	65	CXR, laparotomy	X	X	Ruptured	X
[60]	Chuang et al, 2012	78	CT abd, US abd, laparotomy	TAH	Culture: <i>Bacteroides fragilis</i> and <i>Streptococcus viridans</i>	Not ruptured	Lived
[61]	Izumi et al, 2010	83	CT abd	TAH, drainage	Culture: <i>Bacteroides distasonis</i> , <i>Porphyromonas asaccharolytica</i> , and <i>Streptococcus oralis</i> , no malignancy	Ruptured, postoperative pneumonia and subsequent respiratory insufficiency	Lived
[62]	Yin et al, 2016	67	CT abd, laparotomy	TAH with BSO, drainage	Culture: <i>Staphylococcus epidermidis</i> , no malignancy	Ruptured, wound dehiscence	Lived
[63]	Shayya et al, 2009	78	CT abd, US abd	Transabdominal drainage, manual dilation of lateral vaginal tracts via 24-F catheters, abx	Culture: <i>Morganella morganii</i> , no malignancy	Not ruptured	Lived
[64]	Ploteau et al, 2012 (case 1)	23	CT abd, laparotomy	Subtotal hysterectomy	Culture: <i>Escherichia coli</i>	Not ruptured	Lived

Table 1. Characteristics of All Studies Included in the Systematic Review - (continued)

Reference number	Author	Patient age	Workup	Treatment	Pathology	Complications	Outcome
[64]	Ploteau et al, 2012 (case 2)	27	CT abd	Adhesion release, subtotal hysterectomy	X	Not ruptured	Lived
[65]	Saha et al, 2008	60	US abd, abd XR, laparotomy	Supravaginal hysterectomy with salpingo-oophorectomy and peritoneal lavage, abx	Culture: <i>Staphylococcus aureus</i> , no malignancy	Ruptured	Lived
[66]	Garanpayeh et al, 2006	63	US abd, CT abd, Laparotomy	TLH with BSO, abx	No malignancy	Ruptured	Lived
[67]	Bagga et al, 2008	60	Speculum and vaginal examinations, US abd	TAH	Primary squamous cell carcinoma of endometrium	X	X
[68]	Chao et al, 2013	60	US abd, TVUS, CT abd, CT chest, laparotomy	Uterine drainage, subtotal hysterectomy with BSO, abx	Culture: <i>S. epidermidis</i> , squamous cell carcinoma <i>in situ</i> , HPV 16+	Not ruptured, bacteremia	Died due to septic shock and multiple organ failure caused by persistent bacteremia
[69]	Cho et al, 2011	74	Pelvic US, CT pelvis	Drainage of vaginal canal, external beam radiotherapy	Stage 3 squamous cell carcinoma in the vagina	X	X
[70]	Kriplani et al, 1994	59	Speculum and vaginal examinations, US abd	Lippes loop removed, D&C, abx	Culture: <i>Actinomyces israelii</i> , no malignancy	Not ruptured	Lived
[71]	Kimura et al, 1994	72	Abd XR, laparotomy	TLH with BSO	No malignancy	Ruptured, subcutaneous abscess and pneumonia	Lived
[72]	Chaopotong et al, 2012	88	TVUS, laparotomy	TLH with BSO	No malignancy	Ruptured	Died due to severe sepsis and multiple organ failure
[73]	Roth et al, 2007	78	Pelvic US, CT abd, laparotomy	TAH with BSO and upper vaginectomy	No malignancy	Not ruptured	Lived
[74]	Deutchman et al, 2013	29	Abd US	Pipelle catheter aspiration, abx	Culture: group B strep	Not ruptured	Lived
[75]	Habek et al, 2005	84	Pelvic US, laparotomy	TLH with BSO, appendectomy, omentectomy, and drainage of the Douglas space	Culture: <i>Escherichia coli</i> , no malignancy	Not ruptured	Lived

CT: computed tomography; EMB: endometrial biopsy; D&C: dilation and curettage; US: ultrasound; MRI: magnetic resonance imaging; abd XR: abdominal X-ray; CXR: chest X-ray; abx: antibiotics; TAH: total abdominal hysterectomy; BSO: bilateral salpingo-oophorectomy; TVUS: transvaginal ultrasound; POD: post-operative; TV: transcervical; LEEP: loop electro-surgical excision procedure; CIN: cervical intraepithelial neoplasia; VAIN: vaginal intraepithelial neoplasia; TLH: total laparoscopic hysterectomy; IUD: intrauterine device; HPV: human papillomavirus type 16.

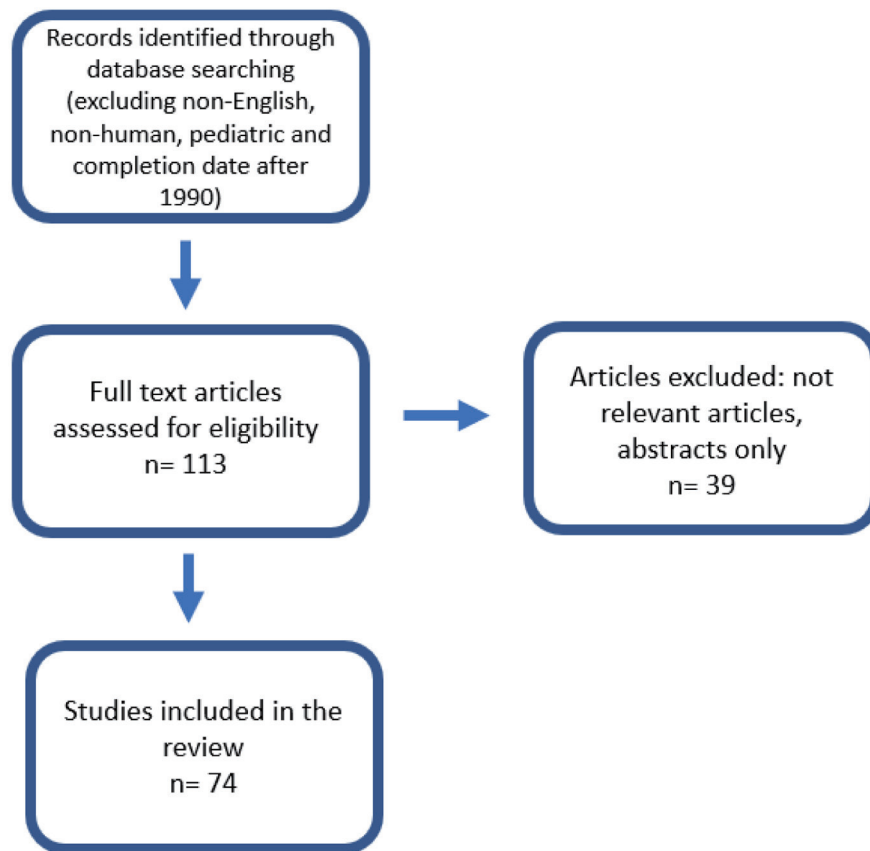


Figure 5. Flow diagram for article selection.

If left untreated, pyometra can rarely result in the serious complication of SPP. Prognosis after SPP can be poor, especially in women of advanced age and those with poor general health. Current literature reports rates of SPP to be around 5% [4]; however, in our study group, uterine rupture was reported as a complication in 36.1% of cases. Additional complications reported included subcutaneous abscess, pneumonia, wound dehiscence, and respiratory insufficiency. Eight patients died following complications of the pyometra which included complications such as sepsis, pneumonia, colouterine fistula, organ failure and cancer progression due to refusal of treatment. No cases of recurrence were reported.

Conclusion

Preoperative diagnosis of pyometra is difficult but imperative, as early treatment may prevent from future uterine rupture and aid in identification of underlying cause including malignancy. Majority of cases in our analysis presented with abdominal pain and were treated with hysterectomy; however, a wide range of presentations and treatment modalities were identified in the reports included in this analysis. An increased number of cases were complicated by uterine rupture compared to previously reported research, in addition to an increased rate of underlying malignancy. With the presentation of our case and analysis of

previously published case reports, we highlight the importance of considering malignancy as a differential diagnosis when presented with a postmenopausal patient with pyometrium, in addition to early intervention to prevent uterine rupture.

Learning points

Highlight a case of pyometra in a postmenopausal woman with underlying gynecological malignancy.

Uterine perforation is a dangerous, and not uncommon consequence of prolonged pyometra, highlighting the importance of early diagnosis.

Underlying gynecological malignancy should be considered as an underlying cause of pyometrium in postmenopausal women.

Acknowledgments

None to declare.

Financial Disclosure

None to declare.

Conflict of Interest

None to declare.

Author Contributions

BD: literature search, introduction, discussion, abstract, and references. RM: case report, images, and literature search. GEK and MN: description of pathology findings, and images.

Data Availability

The authors declare that data supporting the findings of this study are available within the article.

Abbreviations

SPP: spontaneous perforated pyometra; US: ultrasound; CT: computed tomography; MRI: magnetic resonance imaging

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