

Conservative Treatment of Severe Pelvic Abscess Post-Cesarean Section in China: A Case Series

Xiaoli Wu*, Xiaobo He*, Jun Lou

Department of Obstetrics, Affiliated Women and Children's Hospital of Ningbo University, Ningbo, Zhejiang, 315012, People's Republic of China

*These authors contributed equally to this work

Correspondence: Jun Lou, Email mouseloujun@163.com

Background: The rate of cesarean section (CS) is increasing worldwide (especially in China) reaching 51–65%. Although severe pelvic abscesses after CS are rare, they are difficult to treat. To address this problem, we herein report 23 cases of severe pelvic abscesses and their treatments.

Methods: We identified 23 patients with severe pelvic abscesses using International Classification of Disease codes in a retrospective quality assurance analysis.

Results: Among 12,640 cesarean deliveries, 23 women (0.182%) developed severe pelvic abscess. Include total numbers for treatments, 69.5% (16/23) treated with debridement, 30.4% (7/23) with antibiotics only. All patients presented with fever lasting 5–17 days. Imaging (B-ultrasound/MRI) confirmed periuterine abscess cysts in all cases. Pathogens were identified in 18 cases: bacteria (n=14), *Mycoplasma suis* (n=3), and *Rhizopus* (fungal, n=1).

Conclusion: Our study reported that debridement was a good treatment option, and the patient's temperatures were controlled after the pus was expelled.

Keywords: severe pelvic abscess, cesarean delivery, surgery site infection, case series

Introduction

A cesarean section (CS) is a procedure involving an incision in the lower abdomen to expose the uterus and a second incision to the uterus to allow removal of the infant and placenta.¹ With the rate of CS increasing, the rate of wound complications such as infection, hematoma, sarcoma, and dehiscence are increased.² Wound infection is considered a major potential complication of CS.^{3,4} Wound abscesses stem from wound dehiscence, endometritis, and sepsis have increased in recent years, affecting 2–15% of women who undergo CS.⁵ In recent decades, with the widespread use of antibiotic prophylaxis, the incidence of postpartum infection has declined;⁶ however, pelvic abscess can still occur, in between 0.06% and 3.8% of patients.⁷ Due to the low incidence of cases and the absence of high-quality randomized controlled trials (RCTs), the management of pelvic abscess remains contentious. Current approaches can be broadly categorized into conservative management, which often involves antibiotics, and surgical interventions, including drainage or hysterectomy, depending on the severity of the condition. When a pelvic abscess is complicated with uterine dehiscence, laparotomy should be performed,⁸ and hysterectomy is recommended.⁹ The lack of consensus guidelines highlights the need for further research to establish effective treatment strategies. Herein, we report patient findings to study the clinical characteristics and management of pelvic abscesses after cesarean section.

Methods

This retrospective study included patients with pelvic abscesses at Ningbo Women and Children's Hospital, a public tertiary referral center, Ningbo, China; between January 2016 and January 2021. The study included all patients with

a diagnosis of pelvic abscess and puerperal infection after CS according to specific ICD-10 codes. All patients diagnosed with puerperal infection with pelvic abscess were consecutively included.

Puerperal infection describes any bacterial infection of the genital tract after delivery, together with one or more of the following criteria: a body temperature of 38°C or more, an uncertain diagnosis, oral antibiotic treatment for 48 hours with no response, clinical signs of peritoneal irritation, and nausea and vomiting that impede oral intake. The diagnosis of pelvic abscess can be evaluated using computed tomography (CT) or magnetic resonance (MR) imaging. All patients were followed up to 42 days after delivery.

The inclusion criteria were as follows: all pregnant women who underwent cesarean section and had abdominal or pelvic pain, fever, vaginal discharge, nausea and a diagnosis of pelvic abscess by ultrasound or MRI with or without wound dehiscence.

The exclusion criteria were incomplete medical records or other reasons for abscess, appendicitis, intestinal perforation, etc.

Patient Characteristics

The study examined demographic, obstetric, maternal, operative, and postpartum variables. Demographic variables included age, body mass index (BMI), and weight gain during pregnancy. Obstetric variables included the number of prior pregnancies and births, color of amniotic fluid, diagnosis of chorioamnionitis, bacterial vaginosis, and preterm birth. Operative variables included the urgency of the operation (elective or emergency). The amount of intraoperative bleeding was measured from the time of skin incision to the time of wound closure. The amount of postpartum hemorrhage (PPH) was defined as the total volume of blood exceeding 500 mL from the end of the cesarean section procedure to 24 hours later.¹⁰ The records were also checked for the outcomes of cultures of discharge from the vagina, amniotic fluid or wounds. Clinical characteristics were recorded for all patients from electronic medical chart reviews. Fever onset, duration, maximum temperature, and pattern were recorded in SF (+) patients. Postoperative fever was defined as a fever that began on or after postoperative day (POD), and the temperature was more than 37.8°C on 2 successive measurements or greater than 39°C once. Fever duration is delineated as the temporal span from the primary recorded corporeal temperature $\geq 38.0^\circ\text{C}$ until the corporeal temperature reverts to $< 37.5^\circ\text{C}$ and persists in a stable state without the administration of antipyretics for a minimum of 24 hours. B ultrasonic or MRI results were also recorded. Paralytic ileus was associated with 2 or more of the following symptoms 2 days after surgery: vomiting, abdominal distension, the inability to tolerate oral feeding, and the absence of flatus.¹¹ Culture results refer to the findings obtained from microbiological cultures of clinical specimens—such as blood, pus, urine, or tissue—used to detect, isolate, and identify pathogenic microorganisms, as well as to determine their antibiotic susceptibility profiles when available. The treatment of pelvic abscess was based on the recommendation of Antibiotic Therapy for Acute Pelvic Inflammatory Disease: The 2006 Centers for Disease Control and Prevention Sexually Transmitted Diseases Treatment Guidelines.^{4,12}

Results

A total of 12640 patients underwent CS over the ten-year study period, of whom 23 (0.182%) were diagnosed with pelvic abscess after CS. Include total numbers for treatments, 69.5% (16/23) treated with debridement, 30.4% (7/23) with antibiotics only. The characteristics of all patients are shown in Table 1. Every patient had a fever that lasted 5–17 days, and the average temperature for patients was 39.5°C. B ultrasound or MRI revealed abscess cysts around the uterus in the pelvic abscess group. A total of 15 (65.2%) of the 23 patients with pelvic abscesses had wound dehiscence. Using a vascular clamp, the uterine cavity was accessed through the wound in 6 patients (Figure 1). Nine patients (39.1%) had suffered from paralytic ileum (Table 2). In our patients, 18 patients had a positive culture, 14 were bacteria, three were *Mycoplasma suis*, and one was a *Rhizopus* (Table 2). Gram-negative bacteria were detected mostly and were taken up by *Streptococcus* and *Escherichia coli*. Most of the patients were given antibiotics, nine of them were given Tienam, and one was given micafungin because of the culture results. 15 patients were underwent debridement due to wound dehiscence, and 4 of them underwent drainage (two from the wound, one from culdocentesis, and one from a secondary suture) (Table 2). Every patient recovered well without the need for a hysterectomy.

Table 1 Demographic, Clinical, and Operative Characteristics of Patients

Cases	Age (Years)	Gravity and Parity	Gestation Age at Termination (Weeks)	Indication for CS	Emergency	PPH (mL)	Special Items
1	33	2/1	30+2	Fetal distress	Yes	400	
2	26	2/0	38+1	Arrested descent	Yes	600	
3	25	2/0	32+6	Twins, PPROM	Yes	600	
4	26	3/1	36+6	Prior CS	Yes	600	
5	31	1/0	31	Twins	0	1000	B-lynch suture and PAE
6	30	3/1	33+6	Prior CS, PPROM	0	1500	PAE at POD 7
7	20	2/0	39+6	CSMR	0	250	0
8	26	3/0	40	Fetal distress	Yes	400	0
9	26	1/0	37+4	Twins	Yes	800	0
10	23	3/1	36+6	Prior CS	Yes	1200	0
11	25	5/1	38+3	Prior CS, PA	Yes	1200	0
12	26	1/0	35	Footing presentation	Yes	400	0
13	24	3/1	39	Prior CS	0	400	0
14	36	3/1	38+4	Prior CS	0	400	0
15	33	1/0	29	Arrested descent	0	1350	BBT
16	30	1/0	34	Twins	0	1000	BBT
17	22	1/0	40+1	Arrested descent	Yes	350	0
18	33	5/2	29+2	Twins, PA	Yes	500	0
19	28	1/0	40+5	Arrested descent	Yes	5100	D*
20	32	1/0	39	CSMR	0	400	0
21	31	4/0	39+6	Intrauterine infection	Yes	400	0
22	30	2/1	36+6	Prior CS	Yes	350	0
23	28	3/2	38	Prior CS	0	400	0

Notes: D* represented that this patient was performed by removal of hematoma of broad ligament and posterior peritoneum hematoma, the ligation of left internal iliac artery.
Abbreviations: BBT, Bakri balloon tamponade insertion; PPROM, preterm premature rupture of membranes; CS, cesarean delivery; CSMR, cesarean delivery on maternal request; PA, placental abruption; PAE, pelvic arterial embolization.

Discussion

During the ten-year study period, 12,640 patients underwent CS, among whom 23 (0.18%) developed postoperative pelvic abscess. The treatment approaches for these cases included surgical debridement (69.5%, 16/23) and antibiotic therapy alone (30.4%, 7/23). Cesarean delivery accounts for 45–60% of all births in China, making standardized incision management critically important. Prevention strategies such as: Dermabond Prineo™ Skin Closure may potentially improve wound healing outcomes.^{13–15}

In 13 patients, the cyst was located anterior to the uterus, 9 of whom were complicated by wound dehiscence, so debridement was the best treatment. Because many cysts are located anterior to the uterus, the pus can drain from the incision after debridement. Until removal of foreign matter and necrotic tissue (which may serve as a culture medium for bacteria) is completed, wounds will heal, begin to granulate and consequently epithelialize.⁹ After the pus was drained, the pelvis recovered. Unfortunately, only one patient underwent secondary closure and removal of the pelvic abscess by laparotomy surgery. In our study, another patient underwent US drainage twice due to abscesses located at the pouch of Douglas. It has been reported that the success rates of CT- and US-guided drainage are 83.3% and 92%, respectively, with tubo ovarian abscesses in gynecology.^{16,17} Interestingly, in Chen's study, they reported two patients with pelvic abscesses of a 5–6 cm single cyst in diameter without wound dehiscence who were treated with laparoscopic surgery because they all had difficulty performing CT- and US-guided drainage.¹⁸ It is possible that laparoscopic surgery is a good treatment for patients with pelvic abscesses. However, in our study, other patients with pelvic abscesses of a 5–6 cm single cyst in diameter without wound dehiscence were all treated with antibiotics. Surgical or chemical debridement is commonly used to manage infected wounds by removing necrotic tissue and promoting healing. However, existing trials have not established which method is most effective.

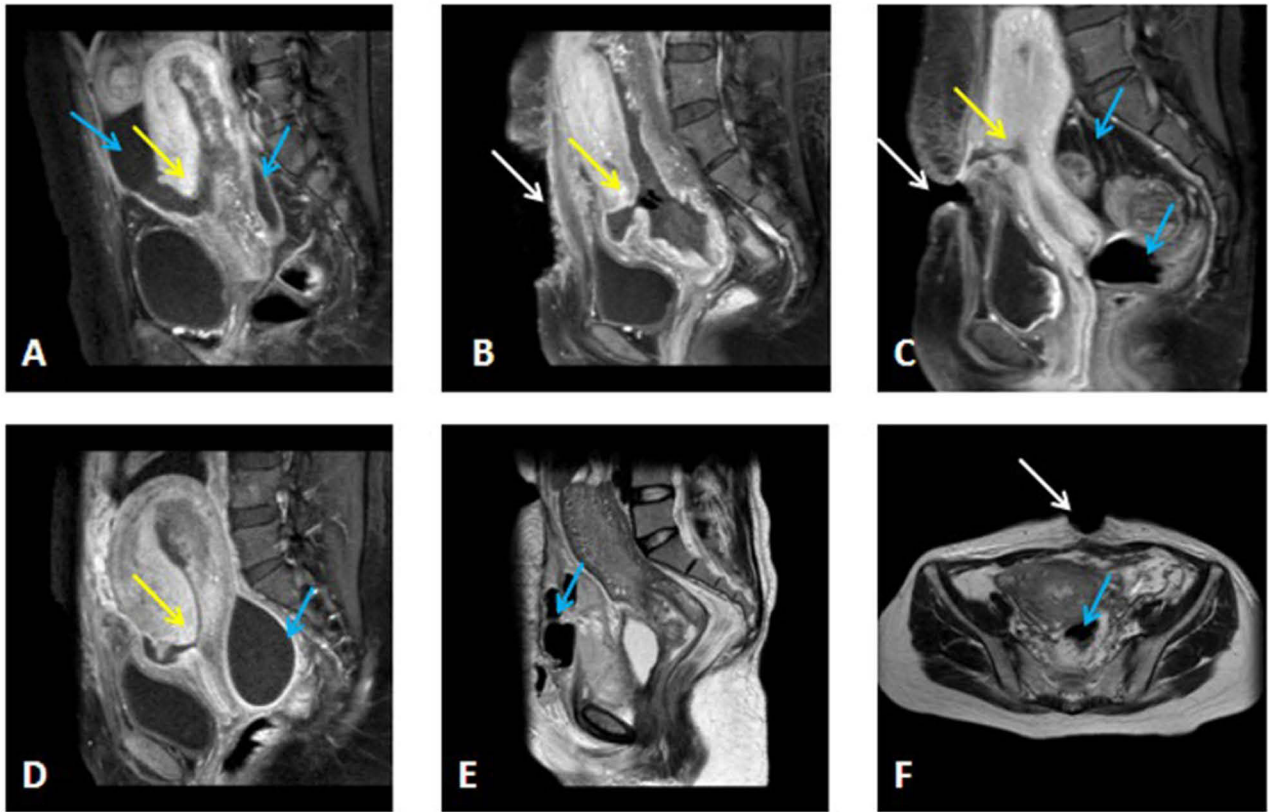


Figure 1 Sagittal T1-weighted image contrast (A–D) obtained after CS demonstrates a mixed signal intensity mass located (blue arrows) in the pelvis. There were uterine dehiscences (yellow arrows) and wound dehiscences (white arrows). Sagittal T2-weighted image (E) and coronal T2-weighted image (F) demonstrate pelvic abscess (blue arrows) and wound dehiscences (white arrows).

A total of 65% (18/23) of patients had a positive discharge culture. The most common pathogens in the discharge were *Streptococcus* (30.7%), *Enterococcus spp.* and *Escherichia coli*, which is consistent with studies from Great Britain, where *Streptococcus* was the most common pathogen.^{9,19–21} However, due to the long time and widespread use of broad-

Table 2 Outcomes and Treatment of Patients with Pelvic Abscess

Cases	Paralytic Ileus	Fever Duration (Day)	The Average of Fever	Diameter of Pus on Ultrasound or MRI (cm)	Wound Disruption	Chorioamnionitis	Treatment Applied (Debridement)	Culture Results
1	Yes	1–6	39	13	0	Yes	0	<i>S. mutans</i>
2	Yes	1–7	39	12	Yes	Yes	Yes	<i>S. agalactiae</i>
3	Yes	1–11	39	8	Yes	Yes	Yes	None
4	Yes	1–6	39.6	5	Yes	0	Yes	None
5	Yes	18–35	39.4	8	Yes	0	Yes	<i>K., E. coli</i>
6	0	2–14	39.6	7	Yes	0	Yes	<i>S. milleri</i> group
7	0	3–13	39.5	6	0	0	0	None
8	Yes	1–7	38.6	5	Yes	0	Yes	<i>E. coli</i>
9	0	4–7	39	10	0	0	0	<i>E. coli</i>
10	0	2–7	39	6	0	0	0	None
11	0	6–7	38.9	5	Yes	Yes	A*	<i>E. coli</i>
12	0	5–7	38.3	7	Yes	0	Yes	None
13	0	19–26	39.1	8	0	0	0	None

(Continued)

Table 2 (Continued).

Cases	Paralytic Ileus	Fever Duration (Day)	The Average of Fever	Diameter of Pus on Ultrasound or MRI (cm)	Wound Disruption	Chorioamnionitis	Treatment Applied (Debridement)	Culture Results
14	0	11–15	38	12	0	0	0	<i>Gemella morbillorum</i>
15	Yes	1–4	39.5	9	Yes	Yes	Yes	<i>S. anginosus</i> , <i>E. coli</i>
16	0	1–5	41	9	Yes	0	Yes	<i>E. coli</i>
17	0	2–14	39.3	9	Yes		B*	<i>Mycoplasma</i>
18	Yes	3–10	39.5	12	Yes	Yes	Combined drainage	None
19	Yes	8–12	39.2	16	yes	0	Combined drainage	<i>Rhizopus</i>
20	0	2–10	40.2	10	Yes	0	Yes	<i>Mycoplasma</i>
21	0	1–6	39.4	6	Yes	Yes	Yes	<i>E. coli</i>
22	0	5–11	38.5	9	0	0	0	<i>Mycoplasma</i>
23	0	9–15	39.8	7	0	0	A*	<i>E. coli</i>

Notes: A* represented that this patient was treated by abdominal wall incision debridement and suture; pelvic abscess incision and drainage. B* represented that this patient was treated by posterior fornix puncture and drainage.

spectrum antibiotics, pelvic abscess pathogens may also originate from fungi.^{22–24} Based on the guidelines developed by the CDC, the treatment of pelvic abscess is empirical and involves the use of broad-spectrum antimicrobial agents to cover likely pathogens.^{6,25,26} In our study, nine patients were treated with Tienam due to failure of other antimicrobial agents. Interestingly, when we performed drainage and debridement, the temperature would slowly return to normal. This was also reported in John's study.²⁴ Therefore, in the clinic, we should locate the infection and not just switch the antimicrobial agents.

The patient's presenting symptoms of fever, abdominal pain and wound dehiscence initially prompted us to consider infection and led us to sonographic and subsequent radiological investigations to learn the underlying abscess. Twenty-three patients all presented with abscesses located at the lower anterior wall of the uterus, posterior fornix, uterine fundus, and retrorectal space. In one patient, we were able to use a vascular clamp to directly access the uterine cavity from the wound dehiscence and see the cervical mucus on the incision in the abdominal wall. Three patients all presented with uterine dehiscence in the lower uterine segment at the site of the uterine scar and pelvic abscesses on MRI (Figure 1). Others presented with more gas and liquid in the abscesses. In Dana's report, they also showed the results of abscesses on CT imaging.¹⁰

Our study has several limitations. The primary limitation is that pelvic abscesses could not be located as early as possible. Most patients' pelvic abscesses were discovered when the fever persisted despite good antibiotics for a long time. The second limitation was the retrospective nature of this research. Third, the treatment of every patient with pelvic abscess had its own characteristics, so there is no standard guideline for locating the abscesses.

Conclusion

In conclusion, our study reported that debridement was a good treatment option, and the patient's temperatures were controlled after the pus was expelled. We propose to develop the possibility of future standardized guidelines by expanding the sample size based on the results of the study.

Data Sharing Statement

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Ethics Approval and Consent to Participate

This study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethnic Committee of the Affiliated Women and Children's Hospital of Ningbo University (approval number: EC2020-068). All data were

collected from the electronic medical record system in the department of Obstetrics Medicine Center. Data were anonymized and de-identified before analysis. Informed consent was obtained from the patients for publication.

Acknowledgments

Xiaoli Wu and Xiaobo He are co-first authors for this study. We thank those who have devoted much to this study, including nurses, study doctors, statisticians, reviewers, and editors. They were not financially compensated for their contributions. This paper has been uploaded to ResearchSquare as a preprint: <https://www.researchsquare.com/article/rs-1984768/v1>.

Funding

This study was supported by the Medical Science and Technology Project of Zhejiang Province (2024KY1575 & 2024ZL960). This study was supported by the project of Ningbo Key Technology R&D 2023, Zhejiang Province, China under Grant (2023Z183 & 2010-S04).

Disclosure

The authors declare no conflicts of interest in this work.

References

- Centers for Disease Control and Prevention's National Healthcare Safety Network Classification for Surgical Site Infection (SSI). Adapted from centers for disease control and prevention's national healthcare safety network classification for surgical site infection (SSI).
- Leanza V, Presti VL, Di Guardo F, et al. CT-guided drainage with percutaneous approach as treatment of E. Faecalis post caesarean section severe abscess: case report and literature review. *Il Giornale di chirurgia*. 2019;40(4):368–372.
- Berrios-Torres SI, Umscheid CA, Bratzler DW, et al. Centers for disease control and prevention guideline for the prevention of surgical site infection, 2017. *JAMA Surg*. 2017;152(8):784–791. doi:10.1001/jamasurg.2017.0904
- Committee on Practice Bulletins-Obstetrics. ACOG practice bulletin no. 199: use of prophylactic antibiotics in labor and delivery. *Obstet Gynecol*. 2018;132(3):e103–e119. doi:10.1097/AOG.0000000000002833
- Benigno BB. Medical and surgical management of the pelvic abscess. *Clin Obstet Gynecol*. 1981;24(4):1187–1197. doi:10.1097/00003081-198112000-00016
- Walker CK, Wiesenfeld HC. Antibiotic therapy for acute pelvic inflammatory disease: the 2006 centers for disease control and prevention sexually transmitted diseases treatment guidelines. *Clin Infect Dis*. 2007;44(Suppl 3):S111–22. doi:10.1086/511424
- Curry A, Williams T, Penny ML. Pelvic inflammatory disease: diagnosis, management, and prevention. *Am Fam Phys*. 2019;100(6):357–364.
- Granberg S, Gjelland K, Ekerhovd E. The management of pelvic abscess. *Best Pract Res Clin Obstet Gynaecol*. 2009;23(5):667–678. doi:10.1016/j.bpobgyn.2009.01.010
- Poincloux L, Caillol F, Allimant C, et al. Long-term outcome of endoscopic ultrasound-guided pelvic abscess drainage: a two-center series. *Endoscopy*. 2017;49(5):484–490. doi:10.1055/s-0042-122011
- American College of Obstetricians and Gynecologists. ACOG practice bulletin: clinical management guidelines for obstetrician-gynecologists number 76, October 2006: postpartum hemorrhage. *Obstet Gynecol*. 2006;108(4):1039. doi:10.1097/00006250-200610000-00046
- Zlakisvili B, Sela HY, Tankel J, et al. Post-caesarean ileus: an assessment of incidence, risk factors and outcomes. *Eur J Obstet Gynecol Reprod Biol*. 2022;269:55–61. doi:10.1016/j.ejogrb.2021.12.019
- Brun J-L, Castan B, de Barbeyrac B, et al. Pelvic inflammatory diseases: updated French guidelines. *J Gynecol Obstet Hum Reprod*. 2020;49(5):101714. doi:10.1016/j.jogoh.2020.101714
- Liu X, Lynch CD, Cheng WW, Landon MB. Lowering the high rate of caesarean delivery in China: an experience from Shanghai. *BJOG*. 2016;123(10):1620–1628. doi:10.1111/1471-0528.14057
- Holt B, Varadarajulu S. Endoscopic ultrasound-guided pelvic abscess drainage (with video). *J Hepato-Biliary-Pancreatic Sci*. 2015;22(1):12–15. doi:10.1002/jhbp.150
- Libretti A, Bracci B, De Pedrini A, Surico D, Troia L, Remorgida V. The dermabond prineo skin closure system: benefits and complications. *J Gynecol Surg*. 2024;40(2):123–131. doi:10.1089/gyn.2023.0038
- Peng T, Dong L, Zhu Z, et al. CT-guided drainage of deep pelvic abscesses via a percutaneous presacral space approach: a clinical report and review of the literature. *Acad Radiol*. 2016;23(12):1553–1558. doi:10.1016/j.acra.2016.06.009
- Chen K-Y, Tseng J-Y, Yang C-Y. Tubo-ovarian abscess with sepsis in a nonagenarian woman: a case report and literature review. *BMC Women's Health*. 2019;19(1):81. doi:10.1186/s12905-019-0782-6
- Meislin HW. Bacteroides in pelvic abscesses. *New Engl J Med*. 1977;297(14):788–789.
- Ren HJ, Zhang JP, Tian RX, et al. Analysis of the effect of transgluteal percutaneous drainage in the treatment of deep pelvic abscess. *Zhonghua Wei Chang Wai Ke Za Zhi*. 2020;23(12):1177–1181. doi:10.3760/cma.j.cn.441530-20201103-00588
- Yagur Y, Weitzner O, Man-El G, et al. Conservative management for postmenopausal women with tubo-ovarian abscess. *Menopause*. 2019;26(7):793–796. doi:10.1097/GME.0000000000001317
- Bennett JD. Continuing professional development. Evidence-based radiology problems. Transrectal drainage of pelvic abscess: June 2004 - May 2005. *Can Assoc Radiol J*. 2004;55(3):140–3; quiz143–4.
- Sohn M, Agha A, Iesalniaks I, et al. Risk of colectomy after conservative treatment of diverticulitis of the left hemicolon complicated by abdominal or pelvic abscess: protocol of a systematic review and meta-analysis. *BMJ Open*. 2020;10(12):e042350. doi:10.1136/bmjopen-2020-042350

23. Akıncı D, Ergun O, Topel Ç, et al. Pelvic abscess drainage: outcome with factors affecting the clinical success. *Diagn Interv Radiol.* 2018;24(3):146–152. doi:10.5152/dir.2018.16500
24. Kwon SY, Brown S, Hibbeln J, et al. Conservative management of pelvic abscess following sacrocolpopexy: a report of three cases and review of the literature. *Int Urogynecol J.* 2017;28(6):875–879. doi:10.1007/s00192-016-3189-z
25. Dhindsa BS, Naga Y, Saghir SM, et al. EUS-guided pelvic drainage: a systematic review and meta-analysis. *Endosc Ultrasound.* 2021;10(3):185–190. doi:10.4103/eus.eus_71_20
26. Horowitz JM, Hotalen IM, Miller ES, et al. How can pelvic MRI with diffusion-weighted imaging help my pregnant patient? *Am J Perinatol.* 2020;37(6):577–588. doi:10.1055/s-0039-1685492

International Journal of Women's Health

Publish your work in this journal

The International Journal of Women's Health is an international, peer-reviewed open-access journal publishing original research, reports, editorials, reviews and commentaries on all aspects of women's healthcare including gynecology, obstetrics, and breast cancer. The manuscript management system is completely online and includes a very quick and fair peer-review system, which is all easy to use. Visit <http://www.dovepress.com/testimonials.php> to read real quotes from published authors.

Submit your manuscript here: <https://www.dovepress.com/international-journal-of-womens-health-journal>

Dovepress
Taylor & Francis Group