

Transvaginal Ultrasound-Guided Aspiration of Pelvic Abscesses

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ABSTRACT

Objective: To assess the utility of a less invasive approach to the care of women with a pelvic abscess, we retrospectively reviewed the outcome of women with pelvic abscesses managed by transvaginal ultrasound-guided aspiration.

Methods: A retrospective analysis of 27 pelvic abscesses in 22 consecutive women undergoing transvaginal drainage, including 13 tuboovarian abscesses (TOAs) and 14 postoperative abscesses (POAs). All patients received broad-spectrum intravenous antibiotics from the time infection was diagnosed to resolution of signs and symptoms. Chart review and examination of ultrasound files were utilized to extract demographic clinical, laboratory, and outcome data.

Results: The mean age for the study group was 30 years old. Mean duration from diagnosis to drainage was 5.6 days (TOA) and 2.0 days (POA), $P < 0.01$. The mean diameter of the abscesses was 86 mm. The volume of purulent material drained ranged from 70–750 mL. Perceived adequacy of drainage was correlated with lack of abscess septation. Cultures for aerobic and anaerobic pathogens were positive in 51% of cases (79% POA versus 23% TOA, $P < 0.05$) with 1.9 organisms/positive culture. Transvaginal drainage was successful in 25 of 27 abscesses. No complications were reported.

Conclusion: In skilled hands, transvaginal guided aspiration of pelvic abscess is a highly successful technique with minimal risk to the patient. Follow-up studies are needed to assess the long-term sequelae, such as frequency of infertility, ectopic pregnancy, and chronic pelvic pain. *Infect. Dis. Obstet. Gynecol.* 7:216–221, 1999. © 1999 Wiley-Liss, Inc.

KEY WORDS

tuboovarian abscess; pelvic mass; minimally invasive procedure; pelvic inflammatory disease

Tuboovarian abscess (TOA) accounts for as many as 2.2% of admissions to urban hospitals,¹ while postoperative abscesses (POAs) occur following 0.7–4.0% of major gynecological operations.² Pelvic abscesses are associated with significant acute morbidity and serious long-term sequelae, including adhesion formation, chronic pelvic pain, and impaired fertility.

Contemporary management of an unruptured TOA consists of treatment with intravenous broad-spectrum antibiotics. Persistence of symptoms or suspected rupture of TOA requires laparotomy, with drainage of the abscess and excision of infected tissues. Recent literature suggests that an alternative to conventional surgical treatment of acute pelvic abscesses is early laparoscopic drain-

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age.^{3,4} Another approach to the management of pelvic abscesses is transabdominal interventional radiology-directed aspiration and drainage. While both interventions offer potential reductions in length of hospital stay and cost, ultrasound-guided drainage has the advantage of being less invasive than laparoscopic surgery and avoids the cost and morbidity associated with a surgical procedure. This report describes 27 cases of pelvic abscess in 22 patients who were managed by intravenous antibiotics combined with transvaginal ultrasound-guided drainage.

MATERIALS AND METHODS

The medical records of all women undergoing transvaginal drainage of pelvic abscesses at Hutzel Hospital, Detroit, Michigan, from 1991 to 1995 were reviewed. All patients had received a minimum of 48 hours of parenteral antibiotic therapy alone, had persistent abdominal and pelvic pain, fever (temperature $>38.0^{\circ}\text{C}$), or leukocytosis (white blood cells $>10,000/\text{mm}^3$). The antibiotic regimens consisted of cefotetan, 2 g intravenously every 12 hours, plus doxycycline, 100 mg intravenously every 12 hours, or gentamicin, 2 mg/kg loading dose intravenously, followed by gentamicin, 1.5 mg/kg intravenously every 8 hours, plus clindamycin, 900 mg intravenously every 8 hours. Five patients underwent bilateral TOA drainage.

All pelvic abscess aspirations were performed transvaginally in the radiology suite following premedication of the patient with intravenous or intramuscular sedatives or analgesics including Versed® (Roche Pharmaceuticals), 1–2 mg; Demerol® (Sanofi Winthrop), 50 mg; and Valium® (Roche Products), 5–10 mg.

Following povidone-iodine preparation, the vaginal wall was anesthetized with 1% lidocaine. Aspirations were performed using either a 5-MHz (ATL-Ultramark 4, Bothell, WA) or a 6.5-MHz (Diasonics Spectra VST, Santa Clara, CA) endovaginal transducer with an attached biopsy guidance system. A diagnostic aspiration of all collections was initially performed with a 22-g, 20-cm long Chiba needle (EZ-M, Westbury, NY). An indwelling 8-F catheter (APD, Medi-Tech, Boston, MA) or 12-F–14-F catheter (van Sonnenberg sump, Medi-Tech) was placed in 17 abscesses because of viscous, purulent fluid or multiple loculations. Nine abscesses with low viscosity that were uni-

TABLE 1. Etiology of pelvic abscess

Type of pelvic abscess	No. of cases
Tuboovarian abscesses	13
Postoperative abscesses	14
Total abdominal hysterectomy	6
Small bowel resection	2
Ovarian tumor debulking	1
Radical hysterectomy with pelvic node dissection	1
Vaginal hysterectomy	1
Ileostomy complicating ruptured appendix	1
Colonic reanastomosis	1
Postpartum tubal ligation	1

locular were aspirated with an 18-g–22-g Chiba needle. If no hemorrhagic component was noted in the effluent, irrigation of the abscess cavity with saline was performed after evacuation of its contents. Catheters were left indwelling for gravity drainage. Daily irrigation of the catheter with 10–20 mL of saline was performed in highly viscous collections to prevent catheter occlusion. Catheters were removed following cessation of symptoms, minimal or no drainage, normalization of white blood cell count, and defervescence.

Chi-square and Fisher exact tests were used to analyze categorical variables, while continuous variables were analyzed with a two-tailed *t* test. A *P*-value less than 0.05 was considered significant.

RESULTS

Twenty-seven transvaginal aspirations were performed on twenty-two women. The etiologies of the abscesses are shown in Table 1. The mean age was 39 years old, with a range of 21–78 years. The most common presenting symptoms were lower abdominal pain (83%), fever and chills (70%), pelvic pain (52%), and/or nausea and vomiting (43%). All patients with TOA presented with fever and chills, lower abdominal pain, and a vaginal discharge. The mean onset of symptoms in postoperative patients occurred on postoperative day 3 (range, 1–14 d), whereas in TOA patients, presenting symptoms occurred at a mean of 6 days prior to admission (range, 2–18 d). The physical examination findings were similar in both abscess groups, including abdominal tenderness in 87%, fever ($>38.0^{\circ}\text{C}$) in 74%, tachycardia in 52%, and palpable mass in 50%. An elevated white blood cell count was noted in 91% of patients. Initial management of all patients included broad-spectrum intravenous an-

TABLE 2. Bacteria recovered from pelvic abscess

Bacteria	TOA (n = 3)	Postoperative abscess (n = 11)
<i>Escherichia coli</i>	1	5
<i>Streptococcus</i> sp.	3	3
<i>Bacteroides</i> sp.	—	2
<i>Prevotella</i> sp.	—	2
<i>Klebsiella</i> sp.	—	1
<i>Clostridium</i> sp.	—	1
<i>Staphylococcus aureus</i>	—	1
<i>Streptococcus</i> sp.	—	1
<i>Enterococcus</i>	—	1

tibiotics as listed previously. Transvaginal ultrasound-guided drainage was performed only in those patients who did not show prompt clinical improvement with medical management.

The mean interval between sonographic recognition of the abscess and the drainage procedure was 3.6 days (range, 1–14 d). A longer delay from diagnosis to drainage was seen in women with TOA (mean, 5.6 d; range, 2–14 d) when compared with women with postoperative abscesses (mean, 2.0 d; range, 1–6 d), $P < 0.01$. The mean diameter of postoperative abscesses was 86 mm (range, 40–123 mm). For TOA, the mean diameter was 81 mm (range, 40–125). The postoperative pelvic abscesses were most commonly located within the cul-de-sac or immediately cephalad to the vaginal cuff in posthysterectomy patients. The volume of fluid drained ranged from 70–750 mL (mean, 177 mL). All fluid contained white blood cells. The bacteria recovered from abscess fluid are noted in Table 2.

Transvaginal ultrasound aspiration was successful in 25 of 27 abscesses. Patient tolerance of the transvaginal procedure was satisfactory. No complications were noted. Ten patients had follow-up ultrasound scans performed from 3 days to 13 months following the drainage procedure; minimal residual fluid was detected in five cases. One patient with bilateral TOA drainage demonstrated bilateral hydrosalpinx on ultrasound 13 months after transvaginal drainage. Of the 26 abscesses with adequate drainage, 25 (96%) had resolution of signs and symptoms within 24–72 hours after the procedure and were discharged from the hospital without further intervention. One patient in whom bilateral TOA drainage was successful underwent total abdominal hysterectomy and bilateral salpingo-

oophorectomy due to persistent abdominal pain. One patient with a thick-walled organized postoperative abscess was unable to be drained transvaginally and required laparotomy for treatment.

DISCUSSION

In clinical gynecology, pelvic abscesses remain a major cause of morbidity and mortality. Medical therapy, consisting of bed rest, fluid and electrolytes replacement, and broad-spectrum antibiotics, is the treatment of choice for pelvic abscess.⁵ However, medical therapy alone is successful in only 60–80% of patients with pelvic abscess. Surgical intervention is advocated for patients who do not show prompt clinical improvement or if rupture is suspected. Landers and Sweet⁶ reported on 232 patients with TOA. Of 217 patients receiving antibiotic therapy alone as initial treatment, 20% were deemed early failures, requiring surgical therapy during initial admission. Additionally, 31% of women (late failures) required subsequent surgery after discharge. Similarly, Ginsburg et al.⁷ reported early failure in 31% and late failure in 35% of women receiving antibiotics for TOA. Thus, a significant number of patients require surgery as a result of failure of initial intravenous antibiotic therapy. Most often, surgery consists of unilateral or bilateral salpingo-oophorectomy or total abdominal hysterectomy with bilateral salpingo-oophorectomy.

Alternative surgical approaches to pelvic abscesses are colpotomy without guidance, computed-tomography- (CT) or ultrasound-guided transabdominal drainage, and operative laparoscopy. Laparoscopic surgery carries less risk of morbidity than laparotomy but still possesses the inherent risks of surgery. With a laparoscopic approach, patients with an acute pelvic abscess are treated initially with intravenous antibiotics, and laparoscopic surgery is performed early in the clinical course in an attempt to reduce adhesion formation. In a study by Reich and McGlynn,⁴ 25 patients with TOA and other pelvic abscesses were treated with intravenous antibiotics and early laparoscopic surgery. Twenty of 21 TOAs were successfully treated laparoscopically, with a mean postoperative stay of 4.6 days. In a retrospective review by Raiga et al.,⁸ 39 patients with pelvic abscess underwent laparoscopic drainage. They advocated a second-look laparoscopy to assess and lyse

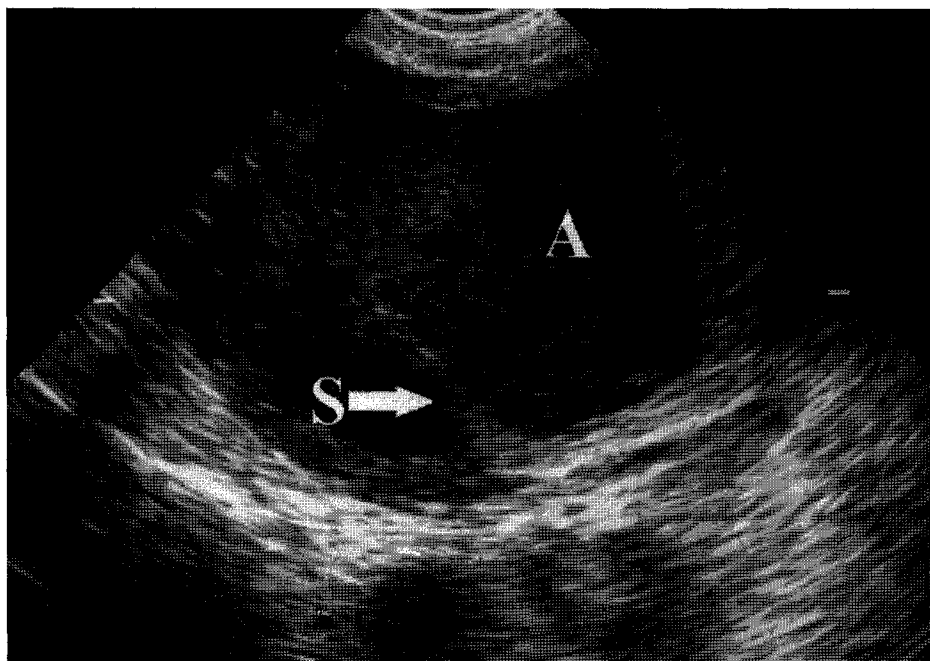


Fig. 1. Transvaginal sonographic image of multiloculated tuboovarian abscess, A = abscess.

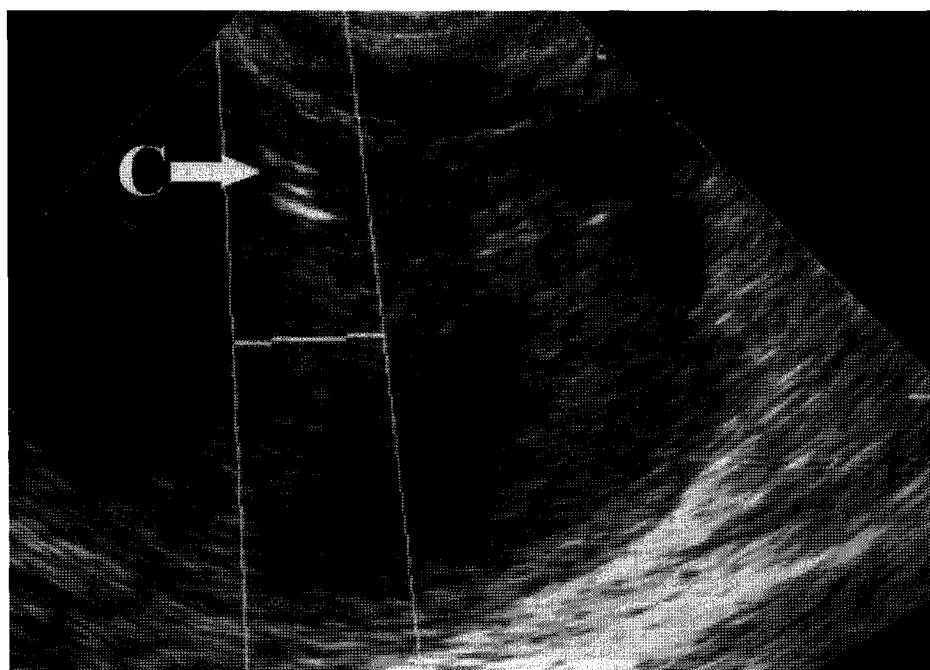


Fig. 2. Transvaginal sonographic image of catheter placement in abscess, C = catheter.

persistent adhesions. A 63% fertility rate was noted in the patients who did not use contraception.

With the advent of interventional radiology techniques and improving technology, ultrasound- and CT-guided drainage have been described as treatment of pelvic abscesses. Initial reports of

evacuations of abscesses utilizing catheter drainage were attempted by a percutaneous transabdominal route.⁹⁻¹² Gerzof¹⁰ treated 71 abscesses and reported satisfactory drainage in 86% of patients. Percutaneous aspiration of deep pelvic abscesses is compromised by access routes that are impeded by

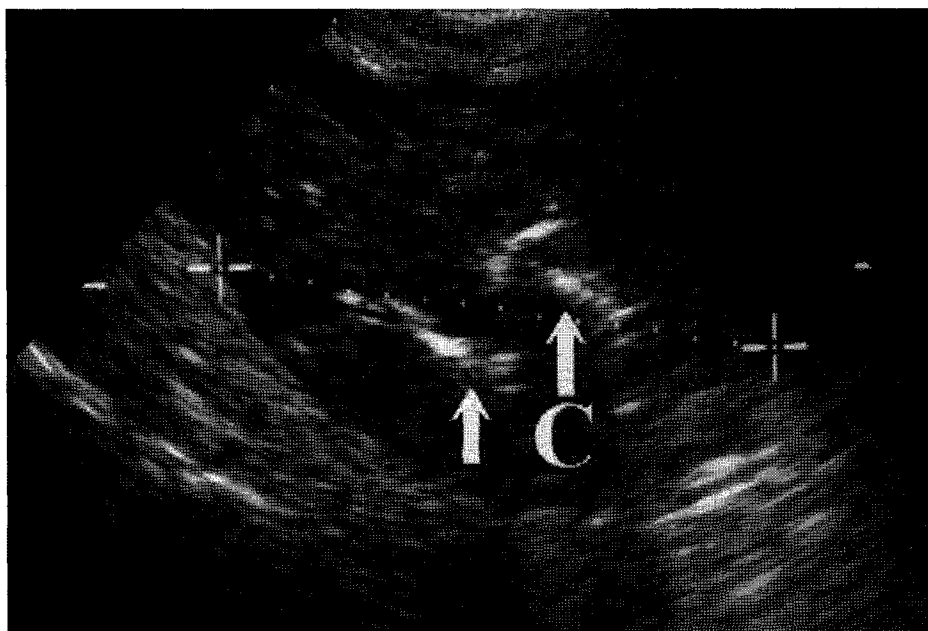


Fig. 3. Transvaginal sonographic image demonstrating catheter in place, C = catheter.

the bony pelvis, bowel, urinary bladder, or iliac vessels. A more useful approach appears to be transvaginal or transrectal ultrasound guidance, which provides a direct route from the vagina into the cul-de-sac or adnexal regions.¹³ Transvaginal aspiration uses the same route as the traditional posterior colpotomy.

The posterior colpotomy is used for fluctuant abscesses that dissect the rectovaginal septum and are well applied to the peritoneum. The disadvantage of such a procedure includes unintended bowel injury due to the blind nature of the procedure and the inability to drain abscesses that do not fit the above requirements. With the use of real-time ultrasound guidance, a catheter or needle may be precisely placed in the pelvic abscess regardless of its size and location, even in sites previously unreachable with an abdominal approach. This alternative approach was described by Noshier,¹⁴ who placed a catheter by the transvaginal route into a 5–6-cm abscess postoperatively following an appendectomy. A second patient who had had a colectomy had a pelvic abscess that was amenable to transvaginal drainage. In a larger series reported by van Sonnenberg et al.¹⁵ ultrasound-guided transvaginal drainage was performed in 14 women for a variety of pelvic abscesses including TOA and postoperative collections. Twelve of the 14 patients were spared a major operation. No major

complications were noted with transvaginal drainage. Teisala et al.¹⁶ successfully drained ten TOAs without complications. Finally, Aboulghar¹⁷ treated 15 patients with TOAs with transvaginal drainage and antibiotics. All patients improved and were afebrile within 24–72 hours of drainage. A 6-month follow-up evaluation showed all patients to be free of symptoms.

While our review of 27 pelvic abscesses revealed that most subjects demonstrated the typical clinical signs and symptoms of an abscess (fever, leukocytosis, and a palpable pelvic mass), two women had a normal white blood cell count, and six patients presented without fever. In a prior report¹⁷ of transvaginal aspiration, the maximal abscess diameter ranged from 40–95 mm, with a mean of 67.3 mm, and drainage ranged from 40–140 mL, with a mean of 57.7 mL. The average volume of specimens aspirated in our study was considerably larger (177 mL). Bacteria were recovered from 51% of the aspirations (79% postoperative abscesses, 23% TOA; $P < 0.05$) with 1.9 organisms/positive abscess. The low culture yield in TOA patients may well be explained by prolonged antibiotic therapy prior to drainage. Other studies showing a higher yield of positive cultures reported that aspiration was performed shortly after initiating antibiotic therapy. *Escherichia coli* and aerobic streptococci were the most frequently recovered organisms.

Transvaginal aspiration of pelvic abscesses appeared less difficult in unilocular collections, compared with complex, multilocular, organized pelvic abscesses with septation. Importantly, the clinical outcome of the vast majority of our subjects has been very good. Surgery was prevented in all but two of the cases, which suggests that transvaginal drainage is a viable alternative to surgery in most cases. A longer delay in initiation of abscess drainage was seen in TOA compared with postoperative abscesses, largely related to a greater clinical expectation of an adequate response to antibiotic therapy of TOA. These delays may potentially result in increased organization of the abscess cavity, precluding adequate transvaginal drainage. The long-term clinical outcome of the women described in this report requires further study, as does the question of whether aspiration of TOA upon initial sonographic recognition and initiation of an antibiotic regimen would reduce long-term morbidity, including pelvic pain, adhesions, and infertility, when compared with surgical or medical management.

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