EUS-guided transrectal drainage of pelvic abscesses: a retrospective analysis of 17 patients

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Abstract

Background: **Pelvic abscess is a common complication of abdominal surgery or intestinal or gynecological diseases. Over the last decades, endoscopic ultrasound (EUS)-guided drainage has emerged as a minimally invasive alternative to percutaneous or surgical treatment of pelvic abscesses.**

Aim: **To evaluate safety and efficacy of EUS-guided transrectal pelvic abscess drainage in a single center.**

Methods: **From February 2017 to April 2023, all data on patients who were treated for pelvic abscesses by EUS-guided drainage in a single center, were retrospectively analyzed.**

Results: **A total of 17 patients were treated for pelvic abscesses by EUS-guided drainage. The procedure was technically successful and uneventful in all 17 patients (100%). Etiology of the abscess was postsurgical (n=5, 29%), secondary to medical illness (n=10, 59%) or gastrointestinal perforation (n=2, 12%). The abscess was multilocular in 5 patients (29%), the mean largest diameter was 76 mm (range 40-146 mm). Drainage was performed using 2 double pigtail stents, and in 1 patient an additional 10 Fr drainage catheter was deployed. Two patients (12%) required a second endoscopic intervention. Treatment success, defined by complete abscess resolution on follow-up CT scan along with symptom relief, was 100%. There was no need for surgical intervention. The median post-procedural hospital stay was 5 days. No recurrence was reported within a median time of follow-up of 39 months.**

Conclusion: **EUS-guided transrectal drainage of pelvic abscesses using double pigtail stents is safe and highly effective. This case series contributes to the cumulative evidence that, in expert hands, EUS-guided drainage should be considered as first-line approach for treatment of pelvic abscesses.** (Acta gastroenterol. belg., **2023,** 86, **395-400**).

Keywords: Pelvic abscess, pelvic fluid collection, endoscopic ultrasound (EUS)-guided drainage.

Introduction

Pelvic abscesses may occur as a common complication of abdominal or obstetric surgery, or medical conditions involving the gastrointestinal tract (e.g. diverticulitis, appendicitis or inflammatory bowel disease) as well as reproductive organs (e.g. pelvic inflammatory disease) (1). Drainage of the abscess is essential for source control of infection, as antibiotic treatment alone is insufficient for treatment in the vast majority. The complex pelvic anatomy with surrounding vital organs, bowel loops and vascular structures, can make treatment a technical challenge. Management has evolved over time from surgery to less-invasive image-guided techniques, including drainage via the transrectal or transvaginal route under ultrasound-guidance or percutaneous route under CT-guidance (2,3). It is now well-accepted that surgical intervention should be reserved for patients presenting with perforation or those who do not respond to less invasive approach (1,2).

Over the last decades, endoscopic ultrasound (EUS) has come forward as a viable alternative method to access a deep pelvic abscess, under direct visualization and with the advantage of avoiding passage through other organs given the proximity between the abscess and the rectal wall (4-11). Several case series have demonstrated the safety and efficacy of EUS-guidance to perform pelvic abscess drainage, however large-cohort or multicenter series remain scarce. Here we report our cumulative experience of EUS-guided transrectal drainage of pelvic abscesses, evaluating safety and efficacy in a case series of 17 patients, in a single center.

Patients and methods

This is a retrospective analysis of a single center case series of patients who underwent EUS-guided drainage of a pelvic abscess in a over 6-year period between February 2017 and April 2023. Patients were referred by colleague gastroenterologists, abdominal surgeons, and gynecologists. A dedicated CT of abdomen and pelvis was performed in all patients prior to the drainage procedure to obtain clear understanding of the location and size of the abscess, and the relationship between the collection and the surrounding structures (Fig 1). At time of drainage all patients received intravenous broad-spectrum antibiotics. Bowel preparation was achieved by administration of phosphate enema. A urinary catheter was placed prior to the procedure to assure distinction between the abscess and the urinary bladder, minimizing the risk of inadvertent bladder punction. All procedures were performed in left lateral decubitus position and under general anesthesia using propofol. The procedure was performed under triple guidance with ultrasound, endoscopic and fluoroscopic control. Informed consent was obtained from all patients prior to the procedure.

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Fig. 1. — Initial computed tomography (CT) scan showing a pelvic abscess, caused by diverticulitis, measuring 80 x 70 mm.

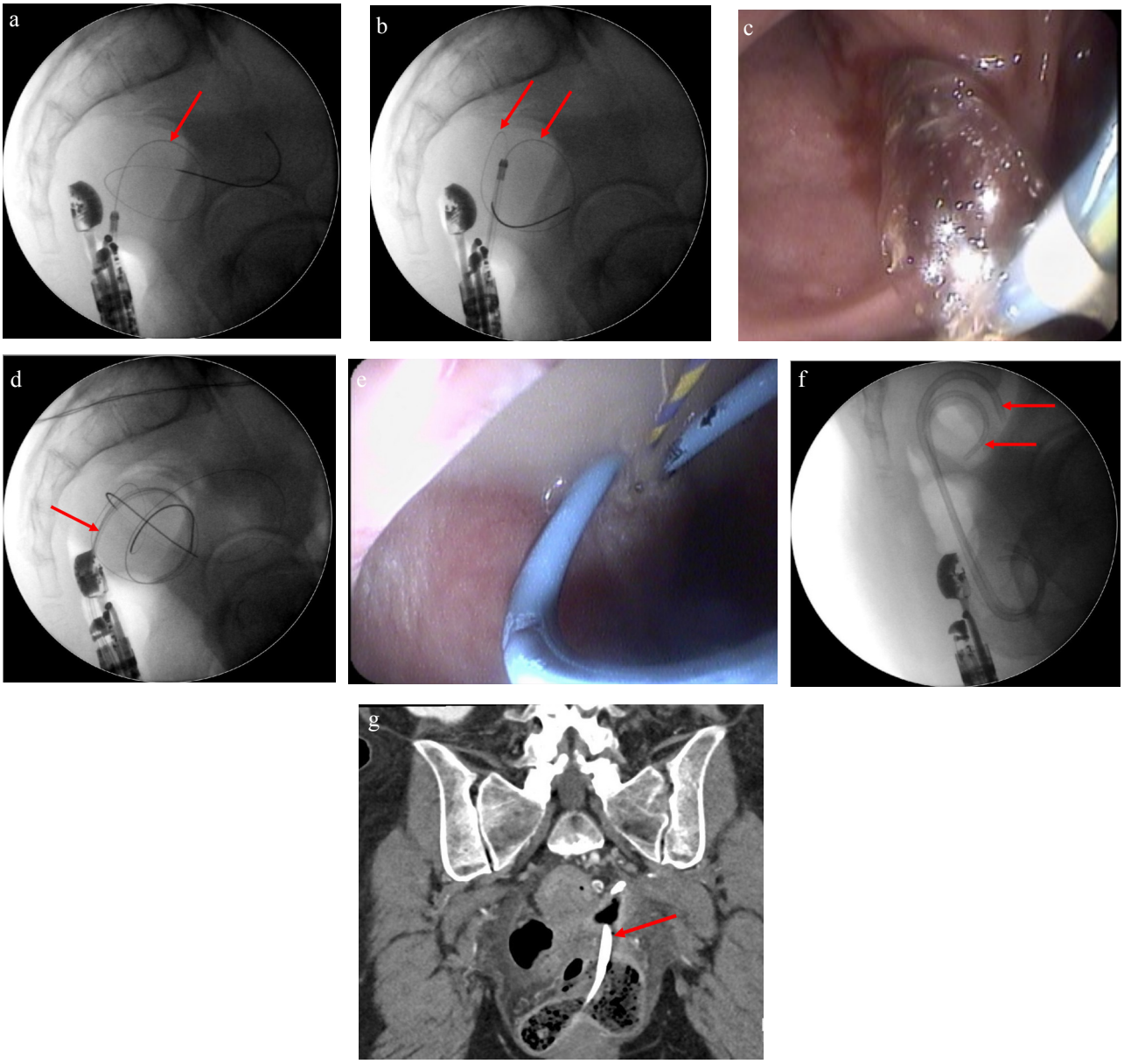

Fig. 2. — EUS-guided drainage of a pelvic abscess: (a) Fluoroscopic view of coiling the first and (b) second guidewire in the collection. (c) Endoscopic view of dilation of the tract with a 10 mm through-the-scope balloon over the first guidewire. (d) Fluoroscopic view of deployment of the first double pigtail stent. (e) Endoscopic control showing successful deployment of the first double pigtail stent with pus drainage into the rectal lumen. (f) Deployment of the second double pigtail stent. (g) CT-scan after 1 week showing a double pigtail stent in place, with almost complete resolution of the abscess.

Procedural technique

The technique of EUS-guided drainage of a pelvic abscess comprised the following steps (Fig 2):

1 The pelvic abscess was first located and examined by using a therapeutic curvilinear array echoendoscope (Pentax® EG-3870UTK echoendoscope connected to the Hitachi® EUB-6500HV ultrasound system; or Olympus® GF-UCT180 echoendoscope connected to the Hitachi® Arietta 750 ultrasound system).

2 An appropriate puncture site was selected at the contact area with minimal distance between the rectal wall and the abscess cavity, and after excluding intervening vasculature by using color doppler.

3 The abscess was punctured under EUS-guidance using the needle of a 10 Fr cystotome (G-flex® CYSTO10UK) and entered with the inner guiding catheter. Electrocautery was used (ERBE® VIO 300D) with papillotomy settings (endocut effect 2 and forced coagulation effect 1 40 W) for puncture.

4 The needle was then withdrawn, leaving the inner catheter in place.

5 A 0.035-inch guidewire was inserted through the inner catheter and coiled into the abscess cavity under fluoroscopic guidance.

6 The puncture tract was then enlarged with the 10 Fr outer sheath of the cystotome using electrocautery (ERBE® VIO 300D) with papillotomy settings (endocut effect 2 and forced coagulation effect 1 40 W).

7 After removing the inner catheter, a second guidewire was coiled through the cystotome into the cavity.

8 The cystotome was withdrawn, followed by dilation of the fistula tract by using a 10 mm through-the-scope (TTS) balloon over the first guidewire.

9 A double pigtail stent (7 Fr, 4-5 cm) was deployed over the guidewire under endoscopic and fluoroscopic guidance, followed by removal of the first guidewire and deployment of a second double pigtail stent (7 Fr or 10 Fr, 4-5 cm) over the second guidewire.

10 A fluid sample of the pus, drained into the rectum right after deployment of the stents, was aspirated and sent for gram staining and culture.

A follow-up CT scan was performed after one week to assess the efficacy of the procedure. If the abscess had resolved completely, the double pigtail stents, if not spontaneously migrated, were retrieved by sigmoidoscopy at day 7-10. In the case of incomplete drainage for which a reintervention was undertaken, a second evaluation by CT scan was performed. The duration of antibiotic therapy was determined case-by-case according to the underlying pathology, and therapy was adjusted if needed according to culture results of the aspirated samples. Long-term follow-up data were obtained by evaluation of the most recent medical records of the patients.

Technical success was defined as the ability to drain the abscess under EUS-guidance. *Treatment success* was defined as complete abscess resolution on follow-up CT along with symptom relief (fever, abdominal pain), evading the need for invasive surgical drainage. *Recurrence* was defined as abscess recurrence after stent retrieval.

Results

EUS-guided pelvic abscess drainage was performed in 17 patients (mean age 60 ± 17). The etiology of the abscess was post-surgical in 5 patients (29%), secondary to medical illness in 10 patients (59%) or caused by gastrointestinal perforation in 2 patients (12%). The mean largest diameter of the abscess was 76 mm (range 40-146 mm), and in 5 patients (29%) the abscess was multilocular. Patient characteristics, size and origin of pelvic abscesses are shown in table 1.

Table 1. — **Patient characteristics and abscess etiology**

Patients, n	17
Age, mean (range), years	60 (17-82)
Sex, n (%)	
— Male	7 (41%)
— Female	10 (59%)
Size of pelvic abscess by CT, mm	
— Large axis	
○ mean (SD)	76 (29)
○ median (range)	67 (47-146)
— Small axis	
○ mean (SD)	53 (24)
○ median (range)	45 (20-110)
Etiology, n (%)	
— Post-surgical	
○ Laparoscopic hysterectomy	1 (6%)
○ Right-side hepatectomy	1 (6%)
○ Umbilical hernia repair with mesh	1 (6%)
○ Surgery for ruptured AAA[a]	1 (6%)
○ TaTME[b]	1 (6%)
— De novo	
○ Sigmoid diverticulitis	5 (29%)
○ Appendicitis	4 (24%)
○ PID[c]	1 (6%)
— Gastrointestinal perforation	
○ Sigmoid perforation after colonoscopy	1 (6%)
○ duodenal perforation	1 (6%)

[a]AAA, abdominal aortic aneurysm; [b]TaTME, transanal total mesorectal excision; [c]PID, pelvic inflammatory disease

The procedure was technically successful in all 17 patients (100%) without any procedural complications. Technical data and clinical outcomes are reported in table 2. In all cases 2 double pigtail stents were used: two 7 Fr stents in 7 patients (41%) and a combination of a 7 Fr and 10 Fr stent in 10 patients (59%). In one patient with a large multilocular abscess (146 mm x 94 mm), a 10 Fr flushing catheter was deployed in addition to the double pigtail stents. This decision was made based on the large size and more viscous appearance of the abscess content by EUS evaluation. The drain was flushed with 50 ml of normal saline every 6 hours until the aspirate was clear after 3 days, and then removed.

Sixteen (94%) of 17 patients became afebrile within 24h after drainage, and all patients encountered decrease

Table 2. — **Technical data and clinical outcomes**

Technical succes, n (%)	17 (100%)
Drainage modality, n (%) — 7 Fr stent + 7 Fr stent — 7 Fr stent + 10 Fr stent	 7 (41%) 10 (59%)
Treatment succes, n (%)	17 (100%)
Second intervention, n (%)	2 (12%)
Spontaneous stent migration, n (%)	5 (29%)
Post-procedure hospital stay, days — Mean (SD) — Median (range)	 6 (5) 5 (1-21)
Duration of follow-up, months — Mean (SD) — Median (range)	 43 (23) 39 (1-74)
Recurrence, n (%)	0 (0%)

in abdominal pain after 1 day. Follow-up CT at 1 week showed complete abscess resolution in 15 (88%) of 17 patients. In 2 (12%) patients, both with a large multilocular abscess (130 mm x 110 mm, and 110 mm x 85 mm respectively), there was incomplete response at 1-week follow-up, necessitating a second procedure. One patient underwent a second EUS-guided drainage of the residual, by loculation separated collection, at a different puncture site and after removing the stents placed during the first procedure. In the other patient, CT at 1 and 2 weeks revealed decrease in size but incomplete drainage despite adequate positioning of the stents. A lavage of the residual collection was performed with a gastroscope after TTS balloon dilation of the previously created fistula. In both cases treatment outcome was successful with complete drainage on CT at 3 weeks after the initial procedure.

In 5 patients (29%), spontaneous migration of both stents occurred within 1 week after the procedure, nevertheless the drainage was efficient without any adverse events. In the remaining 12 patients, stents were endoscopically removed after confirming complete abscess resolution on CT: on day 8-10 in 10 patients and on day 21 in the 2 patients who underwent a repeat intervention.

Treatment was successful in all patients (100%), without need for surgical intervention. The median post-procedural length of stay was 5 days. In 12 of 17 patients (71%) post-procedural hospital stay was less than 1 week; follow-up CT scan and stent removal were then organized in the outpatient department.

Within a median follow-up period of 39 months (range 1-74), no recurrence of a pelvic abscess was reported in any patient. One 85-year-old patient though presented with relapse sigmoid diverticulitis after 2 months, without abscess recurrence, but complicated with perforation and septic shock, with fatal outcome. Six patients underwent elective surgery 6-8 weeks after drainage procedure and long-term treatment with antibiotics: appendectomy in 4 patients and sigmoid resection in 2 patients.

Discussion

Our study confirms that EUS-guided transrectal drainage using double pigtail stents is technically feasible, safe, and highly effective for treatment of pelvic abscesses. In our case series of 17 patients, the procedure was technically successful and effective in all patients (100%), without any procedural complications or need for surgical intervention.

EUS was first introduced for treatment of pelvic abscesses by Giovanni et al in 2003, in analogy with the already widespread experience of EUS in drainage of pancreatic collections (4). Since its introduction, several case series and retrospective cohorts have shown favorable outcomes, including two larger studies published by Rhamesh et al (2013) and Poincloux et al (2017) in respectively 38 and 37 patients (4-11). Based on these data, EUS-guided drainage of pelvic abscesses appears to be safe and highly effective, with treatment success rates ranging from 86% to 100% (1). Moreover, all studies report a technical success rate of 100%, reflecting the straightforward nature of this procedure (1, 12).

Given these favorable results, the EUS approach is now increasingly viewed as first line approach of treatment of pelvic abscesses. It is a minimally invasive treatment that is relatively easy to perform within a short procedural time when experienced with therapeutic EUS. The ability to use internal stents to maintain a patent transmural tract, offers some major advantages over other minimally invasive image-guided techniques. It eliminates the need for an indwelling drainage catheter, thereby minimizing patients' discomfort and facilitating early discharge from the hospital (7). In our study, the median post-procedural hospital stay was only 5 days.

Different techniques can be used to gain access to the pelvic collection. In most case series a 19-gauge needle is used to puncture the abscess, followed by guidewire insertion and exchange of instruments over the wire to dilate the tract and insert transluminal stents (1). An alternative method is to use a dedicated 10 Fr cystotome to perform the puncture and subsequent tract dilation, in a one-step process. This device has already shown its value in drainage of pancreatic collections but is only reported in one study for drainage of pelvic collections (5,13). With this technique instrument exchanges can be limited to a minimum and two guidewires can be inserted at the same time, eliminating the need to pass a catheter adjacent to the primary stent to place a second stent, decreasing procedural time. Given our experience with this device for drainage of pancreatic collections, all procedures were performed using this technique.

After tract dilation, one or multiple double pigtail stents can be inserted to maintain tract patency. However a single pigtail stent can suffice as reported by others, multiple pigtail stents can facilitate more rapid drainage and decrease the risk of clogging with pus or fecal matter (8,14). Some authors advocate using an additional

indwelling flushing catheter in larger abscesses (> 8 cm) to enhance drainage by frequent irrigating the cavity for some days (7). In our study, this technique was only used in one patient with a large multilocular abscess (max diameter of 14.6 cm), filled with viscous debris on EUS evaluation. The other 6 patients with large abscesses > 8 cm were successfully managed with stents alone. Given these results along with high treatment success rates reported in other series, this step does not seem crucial even in larger abscesses (5,12,13).

More recent studies reported the use of lumen apposing metal stents (LAMS) (5,15-17). The larger diameter of the stent could be beneficial in collections filled with debris, however more larger studies are needed to evaluate this technique for pelvic collections. Up till now, a total of only 25 cases have been reported, with two complications mentioned (one perforation and one stent misdeployment) (5,16).

There are some limitations to the technique. Generally, careful considerations should be taken regarding location, size, and maturity of the abscess, since stent deployment is limited to mature abscesses larger than 40 mm, within 2 cm from the colonic lumen (1,11). Aspiration alone can be considered in other cases, particularly in smaller abscesses not resolving with antibiotics alone, or immature collections if urgent drainage is indicated in the setting of clinical instability (1). However, in case of aspiration alone, higher rates of recurrence are reported (4,11).

In our study there were no adverse events. In all studies up to date, only one perforation is reported (5). There were no cases of bleeding or other major complications. This one perforation occurred in a patient who was treated for a diverticular abscess with transcolonic EUS-guided drainage using LAMS. Notable is that this patient was on long-term treatment with corticosteroids, which may have had an unfavorable impact on the outcome (5). Also, the transcolonic route for drainage may present special challenges. Navigating the turns of the sigmoid can be difficult with the side-viewing echoendoscope, and the mobility and sharp angulation of the sigmoid can compromise optimal position for safe puncture, potentially increasing risk for perforation. In a study by Rhamesh et al, comparing outcome of transcolonic and transrectal drainage, there was a trend to lower treatment success in the transcolonic group, however not significant (70% for transcolonic drainage versus 96,3% for transrectal drainage, p=0.052) (6). No increase in adverse events were reported.

The same study reported significantly lower treatment success rates in diverticular abscesses compared to abscesses of other etiologies (25% versus 97%, p=0.002) (6). It is hypothesized that this is related to the often multiloculated nature and highly viscous content of these abscesses (6, 12). In our study, all patients with diverticular abscesses had favorable outcomes; however 2 of all 5 patients with multilocular abscesses required a second EUS-guided intervention to achieve complete drainage. Multilocularity was considered a contraindication in the earliest reports, but meanwhile several studies report similar successful outcome in this group (5,8). In our experience, EUS-guided drainage can be attempted in multilocular abscesses but possible delayed response or need for reintervention should be taken in mind treating these patients.

Spontaneous stent migration and expulsion occurs frequently. In our study dislodgement occurred in almost 1/3 of the patients (29%) but others report even higher rates up to 75% (8). However since this is mainly caused by involution of the collection and does not appear to affect the outcome of the procedure, this should not be classified as a complication (1).

In our study there were no abscess recurrences, which is in line with the overall low recurrence rate of 4% reported in previous studies (12). In one patient there was recurrence of a complicated diverticulitis, which underlines the need for adequate follow-up and treatment of the underlying pathology.

Limitations to this study include the limited sample size, the fact that it was a retrospective analysis, and that there was no comparator group, making direct comparison with other image-guided techniques difficult.

Conclusion

In conclusion, EUS-guided transrectal drainage of pelvic abscesses using double pigtail stents is safe and highly effective with good long-term outcome. This case series contributes to the cumulative evidence that, in expert hands, EUS-guided drainage should be considered as first-line approach for treatment of pelvic abscesses.

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