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# Endoscopic ultra-sound (EUS) guided management of symptomatic pelvic collections: puncture-aspiration or drainage? Results from mono-centric retrospective experience with therapeutic algorithm

Marine Guingand, Mohamed Gasmi, Mélanie Serrero, Marc Barthet and Jean-Michel Gonzalez

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**ABSTRACT**

**Background:** Pelvic collections may occur after surgery or in medical diseases. EUS transmural (TM) treatment has been shown as highly effective and safe, becoming an alternative to surgery or radiology. We aimed to assess the results of EUS management of pelvic collections.

**Methods:** Retrospective, single-center observational study conducted between 2004 and 2018. Patients with symptomatic collections treated by EUS-TM approach were enrolled. The procedures were performed with a therapeutic EUS-scope, following two possible options: puncture-aspiration-injection of antibiotics PAIA (group 1) or EUS-drainage by plastic double pigtail stents (DPS) with an ano-cavitary drain (ACD) or lumen-apposing metal Stent (LAMS) (group 2). The main objective was to assess the clinical effectiveness based on symptoms and collection resolution.

**Results:** Seventy-three patients were included. Mean age was 42.5 years [12–87]. 30 patients in group 1 (41%) underwent PAIA and 43 in group 2 (59%) underwent DPS ± ACD in 41 patients (95%) and LAMS in 2. The collection was postoperative in 58%. The mean size was 48.9 mm [8–120], 33 +/- 17 mm in group 1, compared to 67 ± 21 mm in group 2 ($p < .0001$). All the procedures were technically successful. Overall clinical success was 96% (93% in group 1 (28/30), 98% (42/43) in group 2). Failures occurred in 2 post sigmoiditis abscesses and 1 ileo-colic Crohn's disease. No adverse event was reported. During the median follow-up of 7.5 years [4.4–8.9], no patient had recurrence.

**Conclusions:** EUS-TM with either PAIA or drainage depending on the collection size is confirmed to be highly effective and safe.

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Pelvic abscess; endoscopic ultrasound drainage; double pigtail stent; Crohn's disease

## Introduction

Pelvic collections may occur in two main settings: postoperatively related to anastomotic leakage after rectal, colic or gynecological surgery, occurring in 10–20% of the cases [1,2] or complicating medical diseases such 10–30% of Crohn's disease (CD) [3,4] or diverticular sigmoiditis in 16–35% of the cases [5]. In a large study involving more than 1000 patients, the rate of peri-anastomotic collection was 15% after previous rectal resections, with a higher risk with laparotomy compared to laparoscopy (15.3% versus 12.4%) [6,7]. When these collections become symptomatic (pelvic pain, fever, biological inflammatory syndrome), therapeutic management has to be considered, historically involving surgical or radiological approaches.

The radiological percutaneous drainage is challenging because of various anatomical pitfalls (i.e., pelvic bones, uterus, iliac vessels, bladder, vagina, nerves and digestive structures). Since 1970, four studies, including one with 144 patients, showed clinical efficacy rates ranging from 80 to 96%, with complete resolution of the abscess and no mortality [8–11]. The surgical drainage is still possible and effective, but is also complex after previous and recent surgery. It comes with longer hospitalization period and a significant morbidity, between 10 and 40% [3]. Studies show that 10 to 30% of patients with fistulizing CD develop an abscess [4,12] with indication of drainage. In this situation, surgical savings are necessary to avoid postoperative complications that occur frequently.

Recently, interventional EUS has allowed for transmural drainage in the treatment of symptomatic pseudocysts or pancreatic necrosis, biliary or pancreatic duct obstructions, vascular embolization, and more recently endoscopic gastroenteric anastomoses and radio frequency ablation of pancreatic tumors [13–15].

The first studies assessing the TM treatment of symptomatic pelvic collections under EUS guidance were published starting from 2003, with promising safety and efficacy. This approach is effective in more than 85% of cases without adverse event, avoiding surgery [1,16]. The aim of this series was to assess the results of EUS-treatment of pelvic collections looking at puncture-aspiration-injection of antibiotics (PAIA) and drainage by plastic double pigtail stent (DPS) or lumen-apposing metal stent (LAMS), respectively.

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**Figures 1.** CT scans showing symptomatic pelvic collections between the rectum and the sigmoid colon.

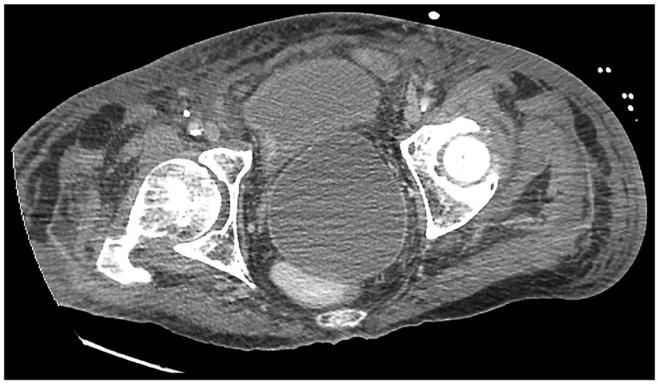

**Figure 2.** CT-scans showing symptomatic large liquid collection spreading behind the bladder.

## Patients and methods

### *Design and selection*

This was an observational, single-center, retrospective cohort study conducted between January 2004 and July 2018 in the Hôpital Nord, Marseille, France. One hundred and sixteen consecutive patients with symptomatic pelvic collections (fever, inflammatory syndrome and pelvic pain) identified on cross-sectional imaging (abdominal-pelvic CT, pelvic MRI) (Figures 1 and 2) and referred for possible EUS-guided TM drainage were analyzed. All cases were discussed in medical-surgical meetings to validate the indication of EUS-TM treatment.

*The inclusion criteria* were: patient older than 18 years old with symptomatic pelvic collection (defined as a collected, organized lesion located near the rectal wall) managed by EUS-TM treatment.

*The exclusion criteria* were: patients in whom the EUS-TM treatment was finally not possible during EUS because of collection characteristics (not technical failure): inaccessible, insufficiently defined and organized, compartmentalized, infiltrating collection, or hematoma. Patient without follow-up or missing data were also excluded.

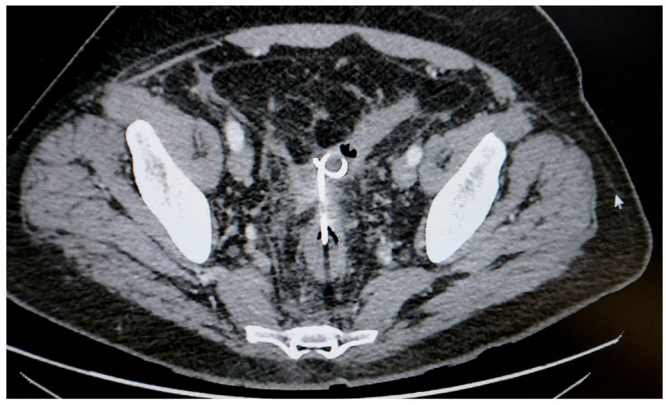

**Figure 3.** CT scan showing a double pigtail stent placed into pelvic collection.

The data collected were patient demographics, collection etiology, cross-sectional and EUS imaging characteristics, endoscopic treatment and follow-up details.

### *Procedure and strategy*

Patients were hospitalized and received a rectal enema half an hour to an hour before the procedure. No antibiotic prophylaxis was administered. The procedures were performed in patients under general anesthesia, in supine position, mostly non-intubated. A linear therapeutic EUS-scope (Pentax, Japan) with C02 insufflation was used (since 2012), associated with fluoroscopy.

The first step was to identify, localize and characterize the collection (peri-rectal, peri-sigmoidal, peri-anal) including size (expressed in millimeters), ultrasound appearance and distance from the rectal wall. A Doppler evaluation ensured the absence of vessel interposition between the probe and the collection or along the puncture route. Then, two therapeutic options could be applied, i.e., as follows.

#### *Puncture-aspiration-injection of antibiotic (PAIA)*

**(Group 1)** consisting of: (i) puncture with a 19 G needle; (ii) aspiration of the fluid content; (iii) injection of antibiotic (Amikacin 500 mg diluted in a 10-cc syringe of saline solution)

#### *EUS-trans-mural drainage (EUS-TMD)*

**(Group 2)** according to the following steps: (i) 19-G needle puncture; (ii) placement of a guide wire (Jag Wire 0.035‴, Boston Scientific, USA) that wraps into the collection; (iii) passage of the 10 Fr cystotome to create the path; (iv) placement of one or more plastic DPS (Figure 3) ± ACD, depending on the fluid density, for subsequent lavage. As alternative to DPS, a LAMS could be used (Hot Axios Stent; Boston Scientific, Marlborough, USA) (Figure 4).

**The choice** of these two techniques was decided upon:

- The diameter of the collection (>4 cm to insert a DPS)
- The distance of the lesion from the rectal or colonic wall and/or the technical difficulty of its approach

**Figure 4.** CT scan showing a lumen apposing stent (Axios stent, Boston Scientific, USA) stent placed into pelvic collection.

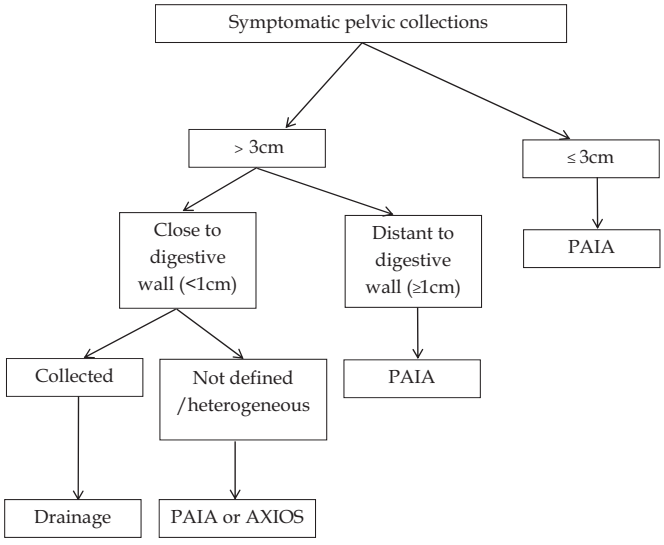


**Figure 5.** Pelvic collections EUS-therapeutic algorithm.

- The organized or unorganized aspect of the collection and its homogeneity or not

Figure 5 summarizes the algorithm for managing pelvic collections according to their size and appearance.

## *Post-operative and long-term follow-up*

In the immediate postoperative course, patients were daily monitored for pain and septic signs (fever), and biologically with C-reactive protein (CRP) and white blood cells (WBC) assays. In patients with ACD, a CT scan was performed at one week to assess the regression of the collection, in which case the ACD was removed, and two DPS were left in place. Otherwise, all patients were re-evaluated between three and six weeks by abdominal-pelvic CT. Plastic or metal stents were removed once the full disappearance of the abscess confirmed. In the absence of regression, the stents were left in place for an additional month.

## *Objectives*

**The primary objective** was to evaluate the immediate clinical efficacy of EUS-TM by PAIA or drainage, defined by the clinical and radiological improvement after endoscopic treatment. The judgment criteria were: symptom resolution (fever and pain), improvement of the biological inflammatory syndrome within 48 h and regression of the collection at cross-sectioning imaging.

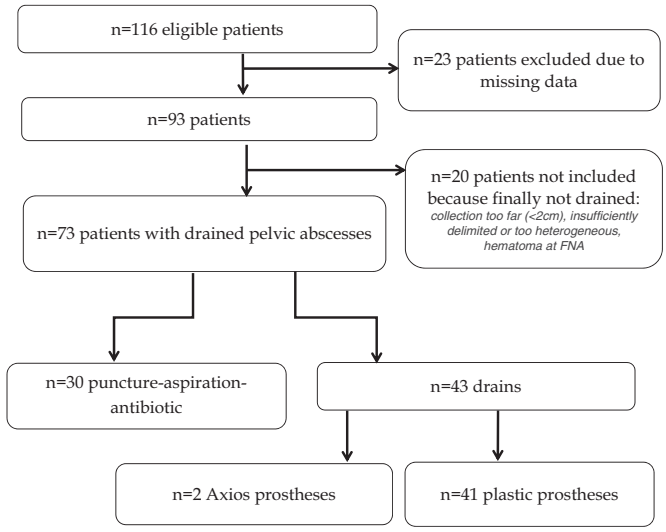


**Figure 6.** Flow chart.

**The secondary objectives** of the study were to document:

- Technical success, defined as the possibility of performing the treatment when the collection is accessible and when indicated;
- Morbidity of endoscopic treatment, including immediate and secondary complications (bleeding, stent-related discomfort, over-infection or stent migration);
- Factors predicting failure of the drainage;
- Recurrence, that is, the reappearance of the drained collection after initial resolution and stent removal

## *Regulatory aspects*

As this was a retrospective study and in accordance with clinical trial legislation, consent was not required. The data used were made anonymous and collected from the Assistance Publique – Hôpitaux de Marseille (AP-HM) computerized file. The current study was found to be in compliance with the European General Data Protection Regulation (GDPR), the recommendations of the French Supervisory Authority, the National Commission on Informatics and Freedom by the Data Protection Officer (DPO) of AP-HM (reference number: PADS19-367).

## *Statistical analysis*

The File Maker Pro (Apple Inc., USA) and Axigate databases of APHM (Axigate SAS, France, Paris) were used to collect the data. Statistical analyses were conducted with Excel software (Microsoft, USA) and SPSS statistics (IBM Rochester Minnesota, USA). The data were expressed on average with

extremes and percentages. Frequencies and percentages were used for the qualitative variables. Median, mean, quartiles were used for the quantitative variables. For the comparison of the mean abscess sizes a Student test was performed, differences with a *p-value of less than .05* were considered statistically significant.

## Results

### Patient and collection characteristics

Between July 2004 and July 2018, about 116 consecutive patients were referred to our institution. Twenty-three patients were excluded due to missing data and 20 patients were not included because they did not receive any EUS-TM treatment (abscess not collected, hematoma) (Flow-chart – Figure 6). A total of 73 patients were included for analysis, and their characteristics are reported in Table 1.

The mean age of the patients was 42.5 years [12–87], of which 52% were male. The mean CRP before treatment was 147 mg/l. In 58% of cases, abscesses were secondary to surgical complications (rectal surgery for cancer, anastomotic fistula, and gastric sleeve); in 42% of cases, secondary to medical conditions (active Crohn's disease (CD), sigmoiditis complicated by abscess). The mean size of the pelvic collections was 48.9 mm [8–120]. Their location was peri-rectal in 84%, peri-anal in 12% and peri-sigmoidal in 4%. 39 patients had CD (53%). Out of these 39 patients, 33% had a post-operative abscess and 67% had *de novo* abscess.

**Table 1.** Patient demography and etiologies of pelvic abscesses.

| | |
|---|---|
| Patient, *n* | 73 |
| Mean age, years (range) | 42.5 (12–87) |
| Gender, *n* (%) | |
| Men | 38 (52) |
| Women | 35 (48) |
| Localization of the abscess *n* (%) | |
| Peri-rectal | 61 (84) |
| Peri-sigmoidal | 3 (4) |
| Peri-anal | 9 (12) |
| Average abscess size, mm (EI) | 48.9 (30–69) |
| Group 1 | *33* |
| Group 2 | *67* |
| Pre-op mean CRP, mg/dL (range) | 147 (35–238) |
| WBC pre-op average, g/L (EI) | 12 (6–14) |
| Underlying conditions, *n* (%) | |
| Postsurgical | 42 (58) |
| Crohn's disease operated on | 13 (31) |
| Appendectomy | 7 (17) |
| Rectal cancer | 4 (10) |
| Gastric post sleeve | 4 (10) |
| Sigmoid Diverticulitis | 3 (7) |
| Small bower cancer | 2 (5) |
| Post bypass | 2 (5) |
| Hysterectomy | 2 (5) |
| Uterine cancer | 1 (2.4) |
| Testicular cancer | 1 (2.4) |
| Family adenomatous polyposis | 1 (2.4) |
| Caesarean section | 1 (2.4) |
| DPC/TIPM | 1 (2.4) |
| *De novo* | *31 (43)* |
| Crohn's disease | 26 (84) |
| Abscessed sigmoiditis | 5 (16) |
| Patients with Crohn's disease (CD), *n* (%) | 39 (53) |
| Postoperative abscess | 13 (33) |
| Abscess de novo | 26 (67) |
| Fistulizing CD, n (%) | 26 (67) |
| Fistulizing CD postoperative form (/13p), *n* (%) | 6 (46) |
| Fistulizing CD de novo form (/26p), *n* (%) | 20 (77) |

*n*: number; mm: millimetre; CDP/TIPMP: Cephalic DuodenoPancreatectomy/intra ductal papillary and mucinous tumour of the pancreas; EI: interquartile space; CRP: C Reactive Protein; WBC: White Blood Cells; pre op: pre operative; CD: Crohn's Disease.

### Characteristics of the treatments

Thirty patients (41%) were in group 1 treated with PAIA, and 43 patients (59%) were in group 2, undergoing EUS-TM drainage. In this group, DPS ± ACD were placed in 41 patients (95% of the patients had an ACD) allowing multiple daily rinses with saline solution, whereas two patients had LAMS placement. The details of the technique with the different type of stents used are reported in Table 2.

The average collection size in group 1 was 33 ± 17 mm, compared to 67 ± 21 mm in group 2 ($p < .0001$). In group 1, abscesses were mainly secondary to medical disease, in 73% of cases. As for group 2, they were essentially secondary to surgical complications, in 79% of cases.

### Results of EUS-TM treatment

The technical success of the EUS-TM drainage was 100%. The transrectal (TR) route was used in 96% of cases whereas the transcolonic (TC) route was followed in only 4% (three patients in the study with peri-sigmoidal abscess). The overall clinical success was 96% (70/73 patients). In group 1, the efficacy of PAIA was 93% (28/30 patients) and 98% (42/43 patients) in group 2 (NS) for the EUS-TMD. There were no reported per or postoperative complications. The results and follow-up of treated patients are detailed in Figure 7.

Three failures were reported (4%), defined by the persistence of clinical-biological and collection symptoms within 48 h of EUS-TM treatment. The two failures in group 1 (7%) were patients with collections related to sigmoiditis, with size of 40 mm and 50 mm, respectively, and were managed surgically. The only failure in group 2 (2%) was a patient with severe CD operated on, for complicated ileocolic resection of abscess, the size of the collection was 65 mm of peri-sigmoidal localization. The patient underwent a second

**Table 2.** Technical modalities and follow-up of treated patients $n = 73$.

| | |
|---|---|
| Processing methods, *n* (%) | |
| Drainage | 43 (59) |
| Plastic prostheses (DPS) | 41 (95) |
| Metal prostheses (LAMS) | 2 (5) |
| Puncture-aspiration-injection of antibiotics (PAIA) | 30 (41) |
| Transrectal approach, *n* (%) | 70 (96) |
| Transcolonic approach, *n* (%) | 3 (4) |
| Ano-cavitary drainage, *n* (%) | 39 (95) |
| Median follow-up, years (EI) | 7.5 (4.4–8.9) |
| Technical success, *n* (%) | 73 (100) |
| Clinical success, *n* (%) | 70 (96) |
| Group 1 $n = 30$ | 28 (93) |
| Group 2 $n = 43$ | 42 (98) |
| Patients with CD $n = 39$ | 38 (97) |
| Complications, *n* (%) | 0 (0) |
| Failures, *n* (%) | 3 (4) |
| Group 1 | 2 (7) |
| Group 2 | 1 (2) |

*n*: number; LAMS: Lumen Apposing Metal Stent; EI: inter quartile range; CD: Crohn's Disease.

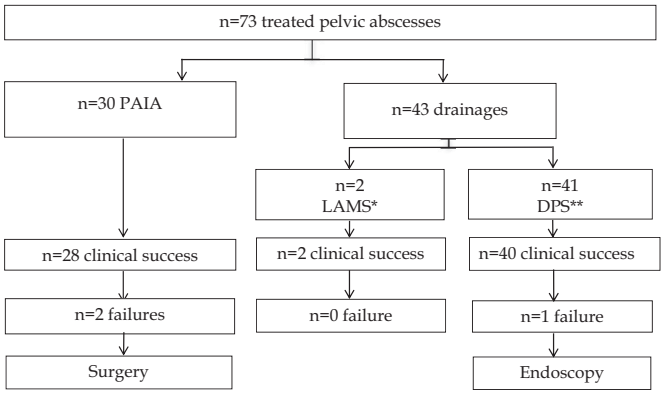


**Figure 7.** Flow chart of outcomes of patients who have been drained under rectal ultrasound endoscopy. *Lumen apposing metal stent; **Double pig-tail stent.

**Table 3.** Clinical success by groups and etiologies of abscesses.

| | Group of people | |
|---|---|---|
| Clinical success | Group 1: puncture-aspiration-antibiotic $n = 30$ | Group 2: drainage $n = 43$ |
| Post operative abscess | 100% | 97%(1) |
| Medical abscesses | 91%(2) | 100% |
| Abscess in patients with CD $n = 39$ | 100% | 95%(3) |

*n*: total number; CD : Crohn's Disease.
NB: (1) 1 failure in group 2: abscess secondary to ileo-cecal resection (CD) $n = 32$.
(2) 2 failures in group 1: abscess on sigmoiditis $n = 22$.
(3) In the CD subgroup, 1 failure was reported in group 2 (ileo-cecal postresection) $n = 22$.

successful EUS-TMD. The Table 3 reports clinical success rates by different groups and etiologies.

### *Evolution – recurrence*

During a median follow-up of 7.5 years (AE 4.4–8.9), no patients had a recurrence of the collection after drainage. Four patients died but the death was not related to pelvic collection. Indeed, one patient died from metastatic colonic cancer, one from cardiac arrest (acute coronary syndrome), one from multi-visceral failure (kidney failure), and one from necrotizing acute pancreatitis.

Moreover, 15% of patients with CD (6/39 patients) presented a new and different pelvic collection during follow-up. Five had an underlying active and severe fistulizing CD under treatment. These new collections appeared more than a month after the first collection and in a different location from the first one. They were all managed with new EUS-TMD (DPS).

## Discussion

Our series is the largest evaluating the treatment of pelvic collections with EUS-TM approach. The technical success was 100% without complications, and with an overall clinical success of 96%, which confirms the data in the literature.

The princeps study indeed, conducted by Giovannini et al. in 2003 [1] on 12 patients with postoperative pelvic abscess, showed a clinical success of 75% after technical success of 100%. Later on, Varadarajulu et al. in 2009 reported in 25 patients with pelvic abscess (post-operative in 68% of cases, diverticulitis in 12% or complicated appendicitis in 8%) a technical success of 100% and clinical efficacy of 96% of a EUS drainage using 7 French plastic DPS and performed in 76% of cases by TR route and in 24% by left TC route [17]. Ramesh et al. in 2013 [18] included thirty-eight patients in a seven-year mono-centric series about mainly postoperative pelvic collections (66% of cases). Eleven cases were TC drainage and 27 cases were TR drainage, with constant technical success. In this study, there was a trend toward greater clinical success in the TR versus TC group (96% versus 70% with $p = .053$) and more surgical procedures (4% versus 27% $p = .6$) for TC drainage. Similarly, the study by Puri et al. [19] in 2014 and in 2010 [20] involving respectively 30 patients and 14 patients, reported a technical success rate of 93%, with no complications. Also, in 2014, in the work of Hadithi et al. [21] with eight patients, there was 100% technical and clinical success each in draining pelvic abscesses with EUS. There were, among other things, two peri-sigmoid abscesses and four multilocular abscesses. The prostheses used were DPS for all eight patients. The authors report that their procedures were performed under conscious sedation and without radiological control. More recently, Poincloux et al. in 2017 [22] showed, through a retrospective multi-centric study on 37 patients with a 12-year follow-up, a constant technical success and a clinical success of 92%. One perforation occurred after LAMS placement for diverticular abscess requiring surgical management. In addition, stent migration and rectal discomfort due to plastic DPS were reported in two patients. Table 4 summarizes the various studies cited above.

A majority of our patient underwent a EUS-TMD with placement of two plastics DPS, which is the most described technique. In 95% of the cases, an ACD was added, to allow for multiple daily rinsing in case of heterogeneous collections with solid components. This was a real asset, inducing fluidization the contents and ensures a better emptying of the abscess. We propose in our practice a frequency of three flushes per day, with a volume adapted to the collection size, and re-evaluation by scanner at one week. More recently, few clinical cases have reported the successful drainage of perirectal abscesses using LAMS [23,24]. In 2017, Manvar et al. [25] reported clinical and technical successes of 100% each in 15 patients. These stents have the advantage of a large diameter (15 or 20 mm) allowing better drainage, and a shape limiting the migration. Their main limitation remains the high cost and unavailability in various centers [26]. Two patients in our study benefited from this stent for very large and heterogeneous collections, with a quick resolution (less than one week) after removal at one week without any recurrence. Concerning the drainage route, TR or TC, the first one in the most often applied since most of the collections are peri-rectal. In our study, three patients underwent TC drainage with two failures, which is consistent with the literature. Moreover, in the study by Ramesh et al. in

Table 4. Summary of the different studies concerning the treatment of pelvic abscesses under rectal endosonographic guidance.

| Year | Studies | Number of patients | Etiologies of abscesses | Type of drainage | Technical success | Clinical success |
|---|---|---|---|---|---|---|
| 2003 | Giovannini et al. | 12 | 8% medical<br>92% surgical | 3 PAIA<br>9 DPS drainage | 100% | 75%(1) |
| 2009 | Varadarajulu et al. | 25 | 12% diverticulitis<br>8% appendicitis<br>12% other medical causes<br>68% surgical | 25 DPS drainage | 100% | 96%(2) |
| 2009 | Trevino et al. | 4 | Not specified | 4 DPS drainage | 100% | 100% |
| 2009 | Puri et al. | 1 | 100% medical | SEMS | | |
| 2010 | Puri et al. | 14 | 35% medical<br>65% surgical | 5 PAIA<br>9 DPS drainage | 100% | 93%(3) |
| 2013 | Ramesh et al. | 38 | 34% medical<br>66% surgical | 38 DPS drainage | 100% | 70%(4)<br>96%(5) |
| 2014 | Puri et al. | 30 | 53% medical<br>47% surgical | 11 PAIA<br>19 DPS drainage | 93% | 84% |
| 2014 | Hadhiti et al. | 8 | 75% medical<br>25% surgical | 8 DPS drainage | 100% | 100% |
| 2017 | Poincloux et al. | 37 | 16.2% medical<br>83.8% surgical | 4 PAIA<br>29 DPS drainage<br>4 LAMS drainage | 100% | 92%<br>87% long term(6) |
| 2017 | Manvar et al. | 15 | Not specified | 15 LAMS drainage | 100% | 100% |
| 2017 | Choi et al. | 4 | 25% medical<br>75% surgical | 4 DPS drainage | 100% | 100% |
| 2018 | Zator et al. | 6 | 17% medical<br>83% surgical | 6 PAIA | 100% | 100% |
| 2019 | Guingand et al. | 73 | 42% medical<br>58% surgical | 30 PAIA<br>41 DPS drainage<br>2 LAMS drainage | 100% | 93% for PAIA<br>98% for drainage |

DPS: double pigtail stent; TC: transcolonic; TR: transrectal; PAIA: puncture-aspiration-injection of antibiotic; SEMS: self expanding metal stent; LAMS: lumen apposing metal stent.
NB: (1) failures: 2 per aspiration, 1 with prosthesis; (2) 76% TR drainage – 24% TC drainage; (3) without fluoroscopy.
(4) Clinical success in TC drainage; (5) clinical success in TR drainage: insignificant difference.
(6) 64 months.

2013, the authors reported a lower clinical success rate in TC drainage compared to TR drainage (70% versus 96%) [18].

Beyond efficacy, the advantages of EUS-TM over radiological and surgical approaches are the accessibility of the collection, the good tolerance and the quick resolution. Oppositely, the average duration of radiological trans-gluteal drainage of deep pelvic abscesses was 8.3 days, in a recent study [27]. This was already reported by two other series [28,29] with mean drainage delays of 9 and 10 days, respectively. To summarize, despite a good clinical efficacy, superior than 80%, the per-cutaneous approach do not always allow for accessing deep collections, and could be painful. With regards to the surgical drainage, few studies in the literature provide evidence of its effectiveness. Moreover, in our current practice, surgical teams are more likely to consider other approaches to address such complications, especially when occurring postoperatively. Maybe, localized diverticular peritonitis with abscesses greater than fifty millimeters are the best indication for surgical or radiological drainage [30].

Importantly, our study includes two main originalities. First, 41% of our patients were managed by PAIA, applied for smaller but symptomatic abscess, in which the placement of any stent would have been complicated because of the size of the collection. This approach showed excellent results, not significantly lower than drainage (93% against 98%, NS). Consequently, this option may be chosen for collections less than 40 mm size with homogeneous liquid content. More recently, in Zator et al. [31], in 2018, in a series of six cases, the authors demonstrate the effectiveness of the PAIA alone. The second one, due to an 'expert center' effect, for inflammatory bowel disease, a large part of our population, includes a majority of patients with CD (53%). Moreover, very interestingly, we demonstrate an excellent efficiency of drainage, that is, 97% in this sub-population, whereas it is a severe disease because it is fistulized in 77% of the Crohn's disease forms *de novo* in our cohort, in which the hypothesis of a failure of drainage and/or recurrence of the collection could have been considered, but invalidated by our results.

In conclusion, this study shows that EUS-TM treatment for symptomatic collection, is a minimally invasive, safe, effective and well tolerated approach, with excellent results. The two techniques seem to provide the same efficacy, the choice between PAIA and drainage depending on the size and the fluidity of its content (Figure 5). This approach is clearly becoming the gold standard option for managing symptomatic pelvic collections; no matter they occur postoperatively or in the setting of a fistulizing CD, with high efficacy.

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