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ORIGINAL ARTICLE

Endoscopic ultrasound-guided pelvic and prostatic abscess drainage: Experience in 30 patients

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Abstract
Background Endoscopic ultrasound (EUS)-guided drainage is an effective treatment for many abscesses in the abdomen. We review our experience with EUS-guided drainage of pelvic abscesses.
Methods Thirty consecutive patients who underwent EUS-guided pelvic abscess drainage were evaluated after excluding three patients with distance to transducer >2 cm or organized abscess.
Results Thirty patients (25 male) aged 60±4.5 years (mean± SD) had 4 prostatic abscesses, 7 perisigmoid abscesses, and 19 perirectal abscesses with mean±SD sizes of 2.5±0.3, 4.7± 0.6, and 5.4±0.4 cm, respectively. Surgery was the most common predisposing factor (n=14, 46.6 %) followed by diverticulitis (n=5, 16.6 %). Interventions included aspiration only (2 prostatic and 3 perisigmoid), aspiration and dilatation (2 patients in each group), and dilatation and stenting (2 perisigmoid and 17 perirectal). Five (16.6 %) patients needed re-intervention, and two (6.6 %) needed surgery. There were no recurrences. Technical success of EUS-guided pelvic abscess drainage overall was 90.9 % (30/33) and was 93.3 % (27/30) in patients in whom EUS-guided drainage was attempted, with 16.5 % (n=5) re-intervention rate.
Conclusion EUS-guided drainage has an excellent success rate in drainage of pelvic abscesses.

Keywords Complication · Conservative treatment · Diverticulitis · Postsurgical abscess

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Introduction

Pelvic abscesses are well-known complications of surgery and a few medical conditions including diverticulitis and inflammatory bowel disease [1, 2]. They may be life threatening and require drainage. Management options include radiological drainage by transgluteal, transrectal, or transvaginal route under ultrasound or CT guidance. Some patients lack good window for drainage and require surgery [3–6]. Few studies evaluated the role of endoscopic ultrasound (EUS)-guided drainage as a safe alternative to the abovementioned modalities [7–11]. There is sparse literature regarding EUS-guided prostatic abscess drainage [12]. In the present study, we evaluated success and efficacy of EUS-guided pelvic abscess drainage including prostatic abscess drainage.

Patients and Methods

The present study was conducted at a tertiary healthcare center. Consecutive patients with pelvic abscess who underwent EUS-guided intervention (aspiration, aspiration and dilatation, or dilatation and stenting) were included in the study. Data was collected retrospectively from January 2007 to July 2013. The study had approval of the institutional ethics committee. Patients with pelvic or prostatic abscess in whom radiological or surgical drainage was not possible due to difficult access were included consecutively. Patients with organized (thick abscess that could not be aspirated) or multiloculated abscess or with distance to transducer >2 cm were excluded. Thirty-three patients met inclusion criteria; three patients were excluded due to exclusion criteria.

Procedure

All the patients had preprocedure CT scan of the pelvis. The procedure was done after colonic preparation with polyethylene glycol or enema. All the patients received intravenous ceftriaxone and metronidazole before and after the procedure for a duration of 5 days followed by oral ofloxacin and metronidazole for another 5 days. Procedure was done using conscious sedation using midazolam and propofol with the help of anesthetist in some cases. All the procedures were done by RP. The patients were either admitted already (and then diagnosed as having pelvic abscess) or admitted from the outpatient clinic for 1 day on the day of procedure. All aspirated specimens were sent for culture and sensitivity. Culture showed Gram-negative organisms in most of the patients (*Escherichia coli* was the most common isolate). Treatment was modified as per culture sensitivity. Fluoroscopy was not used in any of the procedures. The pelvic abscess and the area of contact between the rectal wall/colonic wall and abscess wall were located by therapeutic linear-array echoendoscope (GF-UCT140 by Olympus). After applying Doppler to rule out intervening vascular structures, the abscess cavity was punctured using a 19-gauge needle (Echo-tip, Wilson Cook), and a 0.035-inch guide wire was passed through this needle. This tract was dilated using needle knife or cannula over the wire, and further dilatation was done with controlled radial expansion (CRE)/Hurricane wire-guided balloon (Microvasive, Boston Scientific) to extent of 12–15 mm in cases of perirectal drainage or 8–10 mm in cases of diverticular/prostatic abscess. For small abscesses <4 cm/diverticular abscesses/prostatic abscesses, only aspiration (if re-aspiration showed clear aspirate) with or without dilatation was done. For larger abscesses, dilatation+stenting was done. In case of stenting, a 10 F, 5-cm double-pigtail stent was placed. The aspirated sample was sent for Gram stain, acid-fast bacilli (AFB) stain, and culture. The stents were removed after verification of complete abscess resolution on a follow up EUS of the pelvis 1–2 weeks after initial procedure. A repeat follow up pelvic EUS or CT was done at 3 months or at recurrence of symptoms. Technical success of the procedure was defined as the ability to drain the abscess under EUS guidance. Treatment success was defined as symptom relief in association with complete resolution of the abscess on follow up EUS or CT at 1–2 weeks. Recurrence of abscess was defined as the need for repeat EUS-guided drainage of a pelvic abscess within 90 days after the stent retrieval.

Statistical methods Data is presented as number, percentage, and mean (standard deviation).

Results

During the study period, 33 patients had pelvic abscess; some of them were referred as there was no good window for CT/ultrasound-guided drainage. Three patients had unfavorable abscess characteristics on EUS (two patients had organized abscess and one had >2 cm distance from transducer), so the remaining 30 patients were analyzed. The study cohort comprised 25 males and 5 females, aged 60±4.5 years (mean± SD). Demographic data of study group are shown in Table 1. Four patients had prostatic abscesses; out of these, three patients had decompensated cirrhosis and were high-risk candidates for urology surgery.

Need of re-intervention/surgery

Overall, two patients (6.6 %) needed surgery, and five patients (16.6 %) needed repeat EUS procedure (Table 2). Two patients in perisigmoid abscess group, for whom only aspiration was done, needed surgery later. One patient in prostatic abscess group needed re-aspiration. In the perirectal abscess drainage group, two patients had migration of stent; hence, the whole procedure was repeated in them, and two patients needed repeat dilatation. Overall, 30/33 (91 %) pelvic abscess were amenable for EUS-guided drainage. The procedure was technically successful in all of these patients in whom it was attempted. Technical success of EUS-guided pelvic abscess drainage was 90.9 % in the entire group, with 93.3 % success rate in patients in whom EUS-guided drainage was attempted

Table 1 Baseline data of 30 patients

Parameter	Mean (SD) or *n* (%)
Age (years)	60±4.5
Sex	25 males (83.3 %)
Location of abscess, *n* (%)	
Prostatic	4 (13.1)
Perisigmoid	7 (23.3)
Perirectal	19 (63.3)
Etiology	
Prostatic	
Tubercular	1 (3.3)
Pyogenic	3 (10)
Other	
Lower anterior resection	14 (46.6)
Diverticulitis	5 (16.6)
Ruptured liver abscess	3 (10)
Tubercular	2 (6.6)
Ulcerative colitis post-surgery	1 (3.3)
Idiopathic	1 (3.3)

Table 2 Interventions and need of re-intervention according to location of pelvic abscesses

Group	Intervention	Re-intervention
Perirectal (n=17)	Aspiration and dilatation 2 Dilatation and stenting 15	Stents were migrated in two, repeat stenting was done in these two, two needed repeat dilatation
Perisigmoid (n=7)	Aspiration 3 Aspiration and dilatation 2 Dilatation and stenting 2	Two needed surgery in whom aspiration alone was done, both had diverticular abscess
Prostatic (n=4)	Aspiration 2 Aspiration and dilatation 2	One re-aspiration in whom aspiration alone was done

and with 16.5 % re-intervention rate. There was no recurrence during follow up (6–60 months).

Discussion

Pelvic abscesses occur secondary to surgical complications, appendicitis, diverticulitis, pelvic inflammatory disease, or inflammatory bowel disease [1, 2]. Pelvic abscesses drainage may be challenging because these are usually surrounded by the pelvis, urinary bladder, rectum, prostate, vagina, and gynecological organs. Ultrasound- and computed tomography-guided drainage of pelvic fluid collections has shown good results [13–15]. However, ultrasound and computed tomography have some limitations as some locations are not accessible to ultrasound probe or CT. CT offers percutaneous approach (transabdominal or transgluteal) which sometimes does not offer ideal window for drainage due to presence of pelvic organs or vessels. Ultrasound offers transrectal or transvaginal drainage of pelvic abscesses, and it passages through other organs or structures, limitations of ultrasound (US) include limited reach of US probe and placement of drainage catheters in place of stents that may be uncomfortable and may cause pain [2]. EUS provides excellent anatomic details and proximity to lesion as most of pelvic abscesses are located near the rectum or left-sided colon and avoids passage through other organs. Several studies have shown good results regarding technical and treatment efficacy of EUS without treatment-related complications ([6–11], Table 3). Although there is no comparative data for EUS- vs. US- or CT-guided pelvic abscess drainage, EUS provides several advantages like close proximity to lesions therefore avoiding passage through other organs and deployments of stents without causing discomfort to patients. Limitations of EUS-guided technique include organized/multilocular abscesses or distance to transducer >2 cm, and at present, role is not clear for more proximal colonic drainage, although Ramesh et al. [10] recently reported 11 transcolonic interventions; out of these, three required surgery and treatment success was significantly lower in diverticular abscess group, similar to our study (out of seven transsigmoid procedures in the present series, two needed surgery). In our experience, diverticular abscesses are difficult as these are small and there is risk of perforation. The present series includes 14 patients earlier reported by our group [11]. The optimal method of wall puncture during pelvic abscess drainage is debatable; cannula may fail sometimes, and needle knife has risk of cutting in the wrong direction [16]. We used

Table 3 Endoscopic ultrasound-guided pelvic abscess drainage: comparison with other studies

Authors (year)	Number of samples	Mean/median size (mm)	Drainage modality, duration	Technical success (in whom procedure attempted)/treatment success (%), comments
Giovannini et al. (2003)	12	48.9×43.4	Stent, 4.3 months	100 (75), patient with largest abscess (8 cm) needed surgery
Varadarajulu and Drelichman (2009)	25	68.5×52.4	Drainage catheter (n=8 if abscess >8 cm) and stent, CT done at 36 h and drainage catheter removed if >50 % size reduction, stents removed at 2 weeks	100 (96), mean hospital stay was 3.2 days after procedure
Ramesh et al. (2013)	38	65 mm (TC) 70 mm (TR)	Compared transcolonic (11) vs. transrectal (27) drainage, stenting ±catheters, follow up CT at 2 weeks	100 (89), 3/11 (27 %) in transcolonic and 1/27 (3.7 %) in transrectal group required surgery
Present study	30	25±3 (P) 47±6 (TR) 54±4 (TC)	Aspiration, dilatation, or stenting, 1–2 weeks	100 (93.3), 4 prostatic abscess, stenting was not done for all patients

P prostatic, *TC* transcolonic, *TR* transrectal

needle knife in majority of cases and did not encounter any complication; we always ask our technician to keep traction (slight pull that does not cause pulling of guidewire but keeps it straight) on guidewire during using needle knife. Strengths of our study include a large number of patients (second largest to the best of our knowledge), demonstration of EUS-guided drainage efficacy for prostatic abscesses, success of EUS-guided intervention in selected patients with aspiration±dilatation alone without stent placement, and no use of fluoroscopy. In conclusion, we present a series of 30 pelvic abscesses including four patients with prostatic abscesses and 100 % technical and 93 % treatment efficacy rate without any recurrence in a long-term follow up.

Conflict of interest RP, NSC, HK, SPS, MP, SRM, SB, KM, NS, and RS all declare that they have no conflict of interest.

Ethics statement The authors declare that the study was performed in a manner to conform with the Helsinki Declaration of 1975, as revised in 2000 and 2008 concerning Human and Animal Rights, and the authors followed the policy concerning informed consent as shown on Springer.com.

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