Natural orifice transluminal endoscopic surgery (NOTES) was developed for intra-abdominal surgical procedures, and was first performed for endoscopic appendectomy in 1976. Various routes such as transgastric, transdouglas, transvaginal (TV), transurethral and transrectal (TR) approaches are used in the newly updated therapeutic method (1-7).

Besides the initial theoretical benefits of the lack of visible scars (cosmetic) and less pain, other possible benefits include a diminished postoperative risk of herniation, entration, wound infection and adhesion (3,5,6). However, the need for new instrumentation, overcoming physiological problems ( acidity, sterility, traversing luminal organs, abscess content, accessibility) and the need for surgical expertise are among some disadvantages (3-6,8).

In the treatment of intra-abdominal and pelvic abscesses, the conventional approach is radiological percutaneous drainage. In cases in which this procedure cannot be performed, surgical treatment (laparoscopic or open surgery) or, in selected cases, drainage by means of TR endoscopic ultrasonography (EUS) is recommended (2-4,9,10). TR procedures have been extensively used in the treatment of perianal abscesses. In conjunction with the evolution of NOTES, the TR interventional approach has emerged in the treatment of intra-abdominal abscesses flanking intestinal organs (4,6,10). The placement of drainage catheters by means of percutaneous transgluteal, TR and TV approaches is frequent in pelvic abscess drainage (4,9,11). The currently preferred approach to these procedures is EUS-guided transdouglas, transureterine or TR endoscopy (4).

A case of a patient with a pelvic abscess, which was resolved by a colonoscopic approach without the use of a drainage catheter, is reported.

CASE PRESENTATION

A 16-year-old male patient presented with high fever, a sensation of rectal compression and abdominal pain. Complaints of abdominal pain had started one week previously, at which time antibiotic therapy was commenced with findings of appendicitis obtained by ultrasound (US) and computed tomography (CT) scans. While the patient's abdominal pain had diminished with medical treatment, an increase in the sensation of rectal compression accompanied by high fever (38.5°C) had emerged two days previous to the initial visit. Physical examination revealed suprapubic sensitivity, while laboratory tests showed leukocytosis of 15×10⁹/L. An abdominal CT scan confirmed the fluid collection at the pelvic floor, adjacent to the rectal wall on the anterior left and seminal vesicles, as an 8 cm × 7 cm abscess of perirectal origin (Figure 1). Because the location of the abscess was not convenient for radiological percutaneous drainage, a decision for surgical intervention was made. A preoperative colonoscopy was performed to exclude inflammatory processes, and showed abscess compression with convexity protruding into the distal sigmoid lumen. The erythematous area with superficial ulceration (Figure 2) was dilated to 2 cm by a precut sphincterotome and standard sphincterotome, and punctured (Figure 3). Following the aspiration of dense pus, the cavity was irrigated with 250 mL of isotonic saline solution. Colonoscopy at 24 h postprocedure displayed sustained opening and continuing pus discharge. A CT scan on day 4 revealed marked loss of volume in the perirectal collection, and air-fluid level in the lumen of the abscess cavity (indication of endoluminal drainage) (Figure 4). The patient was discharged on day 5, and the pelvic magnetic resonance imaging scan two months after the procedure showed complete disappearance of the perirectal abscess pouch (Figure 5).
DISCUSSION

The traditional treatment of pelvic and abdominal abscesses by percutaneous drainage via transgluteal, TR or TV catheterization is an effective, safe and widespread therapeutic technique. These methods facilitate access and reduce the need for laparotomy in abscesses that are unsuitable for percutaneous drainage (4). In deep pelvic abscesses, treatment complications are related to the route of approach and surgical experience. Avoidance of adjacent tissue injury (sciatic nerve, sacral plexus and inferior gluteal vessels) during the procedure is crucial (12,13). A straightforward entry is appropriate for the percutaneous drainage of pelvic abscesses. Drainage with the aid of US may not be successful when the abscess is not readily visualized due to localization (neighboring organs) or dense contents (clotted blood or dense pus). An additional factor that has an impact on drainage is the density of abscess content. In this case, a CT scan provides better resolution compared with US and is more helpful in the differentiation of fluid content from the fluid in intestinal loops. Nevertheless, a small percentage of abscesses are ineligible for drainage by these methods due to their localization (4). The etiology of the abscess is also important in the choice of treatment approach. Complicated infected pelvic fluid collections that are fairly common following abdominal and pelvic surgery for diverticulitis, appendicitis and Crohn’s disease were approached by rectal or vaginal blind surgical incisions or laparotomy in the past; however, currently, the preferred method of approach is percutaneous drainage with the aid of CT or US (4,14,15).

TR drainage of pelvic fluid collections by help of fluoroscopy, CT and US have been reported, but cumulative experiences in this area are limited. In one study (16) of 12 patients with abscesses, TR drainage was successful in nine patients but failed in two, while partial improvement was observed in one subject; the authors concluded that the TR drainage technique under fluoroscopy can be performed easily and is safe in moderate to large deep pelvic abscesses. In another study (17) that used US-guided transperineal drainage on 10 patients with deep pelvic abscesses, 90% clinical success was reported with catheter drainage of two to 146 days. Harisinghani et al (12) reported complete resolution in 96% of 154 patients with deep pelvic abscess by percutaneous CT-guided transgluteal drainage. They concluded that percutaneous CT-guided transgluteal...
Pelvic abscess drainage using NOTES

Figure 4) A computed tomography scan showing evidence of marked volume loss in the perirectal abscess with luminal air-fluid level (indication of endoluminal drainage)

Figure 5) A T2-weighted axial magnetic resonance imaging scan crossing the seminal vesicles showing total disappearance of the perirectal abscess two months postprocedure

drainage is a safe and effective alternative to surgery, with rare major complications (hemorrhage 2%).

The treatment of pelvic abscesses by TR US-guided needle aspiration is the treatment method of choice in primary care, because it does not require catheter placement or prolonged drainage. This procedure causes minimal discomfort, and is essentially complication-free. Results demonstrate that US-guided TR needle aspiration combined with antibiotic therapy is an effective treatment for pelvic abscesses (18). In one study of eight cases (9) with serious abdominal and pelvic abscesses, US- and fluoroscopy-guided TR drainage resulted in significant improvement in the patients’ general condition within hours. Ultrasonographic and fluoroscopic TR drainage was found effective and safe in patients with serious deep abdominal or pelvic abscesses.

The patient in the present study was unsuitable for ultrasonographic or fluoroscopic drainage. We performed preoperative colonoscopy to exclude any pathology that might accompany the inflammatory process. Colonoscopy revealed compression of the abscess in the colonic lumen, erythema due to contact and mild superficial inflammation as a secondary finding. Despite the initial plan to operate, colonoscopic endocavitary drainage was performed due to marked compression by the abscess.

As an alternative to surgery in deep pelvic abscesses that are inaccessible by the traditional percutaneous transabdominal or TV approach, US-guided TR and transgluteal drainage was performed with success and without complication on nine patients. Catheters were removed within one to 24 days (median five days) without abscess recurrence. Particularly in cases of deep pelvic abscesses that are not suitable for percutaneous transabdominal or TV drainage, TR and transgluteal approaches are effective, safe and well-tolerated methods (11). Placement of the drainage catheter by help of TR or TV endoluminal US is simple and safe, resolvable within three to five days and curative with antibiotic therapy (3). In our patient, anatomical location was determined first and adjacent structures identified with radiological methods. Drainage was then performed, without EUS guidance and without placement of a drainage catheter, by opening a drainage hole during colonoscopy. The drainage orifice was opened by precut and standard sphincterotome, taking advantage of the abscess location (neighbouring a luminal organ). The problem of abscess localization in terms of the placement of a drainage catheter was thus nullified. This direct colonoscopic method can be considered preoperatively or constitute an alternative to surgery in cases where a large-channel echoendoscope is not available.

Currently, the use of novel large-channel echoendoscopes in direct EUS-guided drainage is considered safe in more aggressive endoscopic procedures (19,20). It is more suitable for the visualization of fluid collections during endocavitary three-dimensional US TV and TR drainage, frequently alters interventional techniques and allows for precise needle placement (21). The endoluminal US-guided TR and TV approach to deep pelvic abscesses are generally comfortable for patients and are safe and simple (3,22). In a study (10) where EUS-guided TR drainage and aspiration was performed in nine of 12 patients with perirectal and deep pelvic abscesses by plastic stents (that were removed endoscopically after three to six months), complete drainage without relapse was achieved in eight patients. Drainage was incomplete in one patient with a large abscess (diameter of greater than 8 cm) and surgical intervention was required. US-guided TR and TV endocavitary drainage of five days duration together with antibiotic therapy was found to be successful in 16 patients with a total of 18 pelvic abscesses (23).

In our patient, antibiotics were started as is recommended before endocavitary drainage and was effective even though a drainage catheter was not used. The location of the abscess adjacent to a luminal organ enabled the use of endocavitary drainage as a treatment alternative. Despite the presence of a symptomatic large pelvic abscess in our patient, there was no recurrence with endoscopic TR catheter-free endocavitary drainage.

CONCLUSION

In light of our encouraging experience in a single patient, abscesses that are adjacent to the colon but not suited for percutaneous drainage may be treated with transcolonic endocavitary drainage via an endoscopically created orifice without the use of a catheter in centres that do not have endoluminal US or interventional radiology facilities. Colonoscopic drainage may form an alternative to surgery in intra-abdominal abscesses in the presence of secondary colonic findings related to the abscess. However, additional experience is needed for a more definitive conclusion.
REFERENCES