CT-Guided Percutaneous Drainage of Tuberculous and Non-Tuberculous Deep Pelvic Abscesses

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Key Words

Percutaneous drainage · Pelvic abscess ·
Computed tomography

Abstract

Objective: To assess the utility of computed tomography (CT)-guided percutaneous drainage in the management of tuberculous and non-tuberculous deep pelvic abscesses.

Material and Methods: Twelve patients with deep pelvic abscesses were drained under CT guidance. Nine patients were drained with an indwelling catheter of size ranging from 8 to 14 F. Needle aspiration and lavage were performed in 3 patients. **Results:** Successful drainage was accomplished in all the patients. A single-session catheter drainage was sufficient in all the cases. In 4 out of 12 patients the abscess was of tuberculous aetiology and all were effectively managed with indwelling catheter drainage. **Conclusion:** CT-guided percutaneous drainage of pelvic

abscesses with appropriate chemotherapy is an easy, safe and effective alternative to surgery in the treatment of tuberculous and non-tuberculous pelvic abscesses.

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Introduction

Intra-abdominal abscesses that are clearly imaged and hence routinely drained using the percutaneous method include hepatic, renal, and retroperitoneal abscesses, and those in the iliopsoas muscle or sheath [1–5]. Percutaneous abscess drainage (PAD) is particularly appropriate for abscesses in the general peritoneal compartment, including the subphrenic and subhepatic spaces and the paracolic gutters. However, within the pelvis, the bony walls and the compact arrangement of various structures restrict the available routes for percutaneous drainage. Also, the collections that are in the perirectal and presacral area are

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extraperitoneal and would require drainage through the routes which avoid breaching the peritonium. The deep pelvic abscesses therefore require careful imaging evaluation for planning a safe access route in most cases. Though some authors [6] advocate conventional surgical rectal drainage for deep pelvic abscesses, others devised various image-guided routes to drain these abscesses percutaneously [7–11]. The literature on percutaneous drainage of tuberculous abscesses in the pelvis is scarce. In recent years various authors have effectively performed this procedure in isolated cases [12–17]. We report our experience with computed tomography (CT)-guided percutaneous drainage of deep pelvic abscesses in our small population and compare our results of tuberculous pelvic abscess drainage with other reports in the literature.

Material and Methods

CT-guided drainage of deep pelvic abscesses was performed in 12 patients (8 males and 4 females) aged 32–76 years, who were seen over a period of 30 months (from October 1996 to March 1999). All patients presented with fever and leucocytosis and had pelvic fluid collections which were documented with CT and subsequent bacteriologic confirmation of infection. CT was performed after intravenous, oral and/or rectal administration of contrast material on a helical scanner (GE, Prospeed Advantage) with 10-mm-thick sections performed from the dome of the diaphragm to the pubic symphysis.

CT guidance was used in all cases. The technique used was either that of Seldinger (9 patients; where an indwelling catheter was placed) or single-step needle aspiration and lavage (3 patients). In the Seldinger technique the puncture point was located. After injection of local anaesthesia (2% xylocaine), a scalpel mark was made in the skin. The initial puncture was performed using an 18-gauge needle with an inner metallic stylet. The needle was positioned along the desired path with the appropriate angulation to avoid injury to bladder, bowel or vascular structures (fig. 1). The drainage catheters were introduced by the Cope introduction system (William Cook Europe A/S, Denmark). Check CT was performed at the end of the procedure

Fig. 1. Tubercular abscess of the right iliopsoas muscle. **a** CT scan shows a low attenuation abscess involving the iliopsoas muscle. **b** Prior to introducing the drainage catheter, initial needle puncture is made with proper angulation under CT guidance to ensure a safe path. **c** Follow-up CT performed prior to removing the catheter shows the abscess has resolved.

Fig. 2. **a** CT scan of the pelvis before PAD showing a collection within loops of bowel. **b** Follow-up CT scan of the same patient shows no residual collection.

to confirm the catheter position. The patients' records were reviewed for the following: laboratory findings, drainage results, size of catheter used, duration of catheter placement, hospital course, and outcome. A 10.2 F pigtail drainage catheter was used in 6 patients, an 8 F was used in 1 patient and a 14 F Malécot abscess drainage catheter (William Cook Europe A/S) was used in 2 patients. The type and size of catheters depended upon the availability at the time of the procedure. The indwelling catheter was securely fixed and connected to a drainage bag. The catheters were checked daily and irrigated as needed with 10–20 ml of sterile saline. Criteria for catheter withdrawal included: (a) patient remained afebrile for 48 h, (b) catheter stopped draining, (c) follow-up CT scan showed no residual collection (fig. 1, 2). Follow-up CTs were performed in patients with tuberculous abscesses. Of the 3 patients who underwent single-step aspiration and lavage, 2 patients had the abscess located in the pre/paracoccygeal region (fig. 3a) and in the 3rd patient, the abscess was deep in the pelvis adjacent to the previously per-

Fig. 3. **a** CT scan of the pelvis reveals a well-circumscribed fluid collection in the presacral region. **b** CT scan of the pelvis of the same patient in prone position. The abscess was aspirated and lavaged using the transgluteal approach.

formed iliorectal anastomosis. These abscesses were drained through the transgluteal route (fig. 3b). Percutaneous aspiration and lavage were performed using an 18 G needle inserted under CT guidance after determining the safest and most appropriate route. The collection was aspirated as completely as possible, and the cavity was gently and repeatedly lavaged with sterile saline. Appropriate antibiotic therapy was given to all the patients with pyogenic abscess. In the tuberculous patients, antituberculous medication was given for 9 months and an external brace was applied to all the patients with spinal lesions.

Table 1. Patients with pyogenic abscess

Patient No.	Age/sex	Catheter type (size)	Duration of drainage	Source of abscess
1	55/M	pigtail (10.2 F)	12 days	colon resection
2	67/M	Malécot (14 F)	6 days	infected haematoma
3	67/M	pigtail (10.2 F)	31 days	laparotomy for acute pancreatitis
4	27/M	pigtail (8 F)	5 days	laparotomy for perforated appendix
5	76/M	pigtail (10.2 F)	6 days	low anterior resection
6	65/M	–	*	abdominal perineal resection
7	70/M	–	*	low anterior resection
8	69/M	–	*	ileorectal anastomosis

Mean: 12 days.

* Patients who had single-step aspiration and lavage.

Table 2. Patients with tuberculous abscesses

Patient No.	Age/sex	Nationality	Location	Catheter type (size)	Duration of drainage	Outcome
1	18/F	Pakistani	iliopsoas	pigtail (10.2 F)	16 days	completed treatment and cured
2	30/F	Sri Lankan	iliopsoas	pigtail (10.2 F)	14 days	completed follow-up for 4 months and travelled abroad
3	28/F	Kuwaiti	iliopsoas (presacral and bilateral gluteal)	Malécot (14 F)	21 days	completed treatment and cured
4	48/F	Kuwaiti	iliopsoas	pigtail (10.2 F)	15 days	under follow-up

Results

Successful drainage was accomplished in all patients without recurrence or complications (tables 1, 2). All the patients had grossly purulent bacteriologic confirmation of infection. In 4 patients the aspirate was of tuberculous aetiology. Three of these patients had tuberculous spondylitis, whereas in 1 patient who had chronic renal failure, there was no evidence of spinal tuberculosis. The length of the drainage varied from 5 to 31 days (mean 12) in the

patients with pyogenic abscesses (table 1) and from 14 to 21 days (mean 16.5) in the patients with tubercular abscesses (table 2). The abscess volume ranged from 145 to 350 cm³ in the patients with pyogenic abscesses and 350–3,000 cm³ in the tuberculous abscesses. In the patients who had single-step needle aspiration, the volume of the abscesses was 65, 80 and 100 cm³. There was complete resolution of fever within 24–48 h in all the patients with pyogenic abscesses, whereas in the patients with tubercular abscesses immediate relief of

local symptoms was experienced. Of those patients with tubercular abscesses, 2 patients completed a 9-month period of antitubercular treatment and follow-up CTs at 3 and 6 months revealing no residual collection. In the 3rd patient, follow-up CT at 3 months showed no recurrence and the patient is still under medical treatment and follow-up. The 4th patient, after 4 months of medical treatment and satisfactory follow-up, left Kuwait for her native country and could not be followed further. Of the patients with tubercular abscesses, 3 had unilateral iliopsoas abscesses (fig. 1a). One patient had an extensive communicating abscess involving the right iliopsoas extending and involving the gluteal muscles bilaterally. This patient was drained by a single catheter in the right iliac fossa.

Discussion

PAD with CT guidance has been the procedure of choice for the treatment of abdominal and pelvic abscesses for more than 15 years [1, 18–22]. This method, which has been chosen as an alternative to open surgical drainage, has proven to be effective in various clinical circumstances. Patient comfort and cost are less than for open surgery, and the risks of general anaesthesia and surgery are avoided.

PAD was initially performed as a two-step procedure by first locating the abscess with ultrasound or CT and then transferring the patient to the fluoroscopy table for catheter insertion. It is currently preferred as a one-step procedure performed under CT or ultrasound guidance. CT especially demonstrates not only the abscess itself, but also the surrounding structures that should be avoided. An essential element in PAD is follow-up catheter care. The interventional radiologist should follow up the abscess with catheter, clinical, and imaging criteria until the abscess has been

resolved. After evacuation of the abscess, the cavity is irrigated with saline in the radiology suite. While the use of saline irrigation likely facilitates cleansing of the cavity, the saline should be administered at low volumes and low pressure, or sepsis may ensue. On the ward, saline irrigation is continued daily by the ward staff. If there is a problem with the catheter, and if an adjustment is necessary, the radiologist should consult with the clinician and remedy the problem expeditiously.

The catheters may be attached to low suction in the patients' room. The criteria for removal of the catheter include parameters that are: (a) clinical (resolution of fever, normalisation of white blood cell count, and resumption of appetite); (b) catheter-related (minimal or no drainage, resistance to injection of a small amount of saline), and (c) radiographic (closure of cavity, healing of the communication depicted on a sinogram or radiogram of the abscess). When these criteria are met, the catheter is withdrawn, and, in cases of large cavities, may be removed over a few days. Drainage can be successfully performed with 12–14 F catheters. In viscous abscesses the 16–20 F catheters are suggested [22]. In our cases, 8, 10 and 14 F catheters provided successful results with no significant difference in the duration of drainage with the different types of catheters. There were no complications.

Some pelvic abscesses especially if very deep may not be amenable to transabdominal PAD, as this approach may have a number of limitations. Suitable access may be obstructed centrally by the bladder, or laterally by the femoral neurovascular structures. Butch et al. [7] studied the transgluteal approach through the greater sciatic foramen to deep abscesses that were inaccessible with an anterior approach. Such abscesses are particularly common after low anterior resections, abdominoperineal resections, and ileal pouch-anal anas-

tomoses. In these types of surgery the peritoneal reflections are cut, the presacral space entered, and considerable amounts of exudate and haematoma can accumulate [23]. The transrectal approach [8, 9] would be a suitable option for draining these collections in the presacral and ischiorectal spaces, but significant limitation to this procedure arises when a major surgical procedure involving the rectum has been performed, and especially if irradiation therapy has been given. Two patients in our study developed presacral abscesses following abdominoperineal surgery. These abscesses were small and were drained from the transgluteal route with single-step needle aspiration and lavage. Wroblicka and Kuligowska [24] recommend this procedure as treatment for abscesses in various locations in the abdomen and pelvis. The drawback of the transgluteal route includes significant discomfort in walking, pain intolerance requiring analgesia, and sciatic nerve and other major neural element injury, which may be prevented by inserting the catheter as close as possible to the sacrum [7, 25]. Transrectal [8, 9] and transvaginal [10, 11] routes allow a relatively painless approach for access to these abscesses. The transrectal approach is the most direct route to pelvic abscesses and provides a convenient exit pathway for the catheter. The performance of a guided procedure might allow drainage of abscesses that are not in contact with the rectum. Some authors [8] recommend that the transrectal approach should be limited to use with those abscesses that are in contact with the rectum wall.

The largest number of tuberculous pelvic abscesses treated with PAD using CT guidance is reported by Pombo et al. [17] (7 abscesses in 6 patients). They found only one relapse, which they believe was because the patient did not effectively take the medication. In small tuberculous abscesses of the psoas or iliopsoas, chemotherapy alone is suf-

ficient for treatment, but for large abscesses, drainage is usually necessary as an adjuvant [26]. These abscesses are usually secondary to vertebral involvement, which results from haematogenous spread of the infection from a pulmonary focus, or, less frequently, from extrapulmonary sources or from a urogenital focus via Batson's plexus. These abscesses can be successfully drained by the percutaneous technique. A single catheter placed in the main abscess is normally sufficient even in multilocular tuberculous abscess or those extending to the opposite side, anterior to the vertebral bodies. Multiloculation is considered to be one possible cause of failure of percutaneous catheter drainage in pyogenic abscesses [27]. One of our patients with a very extensive tuberculous abscess involving the psoas muscle and the gluteal muscles was successfully drained with a single catheter placed in the right iliac fossa.

Conclusion

Our study confirms that CT-guided PAD, when performed by experienced personnel, is an easy, effective and safe method for the treatment of pelvic abscesses. With adjuvant chemotherapy it may be an effective alternative to surgery in tuberculous abscesses and non-tuberculous pelvic abscesses. However, a prospective study involving a larger number of patients can further ascertain the usefulness of PAD in the management of tuberculous abscesses.

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