Why is the percutaneous transgluteal drainage of deep pelvic abscesses special? Issues to consider.

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Learning objectives

Percutaneous abscess drainage is now a well-established procedure, and numerous reports have described its efficacy and complication rates.

With this educational poster we propose to attend this objectives:

- Review the indications, procedure and complications of deep pelvic percutaneous drainage of abscesses through the transgluteal approach.
- Highlight specific issues related to this procedure.
- Evaluate our experience in the treatment of CT-guided percutaneous transgluteal drainage during the last 5 years.
Background

There are a variety of disorders that can produce fluid collections in the lower abdomen and pelvis Table 1 on page 7. In the absence of indications for immediate surgery the percutaneous abscess drainage is the standard of care. However, specific issues of the CT-guided transgluteal approach are the positioning of the patient and the knowledge of the deep pelvic anatomy, which is of utmost importance to avoid damage of underlying vascular, neural, gynecologic or urologic structures.

ANATOMY:

This is a brief anatomic description of the region pertinent to transgluteal drainage.

The greater sciatic foramen is a space in the posterolateral pelvis, bound superiorly by the ilium, inferiorly by the sacrospinous ligament, anteriorly by the ischium and posteriorly by the sacrum Fig. 1 on page 7 (midsagittal view). Contents of the greater sciatic notch include the piriformis muscle, vessels from the internal iliac system, and nerves of the sacral plexus.

The piriformis muscle originates from the anterior surface of the sacrum and exits the greater sciatic foramen to insert on the greater trochanter of the femur. Superior to the piriformis muscle exits the superior gluteal vessels and nerves; inferior to the muscle exits the inferior gluteal vessels and nerves, internal pudendal vessels and nerve, sciatic and posterior femoral cutaneous nerves, and the nerves to the obturator internus and quadratus femoris Fig. 1 on page 7 (posterioinferior view), Fig. 2 on page 8 (midsagittal view).

The sacrospinous ligament is the inferior border of the greater sciatic foramen Fig. 2 on page 8 (anterior view). The major vessels and nerves lie superior to this level, crossing anterior to the piriformis muscle.

It is very important for planning a safe access to translate the described anatomic structures to the axial CT images Fig. 3 on page 9.

TECHNIQUE:

Transgluteal CT guided drainage shares many features with other percutaneous drainage approaches, and it presents certain advantages over traditional surgery, including lower morbidity and mortality, the use of local anesthesia (which avoids subjecting the patient
to required general anesthesia for surgery) and the possibility of establishing an etiologic diagnosis of abscess.

However, aspects **unique to the transgluteal approach** include patient positioning, route planning, and equipment.

**Patient preparation. Points to keep in mind:**

1- Explain the procedure to the patient (risks/complications, subsequent recommendations…) and obtain informed consent.

2- Analyze and correct if any coagulopathies.

3- If the patient is not receiving antibiotics we should administrate them 1 hour before the procedure (this doesn’t interfere with cultures of fluid aspirated from the collection).

4- Administration of an intravenous conscious sedation (Midazolam), reserving general anesthesia for children or uncooperative adults.

5- Review all the material for the procedure Fig. 4 on page 10, Fig. 5 on page 11. Local anesthesia is used in all patients (lidocaine 1-2 %) Fig. 6 on page 12.

6- Proper patient positioning and maintenance. The optimum position is prone if the patient is able to tolerate it Fig. 7 on page 13. Newly operated patients supose a challenge. These patients can be placed in an oblique or lateral decubitus position. Anyway, they must be able to maintain the position.

**Route Planning:**

Although the safest route through the greater sciatic foramen is at the level of the sacrospinous ligament as close to the lateral edge of the sacrum as possible, some lesions require more superior or lateral course Fig. 8 on page 14.

**Catheter placement:**

Drainage can be performed by using the Seldinger technique or the trocar technique. In our hospital we prefer the Seldinger technique which offers more control and precision. It may facilitate drainage of multiloculated, large deep collections Fig. 9 on page 15, Fig. 10 on page 16.

**Catheter care:**

- Check the connection between the catheter and the drainage system.
- Daily irrigation of the catheter with sterile saline solution 2 or 3 times each day to avoid its obstruction, record daily debit and characteristics of the material obtained.

- Catheter should be removed basing on clinical and imaging criteria, usually associated with a debit less than 20-30 ml/day during 48-72 hours, but make sure that the diminution is not due to debris clogging the catheter.

**COMPLICATIONS:**

A meticulous technique and a careful planning can prevent complications.

Fig. 11 on page 17, Fig. 12 on page 18, Fig. 13 on page 19, Fig. 14 on page 20, Fig. 15 on page 21, Fig. 16 on page 22.

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**COMPLICATIONS**

-Pain (fig 11,13)
  - during the procedure
  - inmediate postprocedure
  - postprocedure local pain

- Catheter malposition / dislodgment (fig 12, 13)
- Hemorrhage
- Cutaneous / enteric fistula (fig 14, 15,16)
- Injury to vital structures (nervous, bowel, gynecologic, urologic...)
- Recurrence

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Table 2

**References:** - ALZIRA/ES
### Table 1. Causes of fluid collections in pelvis

<table>
<thead>
<tr>
<th>Postsurgical collections</th>
<th>Inflammatory bowel disease</th>
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<tr>
<td>- abscess</td>
<td>- Crohn disease</td>
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<tr>
<td>- hematoma, seroma</td>
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<tr>
<td>- anastomotic leak</td>
<td></td>
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<tr>
<td>- urinoma, lymphocele...</td>
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</table>

<table>
<thead>
<tr>
<th>Perforated intestine</th>
<th>Inflammatory pelvic disease</th>
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<tr>
<td>- diverticulitis</td>
<td>- tubo-ovarian abscess</td>
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<tr>
<td>- tumor</td>
<td></td>
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<tr>
<td>- appendicitis</td>
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</table>
Fig. 1. Midsagittal view. Anatomy of greater sciatic foramen. 
1= sacral promontory, 2= greater sciatic foramen, 3= sacrospinous ligament, 4= sacrotuberous ligament, 5= lesser sciatic foramen, 6= ischial tuberosity.

Fig. 2. Posteroinferior view. Piriformis muscle exiting the greater sciatic foramen. 
1= piriformis muscle, 2= ischial spine, 3= obturator internus muscle, 4= coccygeus muscle, 5= levator ani muscle, arrow= pudendal nerve.
Fig. 2. Midsagittal view. Relationship between the sacral plexus (4) and gluteal arteries to the piriformis muscle (1). 2= coccygeus muscle, 3= sacrotuberous ligament, straight solid arrow= superior gluteal artery, curved arrow= inferior gluteal artery, open arrow= internal iliac artery.

Fig. 2. Anterior view of the pelvis. Sacrospinosum ligament and its relation to the bony pelvis. 1= iliac fossa, 2= greater sciatic foramen, 3= ischial spine, 4= sacrospinous ligament, 5= sacrotuberous ligament, 6= lesser sciatic foramen.

Fig. 2

© Radiographics
Figure 3: Normal anatomy. Transverse CT images through the pelvis with intravenous and oral contrast. Piriformis muscle (p), gluteal vessels (arrows), bowel (b), sacrospinous ligament (arrowheads).

Fig. 3
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Fig. 4. The surgical team performed the washing of hands and wears gown and sterile gloves. They prepare the operating table and check that everything is correct.
Fig. 5. Single step drainage set locking.
A= french, B=segment sizing, C= multiperforated, D =pigtail

Fig. 5
© - ALZIRA/ES
Fig. 6

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The addition of bicarbonate to lidocaine produces significant reduction in pain
Fig. 7

Devices such as pillows or cushions can also be used as appropriate to secure the patients position.

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Fig. 8 Optimal access for transgluteal drainage in a patient with a deep pelvic abscess (a) due to diverticulitis. Catheter is inserted through the sacroespinous ligament (arrow), as close to the sacrum as possible, thus avoiding gluteal vessels.

Fig. 8

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Fig. 9 SELDINGER TECHNIQUE
a) a needle (20 to 22G) is initially inserted into the collection and then is aspirated with syringe to check their correct placement. After this step a flexible guide wire (0.018-inch) is inserted through the needle (b) allowing (following the withdrawal of the needle) the introduction of caliber dilators (c,d) gradually increased and finally the catheter (e).

This technique is used if larger caliber catheters are necessary.
Once the catheter is placed we will suck the collection as much as possible. Manual aspiration could be required if the material is thick or rich in detritus.

Once placed in its final position, the catheter is attached to the skin and is connected to a bag to allow gravity draining.

Fig. 10

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Figure 11. Postsurgical pelvic abscess. After drainage the patient presented severe local pain. CT scan shows catheter placement through the piriformis muscle (p), thus explains the patient’s symptoms.

Fig. 11

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Figure 12: Malpositioned catheter. (A) Prone CT images through the pelvis in a patient status post sigmoidectomy with a contained post-surgical anastamotic leak (green arrow). Bowel (white arrow). (B) Drainage catheter placed through the greater sciatic foramen, malpositioned into the bowel. (C) Drainage catheter repositioned into presacral collection.

Fig. 12

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Figure 13. a) Small presacral abscess secondary to gunshot wound (red arrows). The patient experienced severe local pain that required intravenous analgesia. CT scan shows a misplaced catheter (12F), thus explaining the patient’s symptoms. Catheter was removed.

b) One week after catheter removal enhanced CT scan shows enlargement of the collection (orange arrows), therefore the patient underwent secondary drainage by a transperineal approach. (The patient refused the transgluteal approach due to the intense pain in the prior drainage).

Fig. 13

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Figure 14. Pelvic abscess after rectal cancer surgery (arrows).
  a) Initial placement of the needle (star) in the abscess cavity to obtain aspirates for stain.
  b) 8F catheter placed with the Seldinger technique.
  c) After contrast administration there is a suggestive image of enteric communication. The patient was still symptomatic and the drainage debit was approx. 30cc/day, so we decided to leave the catheter open and make new control within a week. We suspended the irrigation with sterile saline solution to avoid perpetuating the possible enteric fistula.
Figure 15. Pelvic abscess after rectal cancer surgery.

a) CT scan shows successful deployment of a catheter (10F) in the abscess cavity.

b), c) 15 days after catheter placement, abscessogram image shows a suggestive image of rectal fistula.

The catheter was removed without complications.

Fig. 15

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**Figure 16.** Pelvic abscess after rectal cancer surgery.

a) CT scan shows a 20G needle advanced into the abscess cavity.
b) CT scan shows a 12F catheter with the self-retaining pigtail tip in the center of the cavity.

c) CT scan obtained before the catheter placement shows the staple line (blue arrow) and the left abscess (*).
d) Enhance CT scan obtained 10 days after the procedure shows an enhancing area near to the catheter (yellow arrow), consistent with extravasad contrast due to fistula.

The patient went through surgery.

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**Fig. 16**

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COMPLICATIONS

- Pain (fig 11, 13)
  - during the procedure
  - immediate postprocedure
  - postprocedure local pain

- Catheter malposition / dislodgment (fig 12, 13)
- Hemorrhage
- Cutaneous / enteric fistula (fig 14, 15, 16)
- Injury to vital structures (nervous, bowel, gynecologic, urologic…)
- Recurrence

Table 2

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Findings and procedure details

We retrospectively review our experience during the last 5 years on 28 patients, taking into account different items Table 3 on page 26, Table 4 on page 26. 18 patients were men and 10 were women, with a range of age between 30-82 years (average 60).

32 drainage catheters in 28 patients were placed. 21 catheters were placed close to the sacrum and 11 more laterally. 85.71% were due to postsurgical complications, of whom 83.33% were after tumor resection (85% neoplasm of rectum-sigma).

The most frequently isolated microorganism was E.Coli.

In our study, the most widely used catheter was the 8F, but in some cases was also used 10F and 12F. We placed the patient prone, lateral or oblique depending on the case and after an initial positioning CT we reassessed if the way chosen for the procedure was best suited.

Seldinger technique was used in all cases and a new CT checked the final position of the catheter and identified immediate complications.

There were no immediate complications in any case neither statistical differences between the type of access and complications were found.

The average time of resolution after the placement of the drain was 17 days, with a range of 4-52 days.

Postprocedure complications accounted for 37.5% and consisted of pain (2 patients), catheter malposition (1 patient), catheter dislodgement (4 patients), enteric/cutaneous fistula (3 patients) and recurrence (2 patients).

There were no other complications in our study as described in the literature such as bleeding, injury of adjacent structures or sepsis.
### Table 3

<table>
<thead>
<tr>
<th>Causes of the drainage catheter placement</th>
<th>Postsurgical complications</th>
<th>After tumor resection</th>
<th>Neoplasm of rectum/ sigma</th>
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<tr>
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<td>24 (85.71%)</td>
<td>20 (83.33%)</td>
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<td>3 (10.71%)</td>
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<td>2 (10%)</td>
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<td>1 (3.57%)</td>
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© - ALZIRA/ES
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<th>Culture</th>
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<th>4 (14.28%)</th>
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<th>E.Coli 12 (42.85%)</th>
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<td>Time until catheter was removed</td>
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<td>Complications</td>
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<td>20 (62.5%)</td>
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<td>With complications</td>
<td>Catheter dislodgment</td>
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<tr>
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Conclusion

- We consider this procedure an effective and safe alternative to surgery to treat deep pelvic abscesses, especially in postsurgical collections.

-Knowledge of deep pelvic anatomy as well as to perform a meticulous technique are essential points to get a secure access.
References


