



# Accessing Intraabdominal Abscess for Percutaneous Drainage Using a Trocar Only Technique to Maneuver Intervening Bowel

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## Abstract

### Keywords

- ▶ abdominal
- ▶ abscess
- ▶ access
- ▶ bowel
- ▶ CT-guided
- ▶ drainage
- ▶ hydrodissection
- ▶ obstructive
- ▶ percutaneous
- ▶ trocar

Conventional approaches to the drainage of abscess surrounded by bowel contraindicate percutaneous drainage and often involve more invasive laparotomy. We attempt to demonstrate the use of an image-guided blunt trocar to navigate obstructive bowel and access abdominal abscess. This report presents the use of a blunt trocar to safely maneuver obstructive bowel and perform successful percutaneous drainage of intra-abdominal abscess in two separate cases: one presenting a left lower quadrant diverticular abscess and the other presenting an abscess in the right lower quadrant. Thus, traversing obstructive bowel using a blunt trocar under computed tomography-guidance allows for percutaneous drainage of an intraabdominal abscess, and provides a safer and more effective alternative to more invasive procedures.

## Introduction

Situations may arise in which bowel surrounds an abscess, preventing image-guided percutaneous abscess drainage. Here, we present two cases in which only a trocar and hydrodissection are used to deflect bowel in the path of the needle.

### Case 1

A 43-year-old female patient presented to the emergency department (ED) complaining of worsening left lower quad-

rant (LLQ) abdominal pain. Subsequent computed tomography (CT) revealed a 4.1 × 2.3 cm abscess surrounded by bowel in the LLQ (▶ Fig. 1A).

Drainage was performed under CT guidance, and an 18G trocar needle (Cook Medical, Bloomington, Indiana, United States) was used to gain percutaneous access into the abdomen (▶ Fig. 1B–D). Hydrodissection with 10 to 20 cc of saline displaced a loop of bowel, and the trocar's inner stylet was slightly withdrawn to expose only the blunt trocar. The blunt trocar tip was then advanced in 10 mm increments with simultaneous injection of saline. Upon reaching the abscess,

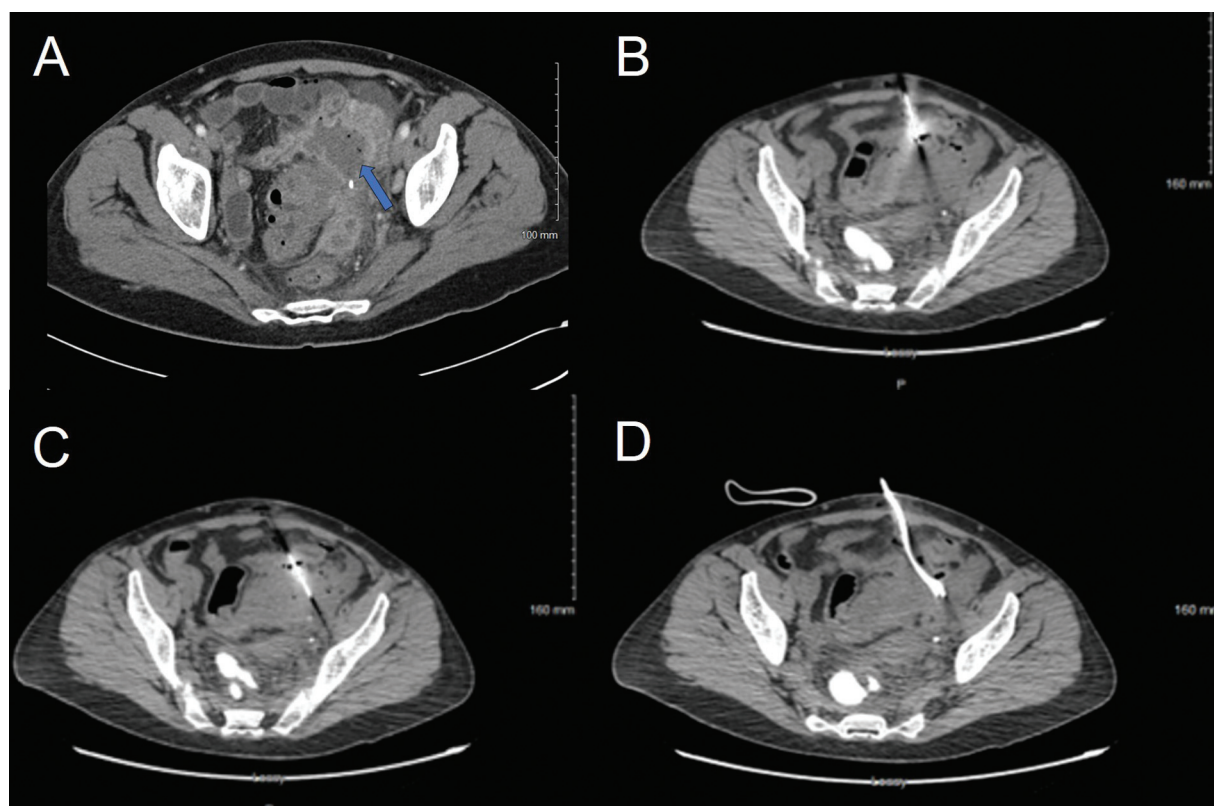
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**Fig. 1** (A) Computed tomography (CT) of the pelvis with contrast (case 1) reveals an abscess (blue arrow) that is surrounded by bowel. (B) CT of the pelvis without contrast (case 1) during intervention depicts a trocar with the inner stylet slightly withdrawn. The trocar was advanced to the bowel and displaced it to allow contact with the abscess wall. (C) Once the abscess wall was contacted, the sharp inner stylet is placed back inside the blunt trocar to allow abscess puncture. (D) Depiction of drain placement inside the abscess without traversing bowel.

the stylet was fully readvanced to the tip to puncture the abscess. A 10 Fr locking pigtail catheter was inserted. Subsequent removal of 20 cc of pus resolved the abscess, which was confirmed by postprocedural CT scan. Drainage was performed via a Jackson-Pratt (JP) suction bulb.

## Case 2

A 68-year-old male patient presented to the ED reporting right lower quadrant (RLQ) abdominal pain. CT imaging revealed a  $4.4 \times 3.8 \times 2.2$  cm RLQ abscess circumferentially surrounded by bowel ( $\rightarrow$  Fig. 2A, B).

CT guidance was used to access the abscess in a similar fashion as the previous case ( $\rightarrow$  Fig. 2C, D). After reaching the abscess, the inner stylet was reinserted for puncture. Using the Seldinger technique, a 10 Fr locking pigtail drainage catheter was percutaneously inserted, removing 20 cc of foul-smelling fluid. CT confirmed abscess resolution and drain position, and the drain was connected to a JP suction bulb.

This technique provided a means for percutaneous abscess drainage that would otherwise be contraindicated.

## Discussion

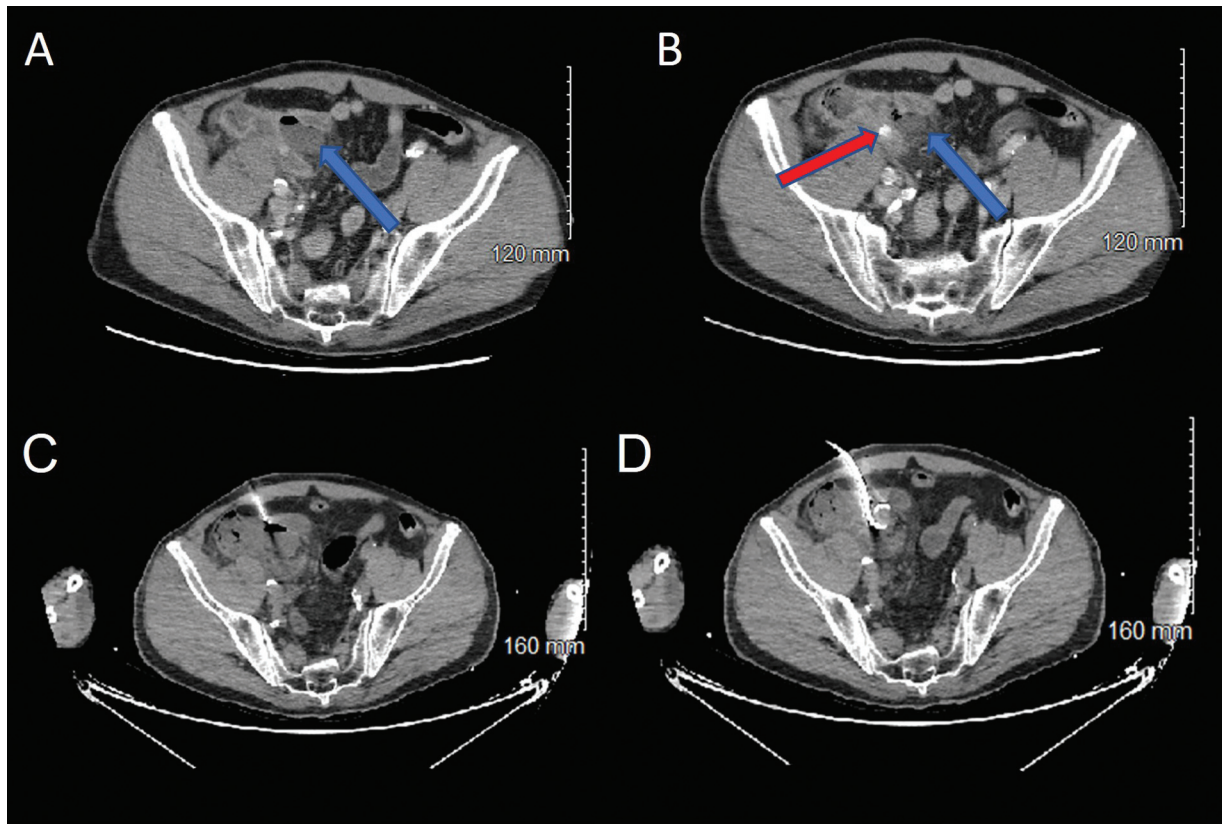
Recent decades have seen CT-guided percutaneous drainage replace conventional surgical intervention as a treatment for

intraabdominal abscesses.<sup>1</sup> However, some abscesses are inaccessible due to the risk of intestinal perforation, as a result of surrounding bowel.<sup>2,3</sup> In such cases, trocar-only guidance can move surrounding intestines to provide effective drainage, circumventing the need for laparotomy.

Afshin Gangi described the treatment of such cases using his SoftGuard coaxial blunt-tip needle. This needle offered safe access to “hard to reach” targets surrounded by critical structures.<sup>4</sup> Historically, blunt needles have been used for other applications, as surgeons often prefer them over sharp instruments to avoid puncturing adjacent structures.<sup>1</sup>

Additionally, CT-guided injection of saline has been used as an effective method of retroperitoneal organ displacement for drainage access.<sup>5</sup> This form of hydrodissection in conjunction with blunt trocar use allowed successful drainage in the above cases. The addition of blunt trocar guidance permits more control than hydrodissection alone and less dependence on the course of saline flow.<sup>5</sup>

The technique outlined in the current report was inspired by past cases involving direct percutaneous jejunostomy.<sup>2,4</sup> The authors acknowledge possible complications include damage to adjacent structures, puncture of organs, and hematomas.<sup>4</sup> In the authors' experience, during percutaneous jejunostomy puncturing jejunum in a nonoperated abdomen (with no prior surgery even with a 21G needle) can be difficult. Jejunum will often mobilize to the opposite side of the abdomen avoiding puncture even with direct real-time



**Fig. 2** (A) Computed tomography (CT) of the pelvis with contrast (case 2) depicts a periappendiceal abscess (blue arrow) surrounded by bowel. (B) CT of the pelvis with contrast, more inferiorly, depicts a periappendiceal abscess (blue arrow) and an appendicolith (red arrow). (C) CT of the pelvis without contrast (case 2), during intervention, depicts a trocar with the inner stylet slightly withdrawn. The trocar was advanced to the bowel and displaced it to allow contact with the abscess wall. (D) Depiction of drain placement inside the abscess without traversing bowel.

fluoroscopic visualization. This has been described by other operators as well.<sup>6,7</sup> We found even more difficulty in puncturing bowel with an 18G needle, especially with a trocar alone, and saline cautiously injected through the trocar as it is advanced further prevented bowel penetration.<sup>4,5</sup>

While an abscess surrounded by bowel is usually a contraindication for percutaneous drainage, the cases outlined above demonstrate that a procedure involving only a trocar may safely displace the intestines to allow access for drainage and avoid a laparotomy.

#### Conflict of Interest

None declared.

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