

Abdominal Imaging

CLINICAL CASE - TEST YOURSELF

Retroperitoneal abscess with an unexpected extension

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PART A

Clinical Presentation

A 62-year-old woman underwent endoscopic retrograde cholangiopancreatography (ERCP) with common bile duct stenting for obstructive jaundice due to choledocholithiasis. Shortly after the procedure, she was

initially diagnosed with post-ERCP pancreatitis and managed conservatively. One week later, she presented with severe lumbar pain, fever, and elevated inflammatory markers. Contrast-enhanced CT demonstrated a large retroperitoneal collection with gas bubbles

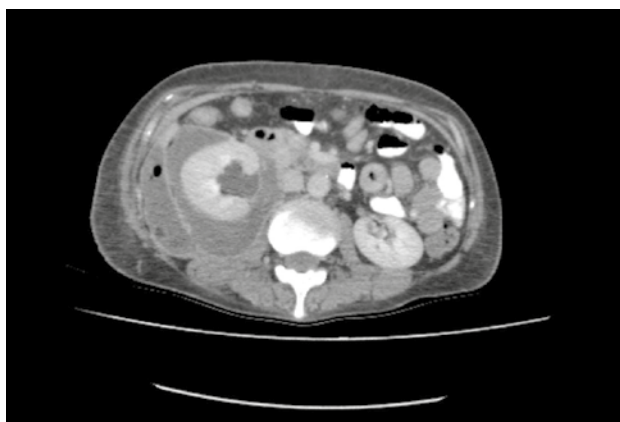


Figure 1: Contrast-enhanced CT image. Axial image of the abdomen.

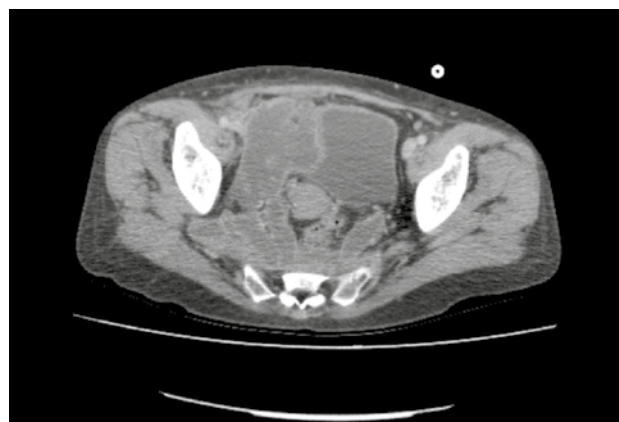


Figure 2: Contrast-enhanced CT image. Axial image of the pelvis.



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suggestive of abscess formation (Fig.1). Percutaneous drainage was performed and cultures revealed *Candida* species. Despite treatment, the patient deteriorated

clinically with sepsis and new-onset right thigh pain. A follow-up contrast-enhanced CT scan was performed for further evaluation of the collections (Fig.2-5).

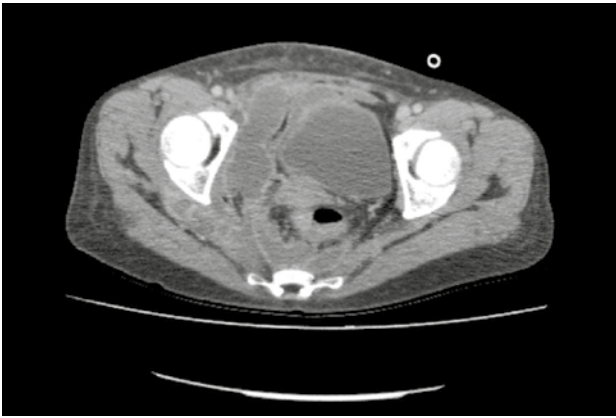


Figure 3: Contrast-enhanced CT image. Axial image of the pelvis.



Figure 4: Sagittal contrast-enhanced CT image.

Figure 5: Coronal contrast-enhanced CT image.

PART B

Diagnosis

Retroperitoneal abscess extending into the gluteal region and posterior thigh via the greater sciatic foramen.

Discussion

Follow-up contrast-enhanced CT demonstrated posterior extension of the abscess from the pelvis into the gluteal region through the greater sciatic foramen, with

further spread of the collection along the posterior aspect of the right thigh (Fig.1-5). Posterior extension of retroperitoneal collections toward the gluteal region and posterior thigh is an uncommon pattern of spread.

The most commonly described route of extension to the thigh is through the iliopsoas compartment, where the dense psoas fascia confines collections and directs their propagation beneath the inguinal ligament to-

ward the anterior thigh [1]. Retroperitoneal duodenal perforation following ERCP may be overlooked at initial presentation, allowing persistent leakage of digestive fluids into the retroperitoneal space and leading to extensive collections and eventual abscess formation [2]. A similar mechanism is likely in our case. Unlike infections confined within the iliopsoas compartment, retroperitoneal collections may propagate along interfascial planes rather than within the iliopsoas muscle itself.

The spread of fluid within the retroperitoneum can be better understood by considering the concept of interfascial planes. Rather than being confined within discrete anatomical compartments, collections propagate along continuous planes of low resistance formed between fascial layers, including the retromesenteric, retrorenal, and lateroconal planes. These planes are interconnected and converge inferiorly, extending into the pelvic retroperitoneum through the prevesical and presacral spaces, thereby allowing extensive downward spread of fluid. As a result, disease processes may extend in multiple directions, following available anatomical pathways rather than fixed compartmental boundaries. Within this framework, disease spread follows the path of least resistance along these potential spaces [3,4].

Furthermore, pelvic and retroperitoneal collections may extend beyond the pelvic cavity through natural anatomical openings. These routes include lateral pathways through the greater and lesser sciatic foramina, anterior spread toward the femoral triangle, inguinal

canal, or obturator canal, as well as midline extension through the perineum via the anal and genitourinary hiatuses. Spread may also occur along the abdominal wall, particularly through the prevesical space or in continuity with the iliopsoas compartment [5].

In our case, the collection accumulated within the posterior pelvic compartment. The piriformis fascia, which forms the lateral boundary of the presacral space at the level of the greater sciatic foramen [6], creates a direct anatomical interface between the posterior pelvic compartment and the gluteal region. From this location, the greater sciatic foramen likely served as the path of least resistance, allowing posterior extension into the gluteal region and along the posterior aspect of the thigh.

The anatomy of the greater and lesser sciatic foramina is closely related. Two key ligaments define this region: the sacrotuberous ligament, extending from the posterior superior iliac spine and sacrum to the ischial tuberosity, and the sacrospinous ligament, connecting the sacrum to the ischial spine. The lesser sciatic foramen lies between these ligaments, while the greater sciatic foramen is located superior to the sacrospinous ligament.

The greater sciatic foramen transmits several important structures, including the piriformis muscle, which divides it into suprapiriform and infrapiriform compartments. The superior gluteal vessels and nerve pass through the suprapiriform compartment, whereas the inferior gluteal vessels, sciatic nerve, and pudendal bundle traverse the infrapiriform compartment. The

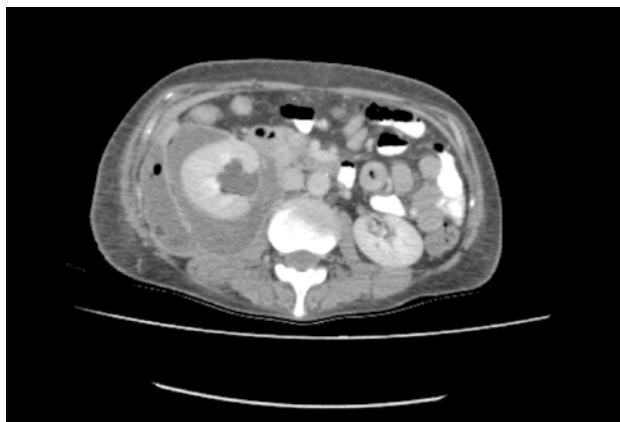


Figure 1: Axial contrast-enhanced CT image demonstrating a retroperitoneal fluid collection with internal gas, consistent with abscess formation.

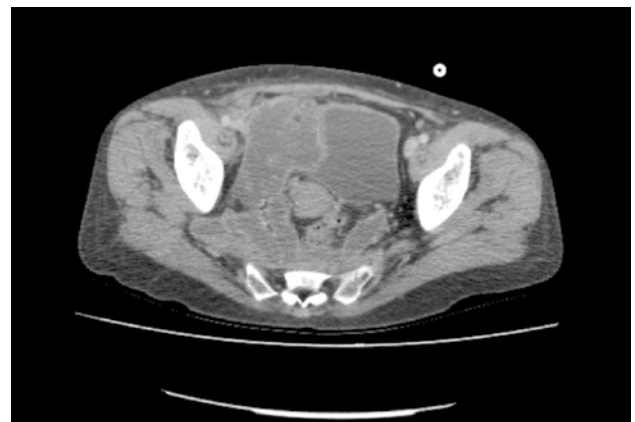


Figure 2: Axial contrast-enhanced CT image demonstrating a fluid collection in the posterior pelvic compartment extending through the greater sciatic foramen.

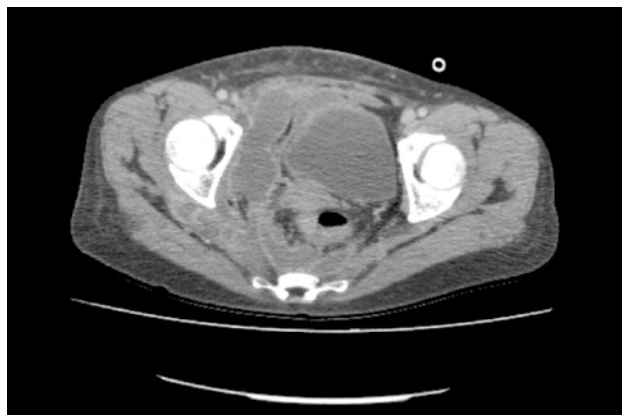


Figure 3: Axial contrast-enhanced CT image demonstrating posterior extension of the collection into the gluteal region.



Figure 4: Sagittal contrast-enhanced CT image demonstrating a large retroperitoneal gas-containing collection with interfascial extension into the gluteal region and along the posterior aspect of the thigh.

Figure 5: Coronal contrast-enhanced CT image demonstrating the full extent of the retroperitoneal collection, with extension into the pelvis and toward the gluteal region.

lesser sciatic foramen transmits the obturator internus tendon, as well as the pudendal nerve and internal pudendal vessels [5].

The greater sciatic foramen provides a direct communication between the pelvic cavity and the gluteal region and may serve as a pathway for posterior spread of inflammatory processes or fluid collections. Once infection reaches the gluteal region, it may further propagate along fascial planes and muscular compartments, particularly around the gluteal muscles and sciatic nerve, extending toward the posterior thigh. The relative lack of anatomical barriers, combined with gravitational effects, facilitates this inferior spread [7].

Contrast-enhanced CT plays a crucial role in identifying the origin and extent of retroperitoneal collections, delineating their spread along anatomical pathways, and guiding clinical management. It provides accurate assessment of disease extent and is essential for surgical planning. In addition to diagnosis, CT also enables image-guided percutaneous drainage, which has been shown to be an effective therapeutic option. However, in cases of severe sepsis, surgical intervention may be preferred, as it allows more rapid control and removal of the infectious focus [1,5,7].

In our case, surgical evacuation of both the buttock and retroperitoneal abscesses was subsequently per-

formed. The buttock abscess was treated with direct incision and drainage, whereas an anterolateral retroperitoneal approach was required for evacuation of the retroperitoneal collections. Intraoperative findings confirmed extensive purulent collections involving the retroperitoneal space and the gluteal region, consistent with the previously described imaging findings. Combined surgical drainage resulted in gradual clinical and radiological improvement.

In conclusion, retroperitoneal abscess with extension to the thigh represents a serious condition that requires early diagnosis and prompt treatment [1,7]. Familiarity

with the potential pathways of spread is crucial for radiologists, as early recognition of atypical extension patterns may significantly influence clinical decision-making and improve patient outcomes. Particular attention should be given to the possibility of occult infection in patients with impaired immune response. Patients presenting with hip or thigh pain and painful groin swellings may harbor significant underlying intra-abdominal pathology, even in the absence of overt clinical signs. **R**

Conflict of interest

There are no conflicts of interest

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CITATION

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