Spondylodiscitis with iliopsoas abscess: Technical aspect of percutaneous image guided intervention.

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Learning objectives

Review cross sectional anatomy of iliopsoas muscle, highlighting the importance of this knowledge while planning the procedure.

Discussion of various approaches and techniques that can lead to successful diagnostic and therapeutic aspiration of iliopsoas abscess.

We also discuss the technique of performing vertebral bone biopsy required to obtain histological diagnosis in certain cases.
Background

There is an increase in incidence of infective spondylodiscitis with iliopsoas abscess world wide. Commonest causative organisms includes stap Aureus, Brucellosis, and TB. Its clinical features may be nonspecific and can mimic a variety of other diseases. Prompt diagnosis and treatment is effective in reducing the rate of disability and functional impairment. Traditionally treatment of iliopsoas abscesses has been either conservative or surgical (1)

Percutaneous image guided diagnostic and therapeutic intervention is an established minimally invasive procedure.

Safe access for percutaneous aspiration and drainage requires a thorough knowledge and understanding of abdominal pelvic retroperitoneum cross sectional anatomy. The major muscles and fascial compartments of the iliac fossa and retroperitoneal structure consist of the psoas and the iliacus and their surrounding fascia (2). Arising separately they merge into a common musculotendinous structure extending caudally underneath the inguinal ligament to insert into the lesser trochanter (2). The psoas muscle originates from the 12th rib and upper lumbar vertebral bodies (2). The iliacus is a fan shaped muscle that arises diffusely from the bony iliac wing and forms the floor of the iliac fossa as it exits inferiorly blending with the psoas muscle (2). Fig 1. The common iliac arteries course downward and laterally on the anterolateral surface of the fourth and fifth lumbar vertebrae along the medial aspect of the psoas muscle before dividing into the internal and external iliac arteries(3). The external iliac arteries run along the anteromedial border of the psoas muscle and continue as femoral arteries below the inguinal ligament(3). The external iliac vein are posteromedial to their corresponding arteries. The right common iliac vein is posteromedial to the corresponding artery while left common iliac vein passes posterior to the left common iliac artery(3). Fig 2.
Imaging findings OR Procedure details

Posterolateral paravertebral approach is suitable for abscesses involving intradiscal, prevertebral and psoas muscle region. Patient lies prone and using CT guidance an 18 Guage 15 cm needle is advanced through the posterior abdominal wall and is angled medially towards the disc space, prevertebral region or psoas muscle depending on the location of the abscess. When the needle tip position is in the collection as confirmed by CT and aspiration of purulent material. An 0.035 Inch superstiff guidewire is advanced through the needle and coiled up in the collection. Then the needle is removed and serial fascial dilatation is performed to accommodate the size of the drainage catheter. A looking -loop pigtail catheter (12-14 French ) with metal stiffener is than advanced into the collection. The stiffener and guidewire are removed and the catheter is locked. Catheter position is finally confirmed by CT. Advantages of this approach is that it is less painful, risk of intra-abdominal organ injury is less. Disadvantages include that patient has to lie prone, risk of major vessel injury such as aorta and IVC. Fig 3,4,5

Anterolateral Extraperitoneal approach is used for abscesses that involve the iliacus and psoas concurrently in the iliac fossa. Patient lies supine and using CT an 18 Guage, 15 cm long needle is angled over the anterior iliac spine and directed both caudally and posteriorly into the iliopsoas muscle group. It is important to direct the needle laterally toward iliac bone rather than medially to avoid low lying ileum or right colon and to make sure that needle lateral to iliac vessels. When the needle tip position is in the collection as confirmed by CT and aspiration of purulent material. Than a looking-loop pigtail catheter (12-14 French ) is placed using the seldinger technique described above. Catheter position is finally confirmed by CT. Advantages of this approach is that it is less painful, less risk of abdominal organ injury. There is a theoretical risk of iliac vessels injury, although it is very rare.

Fig 6

In cases where culture and MRI imaging features are inconclusive or patient has a co-existing malignancy, a fluoroscopic guided transpedicular vertebral bone biopsy would be performed.

Percutaneous vertebral bone biopsy is performed using conscious sedation (e.g Fentanyl and Medazolam). The patient is placed prone and local anaesthesia is administered into the skin subcutaneous tissue, and periosteum of the vertebral body into which the biopsy would be obtained. A small dermatotomy is made with a scalpel and an 11 Gauge trocar biopsy needle is introduced via traspedicular approach using fluoroscopic guidance into
the vertebral body. Samples are than obtained and sent for histological analysis. The patient is observed up to three hours post operatively. Fig 7,8.
Images for this section:

Fig. 1: CT coronal image that demonstrates the right psoas muscle (thick arrow) and left iliacus muscle (thin arrow)

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Fig. 2: CT coronal image that demonstrates the right common iliac vein (thick arrow) and left common iliac artery (thin arrow)

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Fig. 3: Transverse CT scan shows a 14 F pigtail catheter (thin arrow) in the cavity of the right psoas muscle abscess (thick arrow), inserted via right posterolateral paralumbar approach.

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Fig. 4: Axial T2 weighted MRI image a reveals a paravertebral abscess (thin arrow) at the cervicothoracic junction region.

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Fig. 5: Transverse CT scan shows a 12 F pigtail catheter (thick arrow) in the cavity of the right paravertebral abscess (thin arrow), inserted via right posterolateral paravertebral approach.

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Fig. 6: Transverse CT scan shows a 14 F pigtail catheter(thick arrow) in the cavity of the right iliopsoas muscle abscess (thin arrow), inserted via left anterior extraperitoneal approach.

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Fig. 7: Sagital T2 weighted image that demonstrates a paravertebral abscess (thick arrow) and abnormal signal intensity in the nearby disc and vertebral body (thin arrow)

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Fig. 8: Fluoroscopic guided insertion of a biopsy needle (thin arrow) via transpedicular approach to obtain biopsy from vertebral body (thick arrow)

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Conclusion

Percutaneous image guided diagnostic and therapeutic intervention is an effective and safe procedure in treatment of patients with spondylodiscitis and iliopsoas abscess.
References

