Percutaneous CT-guided needle aspiration and catheter drainage

Poster No.: P-0088
Congress: ESSR 2012
Type: Scientific Exhibit
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Keywords: Musculoskeletal soft tissue, Musculoskeletal bone, Interventional non-vascular, CT, Drainage, Abscess
DOI: 10.1594/essr2012/P-0088

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Purpose

The purpose of this presentation is to describe our experience regarding percutaneous CT-guided needle aspiration and catheter drainage of musculoskeletal abscess collections.

Methods and Materials

Over a 9-year period, 25 patients (17 men-8 women, mean age: 55 years) underwent a percutaneous CT-guided needle aspiration and catheter drainage procedure for deep muscular and musculoskeletal abscesses.

A SDCT was used the first 6 years and a 16-MDCT the last 3 years.

After placing the patient in appropriate position, a pre-procedure CT scan was performed with 5mm contiguous slices. From the CT images the exact skin entry site was chosen and the depth from the skin to the lesion was calculated.

Local anaesthesia with 15 ml of 2% lidocaine hydrochloride administrated with a syringe needle and preparation of the skin (cleaning with Povidone Iodine 10% solution) followed.

Two basic techniques are available for percutaneous catheter drainage: Seldinger and trocar. The choice of technique is primarily operator dependent. Though, the trocar technique has been advocated for endocavitary drain placement to avoid the risk of loss of access during the process of serial dilation, a complication associated with the Seldinger technique.

We used trocar technique in all our cases. Two different pig-tail tipped catheter sizes were used: 8 F and 10 F. Before inserting the trocar, a needle (18-25-gauge) was inserted in the lesion under CT guidance. We preferred to do it for two reasons: (1) To ensure a safe route towards the lesion before inserting a tool of a larger diameter (2) To check by aspiration the nature (ie grade of liquefaction) of the lesion. Then, the pigtail catheter was inserted following a route parallel to the needle into the abscess cavity. A 60 ml syringe was mounted at the catheter and aspiration of the abscess contents followed for microbiological examination. Immediately after, the pigtail catheter was connected to a vacuum system, to allow continuous drainage of the abscess cavity. The catheter output was measured daily. When the catheter stopped draining the abscess, a follow-up CT scan was performed, in order to estimate the final outcome of the procedure (correlated with other parameters, such as fever and white blood count).

Results
Paraspinal and iliopsoas muscle was the most common site of drainage, accounting for 85% of the total. Catheter insertion was possible in all patients. Muscle involvement alone was reported in 36% (9/25) and musculoskeletal collections recognised in 64% (16/25). Catheter drainage in combination with proper antibiotic administration after CT-guided needle aspiration was effective in 72% (18/25), not requiring any surgical intervention. The catheter was removed when the abscess's cavity was totally drained and the clinical symptoms remised. The mean stay duration of the catheter inside the abscess’s cavity was 10 days. Skeletal infection was associated with increased risk of treatment failure.

Images for this section:

Fig. 1: CT guided drainage of an abscess in left adductors Pyomyositis is characterized by three stages: (a) the invasive stage, in which edema in the affected muscle leads to pain; (b) the suppurative phase, in which the patient develops a fever and, if not treated, an abscess; and (c) the late stage, which is potentially life threatening and leads to toxicity and sepsis.

Fig. 2: Osteomyelitis and an adjacent soft-tissue abscess in the right femur
Fig. 3: Contrast-enhanced abdominal CT scan demonstrated a rim-enhancing low attenuation paraaortic abscess infiltrating the right psoas muscle and extending further to the retroperitoneal space. Evidence of irregular abdominal aortic dilatation just above its bifurcation was consistent with a saccular mycotic aneurysm of the distal abdominal aorta, with associated paraaortic psoas abscess and deformity of L3 and L4 vertebrae due to the known history of spodylodiscitis.

Fig. 4: Given that the patient was too ill to undergo an open surgical procedure, endovascular stent graft placement followed by a CT guided drainage of retroperitoneal abscess was regarded as the optimum choice (image on left). A follow-up CT performed 11 months later showed no complications of the stent-graft, disappearance of the aneurysm and regression of the abscess (image on right).
**Fig. 5:** Paraspinal abscess complicating TBC spondylitis Contrast-enhanced CT scan shows the 10-F drainage catheter, which has been inserted with a posterior approach. Because the abscess compartments had no communications with each other, the collection was partially evacuated with catheter.
Conclusion

Musculoskeletal abscesses are conditions related to significant morbidity and mortality. Drainage (surgical or percutaneous) of these collections is an important diagnostic and therapeutic tool. Early diagnosis is critical as the culture results determine the indicated therapy. Drainage also helps in evacuating the abscess, preventing extensive tissue necrosis and avoiding life-threatening complications. The procedure is easier when it is performed percutaneously under imaging guidance.

Ultrasound is fast, with no ionizing radiation providing more detailed evaluation of the internal structure and composition of complex collections. However, it is more limited in the evaluation of collections deep within the soft tissues than CT or MRI, and therefore, it is more commonly used for superficial or large fluid collections.

MRI's high cost and low availability limit significantly its use.

CT is able to detect deep collections, distinguish collections from adjacent vasculature by the use of intravenous contrast and offer a more complete evaluation of patients with fever of unknown origin.

Percutaneous CT-guided musculoskeletal aspiration and drainage is a safe, clinically useful and effective technique providing a diagnostic help and a therapeutic alternative to surgery. However, skeletal infection is associated with a higher risk of drainage failure.

References


Personal Information