

A 31-year-old Female Patient with a Thigh Skin Depression

Steven B. Soliman*

Division of Musculoskeletal Radiology, Department of Radiology, Henry Ford Hospital, Detroit, MI, USA

SECTION 2 – ANSWER

Case description

A 31-year-old woman presented with a small palpable and visible area of the skin depression at the anterior mid-distal aspect of her right thigh. This occurred approximately 6 weeks following trauma with prior bruising and swelling in this area. On physical examination, there was a small visible and palpable defect corresponding to the area of skin indentation. The overlying skin was intact and there was no skin discoloration or residual bruising.

INTERPRETATION

Radiographs were completely normal. Musculoskeletal ultrasound (US) demonstrated a small focal hypoechoic cleavage plane or defect extending through the subcutaneous fat [Figure 1]. This was located approximately 20 cm proximal to the patella, at the anterior mid-distal aspect of the right thigh, and corresponded to the area of the skin depression. The overlying cutaneous layer and underlying myofascial plane were intact. There was no significant surrounding subcutaneous edema. There was also no significant associated internal or surrounding hyperemia by power Doppler [Figure 1c]. These ultrasonographic findings were compatible with a diagnosis of a fat fracture.

DISCUSSION

In this case study, we presented a case of a fat fracture diagnosed by US. Other differential diagnoses included fat necrosis, subcutaneous panniculitis, and a subcutaneous abscess. However, unlike a fat fracture, fat necrosis, panniculitis, and an abscess should not have a hypoechoic cleavage plane or defect in US. Furthermore, fat necrosis, subcutaneous panniculitis, and the subcutaneous fat surrounding an abscess will demonstrate a more hyperechoic appearance.^[1] Furthermore, a subcutaneous abscess will present sonographically as a complex, hypoechoic, and variably compressible fluid collection with a surrounding

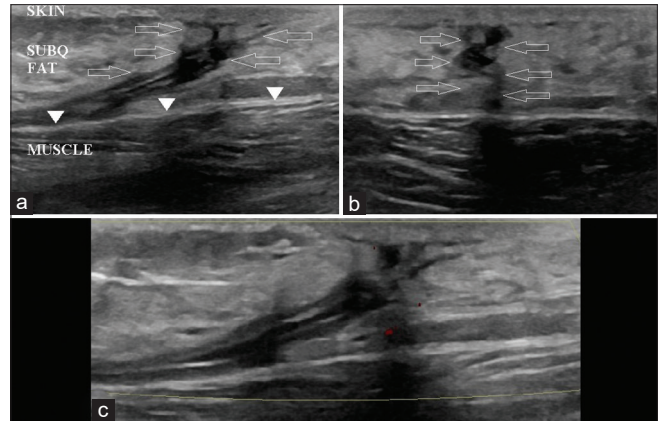


Figure 1: Ultrasound images of an anterior mid distal right thigh fat fracture. (a) Long-axis and (b) short-axis sonographic images demonstrate a small hypoechoic defect or cleavage plane (open arrows) extending through the subcutaneous fat. Note, the intact overlying skin surface and the intact underlying myofascial plane (arrowheads) and quadriceps muscle. (c) Long-axis image obtained with power Doppler demonstrates no significant hyperemia

hyperemic wall. Finally, fat necrosis will also have multiple associated oval-shaped anechoic areas corresponding to the liquefaction of the fatty lobules.^[1]

A fat fracture is a rare diagnosis and rarely considered in the differential diagnosis following trauma.^[2,3] Although the term “fracture” typically refers to bone, fat fractures similarly are caused by blunt trauma and resultant distortion of the organized septa within subcutaneous fat lobules and disruption of the architectural morphology of the adipose tissue.^[2-5] Affected patients typically present with pain in the area and sometimes a visible or palpable skin depression corresponding to the defect or fracture in the subcutaneous fat. The most commonly involved areas are the lateral gluteal region and anterior knee

Address for correspondence: Dr. Steven B. Soliman,
Division of Musculoskeletal Radiology, Department of Radiology,
Henry Ford Hospital, 2799 West Grand Blvd, Detroit 48202, MI, USA.
E-mail: stevens@rad.hfh.edu

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since the adipose tissue in those locations localizes over bony prominences.^[2,4,5] A fat fracture is often overlooked on the physical examination since in the acute setting the associated bruising, swelling, and pain make it difficult to deeply palpate the defect in the subcutaneous fat.^[5] This diagnosis should be considered in the setting of blunt trauma and especially when a palpable or visible soft-tissue defect is observed. In the case of the knee, it is important to ensure that the extensor mechanism is intact and unrelated to a palpable defect near the patella.^[2-5]

Musculoskeletal US, especially given its multiple benefits and its increased use, is an excellent imaging modality for the rapid and accurate diagnosis of a fat fracture.^[3,5-7] US of a fat fracture will demonstrate a hypoechoic defect or cleavage plane within the subcutaneous fat, deep to an intact cutaneous surface, and extending deep to an intact myofascial plane [Figure 1].^[5] This will correspond to palpable or visible skin depression. In the acute period, this may be accompanied by surrounding subcutaneous edema or the presence of a hematoma.^[5] This particular case, similar to prior published cases,^[2-5] also demonstrated the use US in easily identifying a hypoechoic cleavage plane in the subcutaneous fat.

Initial treatment typically consists of conservative management including oral and topical analgesics as well as oral nonsteroidal anti-inflammatory drugs. Avoidance of exacerbating factors and physical therapy is also often recommended.^[2,4,5,8,9] However, with larger defects, conservative treatment can result in significantly delayed healing and a high risk of recurrence with subsequent traumas.^[2,4,5] In patients with larger deformities or with persistent pain, surgical treatment is employed.^[2,3,8,9] Acute surgical excision has been reported as a means to reduce pain and allow earlier recovery.^[2] The surgery consists of an excision of the area and redistribution of the fatty layers. However, this technique is not always sufficient to avoid chronic, cosmetically visible skin depression. Therefore, to achieve better esthetic outcomes, fat grafting in which fat is transferred from other areas and used to fill the defect, can be simultaneously performed.^[2,3,8,9] Unlike a few prior reported cases which required acute surgical excision,^[2,8] our case of a fat fracture responded well to conservative management.

In conclusion, musculoskeletal US is an excellent modality for the prompt and accurate diagnosis of a fat fracture. Early diagnosis is critical to reduce pain by earlier treatment, allow faster healing, and facilitate an earlier return to a preinjury level of function.^[2,4,5]

Declaration of patient consent

The author certifies that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her figures and other clinical information to be reported in the journal. The patient understands that her name and initials will not be published, and due efforts will be made to conceal her identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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