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Musculoskeletal

Traumatic lipohemobursa of the infrapatellar bursa

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ABSTRACT

Displaced fractures allow spillage of bone marrow and blood into the surrounding soft tissues. When the fracture is intra-articular, the spilled marrow contents may be contained by the associated joint capsule, resulting in a lipohemarthrosis. This is sometimes visible as a fat-fluid level on imaging. At the knee, the characteristic appearance of lipohemarthrosis within the suprapatellar recess signifies the presence of an intra-articular fracture that may otherwise not be radiographically apparent. We present a case in which an extra-articular proximal tibia fracture allowed spillage of marrow contents into the deep infrapatellar bursa, resulting in a lipohemobursa. The radiologic appearance mirrors the classic appearance of lipohemarthrosis with a fat-fluid level.

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Introduction

In the setting of acute trauma, the presence of lipohemarthrosis indicates intra-articular fracture, caused by fatty marrow and blood escaping into the joint space, but contained by the joint capsule. We describe a lipohemobursa of the deep infrapatellar bursa in a patient with an extra-articular fracture of the proximal tibia.

Case report

A 71-year-old man was brought to the emergency department after being struck by an automobile traveling at approximately 30 mph. The patient had extensive injuries, including an extension-teardrop fracture of the anteroinferior endplate of C6, subdural hematoma, closed left tibia and fibula fractures and facial lacerations. The cervical spine fracture was managed

conservatively with a cervical collar, the subdural hematoma was followed by serial imaging and did not require surgical decompression, and the facial lacerations were repaired. The evaluation and management of the left lower extremity injuries will be the focus of this report.

Physical examination revealed tenderness, swelling, and deformity of the left lower leg, which raised the suspicion for a closed fracture. Radiography showed comminuted fractures of the proximal tibial and fibular shafts (Fig. 1A), consistent with direct impact from a car bumper. There was no knee joint effusion, suggesting the absence of intra-articular extension, but soft tissue swelling deep to the insertion of the infrapatellar tendon was present. Upon further investigation with computed tomography (CT) (Fig. 2A and B), a component of the tibial fracture was noted to extend anteriorly and superiorly to the tibial tuberosity. There was an isolated lipohemobursa within the deep infrapatellar bursa.

The patient underwent open reduction and internal fixation with an intramedullary rod and interlocking screws for the tibial fractures (Fig. 3).

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Fig. 1 – A 71-year-old man with isolated lipohemobursa of the deep infrapatellar bursa. Cross-table lateral radiograph of the left knee showed comminuted fractures of the proximal tibia and fibula without evidence of intra-articular extension, seen best in A. There was a subtle finding of the deep infrapatellar bursa lipohemobursa, seen best in B (arrow).

Discussion

The term lipohemobursa, not previously found in the literature, is being defined as fat and blood contained within a bursa. In the setting of trauma, fracture of fatty marrow containing bone can release marrow as well as blood and may be detected radiologically [1]. With respect to the knee, intracapsular lipohemarthrosis is classically seen in the setting of an intra-articular fracture. It is visualized within the suprapatellar recess, which freely communicates with the synovial cavity.

In the case we describe, the fracture was neither intra-articular nor did it communicate with the joint capsule. In addition, the tibia fracture extends to the anterior tibial tuberosity, where it is minimally displaced and in direct proximity to the deep infrapatellar bursa. If the fracture had been more displaced, it is likely the fat and blood collection would have dispersed within the anterior lower leg soft tissues. Without containment, the fat and blood would not present with a fat-fluid level.

In the setting of trauma, radiography is typically the initial study performed to evaluate for acute fracture due to availability,

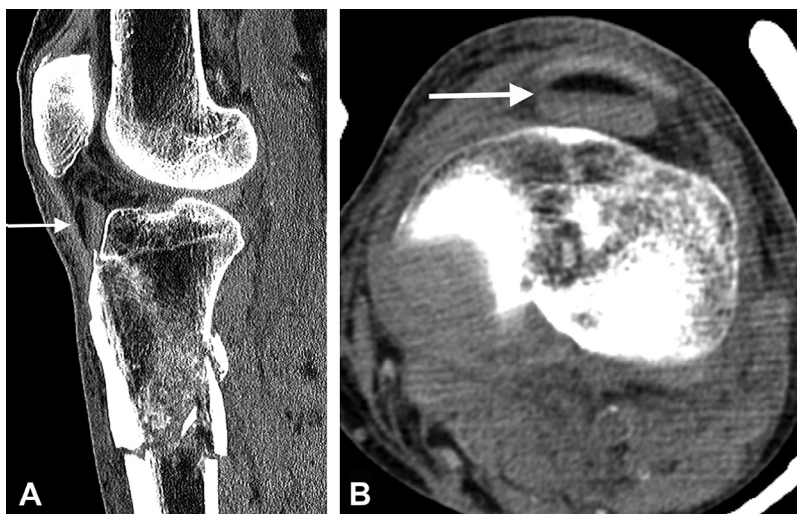


Fig. 2 – A 71-year-old man with isolated lipohemobursa of the deep infrapatellar bursa. Sagittal plane computed tomography (CT) of the left knee showed the comminuted fracture of the proximal tibia. Fibular fracture was not seen on this view. The tibial fracture extended anteriorly and superiorly to the tibial tuberosity (A). Sagittal plane CT and axial plane CT of the left knee (B) showed a double fluid-fluid level, characteristic of lipohemobursa, within the deep infrapatellar bursa (arrow).



Fig. 3 – A 71-year-old man with isolated lipohemobursa of the deep infrapatellar bursa. AP radiograph of the left lower leg showed internal fixation with an intramedullary rod and interlocking screws for the comminuted tibial fracture. The comminuted proximal fibular fracture was also seen.

low radiation exposure, and rapid attainment. Due to the similarity in appearance of lipohemobursa and lipohearthrosis, techniques for characterizing the latter will be discussed. When assessing for intracapsular lipohearthrosis of the knee, the

most useful view is the cross-table lateral view [1,2]. The less dense fat will float on top of the blood as a separate layer (Fig. 1). Frequently, this finding may be the only suggestion of a radiographically occult fracture that may need further investigation with cross-sectional imaging. CT can then be used to further characterize a known fracture or evaluate for suspicion of radiographically occult fracture. CT is also the imaging modality of choice in the trauma setting to detect lipohearthrosis [2], or, in this patient, lipohemobursa. An important distinction between lipohemobursa and hemobursa is the layering appearance. In comparison to lipohemobursa, hemobursa is simply blood within the bursa. In the trauma setting, hemobursa can occur without fracture, such as after tendon rupture [3]. Hemobursa can have a similar layering appearance to lipohemobursa in that there may be a fluid-fluid level if the blood settles into serum above and cellular products below. Due to this similarity, a fluid-fluid level is not specific for lipohemobursa. A double fluid-fluid level is most indicative of lipohemobursa, just as with lipohearthrosis, which appears as fat floating on top followed by serum and lastly cellular products on the bottom [4] (Fig. 2A and B).

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