>> EMERGENCY IMAGING

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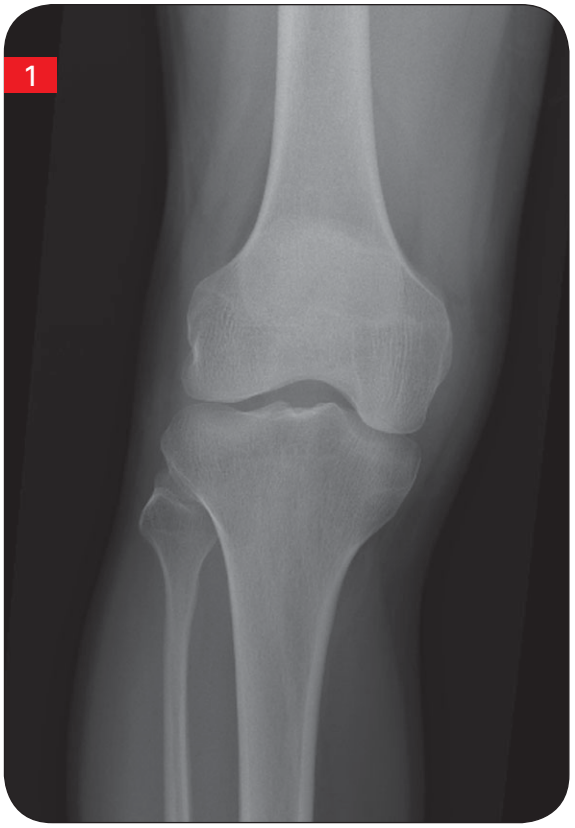
PROBLEM

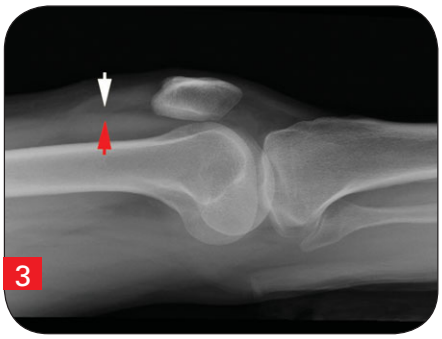


>> A 30-year-old-man presents to your ED after sustaining a knee injury while playing soccer. He is unable to bear weight. Figures 1 and 2 show the radiographs that are obtained.

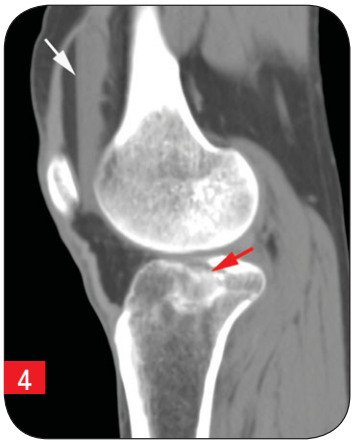
What is your diagnosis?

Turn page for answer >>

ANSWER



>> Based on the radiographs provided, the diagnosis is an intra-articular fracture of the knee. Although the fracture itself is not visible on the radiographs, there is a lipohemarthrosis, which indicates the presence of such. A lipohemarthrosis is a joint effusion in which fat layers on top of blood (fluid), resulting in a fat-fluid interface on the radiograph. This interface can be detected only on a cross-table lateral view of the knee (Figure 3). While a standard lateral view of the knee is taken with the patient lying on his or her side with the film or detector under the table, a cross-table lateral view is obtained with the patient supine and the film or detector at the side of the table.



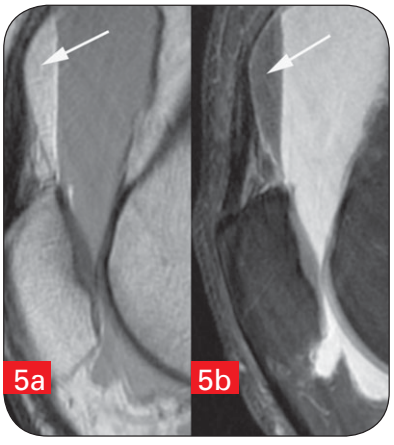


Figure 3 shows the true orientation of a cross-table lateral radiograph: With the knee in this position, gravity allows the fat (white arrow) to layer on top of the blood, which is denser (red arrow). As the only potential source of free fat in the joint is from bone marrow, the presence of a fat-fluid interface indicates that there has been a fracture, which is allowing the marrow fat to escape into the joint. In many cases, a lipohemarthrosis may be the only sign of a fracture; therefore, a cross-table lateral view should be obtained in all cases of knee trauma.

Highly specific for an intra-articular fracture, cross-sectional imaging is useful for confirmation and characterization of the fracture.[1] Although lipohemarthrosis can be visualized using ultrasound, the inability to evaluate the osseous structures limits the utility of this modality. Figure 4 shows that both the lipohemarthrosis (white arrow) and the underlying fracture (red arrow) may be directly visualized on CT. MRI is useful for visualizing the lipohemarthrosis, the fracture, and any associated soft-tissue injuries, which are common with fracture of the knee.[2] Figures 5a and 5b are MR images of the knee without and with fat suppression, respectively, demonstrating the fat lying on top of blood. Note that the signal of the fat becomes low on the fat-suppressed image, confirming that this is indeed a lipohemarthrosis.

Although the fracture in this patient was radiographically occult, it could be visualized as an area of low signal intensity within the medial tibial plateau (white arrow) on the MR examination, as seen in Figure 6.

REFERENCES

1. Schick C, Mack MG, Marzi I, Vogl TG. Lipohemarthrosis of the knee: MRI as an alternative to the puncture of the knee joint. *Eur Radiol.* 2003;13(5):1185-1187.
2. Berquist TH. Osseous and myotendinous injuries about the knee. *Magn Reson Imaging Clin N Am.* 2007;15(1):25-38.

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