Radiology Case Reports

Volume 5, Issue 4, 2010

High-energy fracture of the fabella

Joseph Y. Tang, MD: Hazel Mulcahy, MD; and Felix Chew, MD

Fractures of the fabella are rare, with only nine cases reported in the literature. However, they can cause severe posterolateral knee pain. Other complications include osteoarthritis and, very rarely, peroneal nerve compression. All the prior cases have been transverse fractures. Here we present a first case of a sagittally oriented fabella fracture initially diagnosed on radiographs and subsequently confirmed by computed tomography (CT) with three-dimensional volume renderings. Early recognition and conservative treatment with rest, immobilization, and physical therapy are believed to be effective at relieving symptoms.

Introduction

The fabella is a bony or fibrocartilagenous sesamoid located within the tendon of the lateral gastrocnemius head present in 12% to 15% of the population (1). It is an attachment site for the fabellofibular ligament, which can coexist with or replace the arcuate ligament in reinforcing the posterolateral capsule of the knee (2). In fact, its function has been compared to the patella, serving as a stress nodal point for the intersecting tensile forces from the lateral head of the gastrocnemius and the arcuate, oblique, and fabellofibular ligaments (3).

As such, it is not surprising that a variety of pathologies can result from mechanical or degenerative etiologies and can cause severe posterolateral knee pain. The more common ones include the fabella syndrome, chondromalacia fabella, and primary osteoarthritis (1, 4, 5). Fracture of the fabella is an exceedingly rare cause of pain, with only nine cases reported in the literature (2, 6-10). All of these previously published cases show horizontal fractures on radiographs. No cross-sectional studies have previously been published. We present a case of a vertically oriented fabella fracture confirmed on CT, including three-dimensional (3D) volume-rendered images after initial radiographic diagnosis.

Case report

A 65-year-old man presented with polytrauma sustained as a restrained driver in a car-versus-tractor-trailer collision. His situation was complicated by a prolonged extraction (20 minutes) and loss of consciousness. The patient awoke in an extremely combative state and eventually underwent endotracheal intubation for airway protection at the scene. On arrival to the hospital, the patient was hypotensive and anemic; he underwent fluid resuscitation and blood product transfusions with resultant normalization of blood pressure. Initial imaging workup showed multisystemic injuries including a subdural hematoma, left internal carotid artery injury with stenosis (Biffl grade 2), sternal fracture with a mediastinal hematoma, bilateral rib fractures with pneumothoraces, and lower-extremity fractures involving the left supracondylar femur, left bicondylar tibial plateau, and right lateral tibial plateau.

Initial radiographs of the right knee (Fig. 1) showed a vertically oriented, slightly displaced fracture of the fabella. In addition, there was a comminuted, predominantly vertical fracture of the lateral tibial plateau and associated effusion. The patient underwent closed reduction and external fixation of the left femoral and bilateral tibial plateau fractures as temporizing measures during his resuscitation and stabilization. Subsequent CT images (Figs. 2 and 3) confirmed a sagittally oriented, slightly displaced fabellar fracture and a Schatzker type-II tibial-plateau fracture. On day

Citation: Tang JY, Mulcahy H, Chew F. High-energy fracture of the fabella. *Radiology Case Reports*. [Online] 2010;5:454.

The authors are in the Department of Radiology at the University of Washington Medical Center, Seattle WA. Contact Dr. Tang at joetang@uw.edu.

Competing Interests: The authors have declared that no competing interests exist.

DOI: 10.2484/rcr.v5i3.454

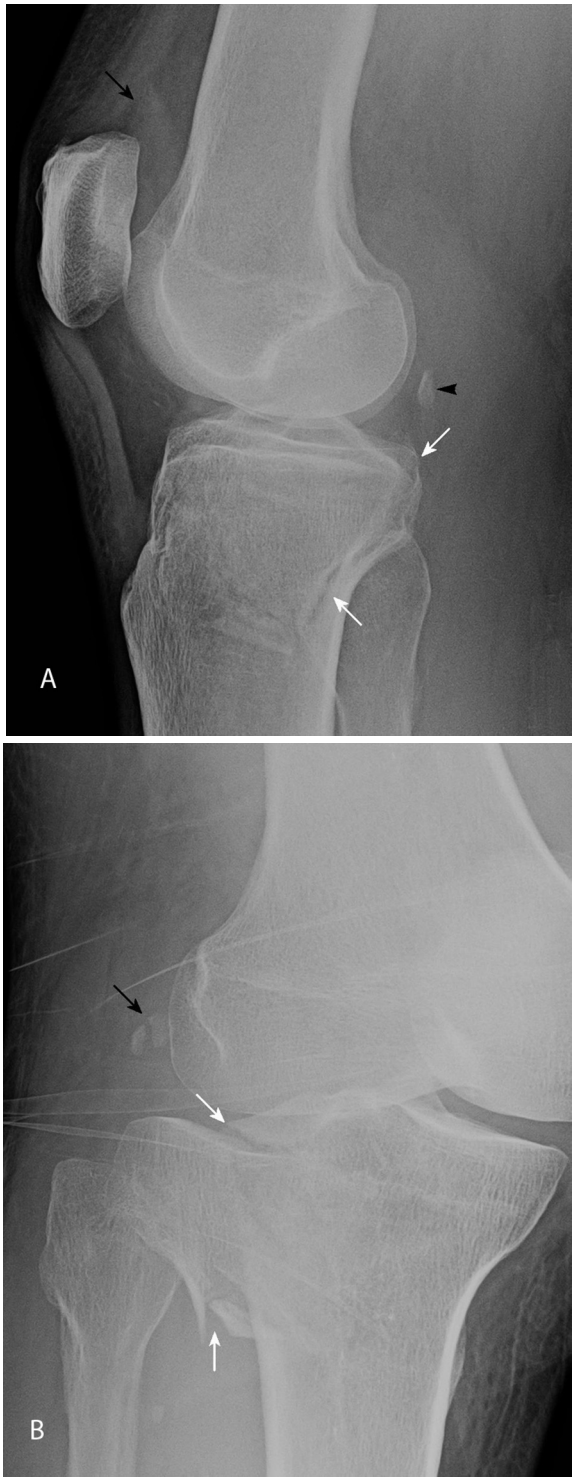

Fig. 1A & B. 65-year-old man with fracture of the fabella. Lateral and oblique radiographs of the right knee. A. Lateral view shows an effusion (black arrow) and the tibial plateau fracture (white arrows). The fracture line through the fabella (arrowhead) is not visible on this view . B. Oblique view shows a vertical, mildly displaced fracture of the fabella (black arrow). The split-depression fracture of the lateral plateau is better visualized (white arrows).

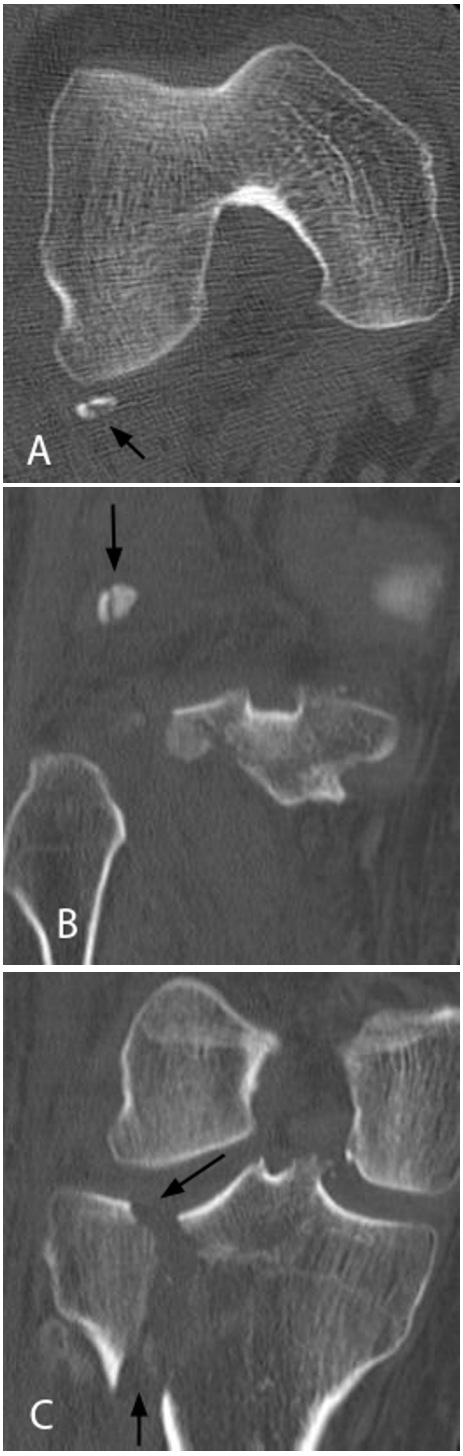

Figure 2A, B, C. CT of the right knee in bone windows. A. Axial image at the level of the femoral condyles shows sagittally oriented fracture of the fabella (arrow). B. Coronally reformatted image at the level of the fabella also demonstrates sagittally oriented fracture of the fabella (arrow). C. Coronally reformatted image at the level of the intercondylar notch shows split-depression fracture of the lateral tibial plateau with lateral displacement of the lateral fragment (arrows).

Fig. 3A, B. 65-year-old man with fracture of the fabella. 3D volume-rendered reformatted CT images show a sagittally oriented fracture of the fabella (arrow) and a split-depression fracture of the lateral tibial plateau.

three, the patient underwent internal hardware fixation of the right tibial plateau fracture. The fabella fracture was treated conservatively.

While awaiting medical clearance for operative repair of the left bicondylar tibial plateau fracture, the patient developed acute respiratory distress syndrome on day four. Two days later, the patient went into multisystem organ failure. Subsequently, the patient had a cardiac arrest and died on day eleven.

Discussion

Fractures of the fabella, although rare, are a cause of severe posterolateral knee pain associated with decreased range of motion, inability to bear weight, and limited knee extension. On exam, tenderness is elicited with either hyperextension or compression of the fabella over the lateral femoral condyle (2, 7, 8). Fracture etiologies in the published cases include direct trauma to the lateral or posterolateral knee (2, 6, 7, 9), repetitive microtrauma (8), and altered biomechanics in patients after total knee arthroplasties (10). All of those cases were demonstrated as transverse fractures (2, 6, 7, 8, 9, 10), and they likely resulted from tensile force caused by various low-energy trauma. Our patient presented with a vertically oriented fracture. The mechanism of injury is not clear in our case; however, considering that he sustained multiple injuries including the adjacent Schatzker type-II tibial-plateau fracture, it must have resulted from a high-energy force. The orientation of the fracture plane indicates tensile forces in the medial-lateral direction.

Differential diagnosis could include a bipartite fabella (8). Potential complications include osteoarthritis. Common peroneal neuropathy is also possible if the fracture is displaced and compressing the nerve (11).

In the few published cases, conservative treatments, which include anti-inflammatory medications, rest, immobilization, and physical therapy, seemed effective (2, 8). However, one case underwent fabellectomy (7), which is recommended only after a failed trial of conservative therapy or if there is impingement of the common peroneal nerve (1). In the setting of multiple trauma, including life-threatening injuries to other systems and knee fractures, the presence of the fabellar fracture had little clinical importance in the acute setting.

References

1. Weiner DS, McNab I. The fabella syndrome: an update. *J Pediatr Orthop*. 1982 Oct;2(4):405–408. [PubMed]
2. Marks P. Fracture of the fabella: A case of posterolateral knee pain. *Orthopedics*. 1998 Jun;21(6):713-4. [PubMed]
3. Muller W. The fabella as a stress nodal point. In: Muller W, ed. *The knee: form, function, and ligament reconstruction*. Berlin, Germany: Springer-Verlag; 1983:192.
4. Goldenberg RR, Wild EL. Chondromalacia fabella. *J Bone Joint Surg Am*. 1952 Jul;24-A-3:88-90. [PubMed]

5. Pritchett JW. The incidence of fabella in osteoarthritis of the knee. *J Bone Joint Surg Am*. 1984 Dec;66(9):1379–1380. [PubMed]
6. Sagel J. Fracture of the sesamoid bones. A report of two cases. *Am J Surg*. 1932;18:507-509.
7. Dashefsky JH. Fracture of the fabella. A case report. *J Bone Joint Surg*. 1977 Jul;59(5):98. [PubMed]
8. Woo C. Fracture of the fabella. *J Manipulative Physiol Ther*. 1988 Oct;11(5):422–425. [PubMed]
9. Levowitz BS, Kletschka HD. Fracture of the fabella. *J Bone Joint Surg*. 1955 Jul;37-A(4):876-7. [PubMed]
10. Theodorou SJ, Theodorou DJ, Resnick D. Painful stress fractures of the fabella in patients with total knee arthroplasty. *AJR*. 2005 Nov;185(5):1141-1144. [PubMed]
11. Mangieri JV. Peroneal nerve injury from an enlarged fabella. A case report. *J Bone Joint Surg Am*. 1973 Mar;55(2):395–397. [PubMed]