



CASE REPORT

Hoffa fracture, eminentia fracture and posterior cruciate ligament damage: An unusual knee injury

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Introduction

Isolated femoral condylar fractures in the coronal plane of the knee are rare. When they do occur, the cause is often direct anteroposterior force applied to a flexed knee in a high-energy accident. Hoffa described the injury in 1904⁵ as generally involving the lateral femoral condyle, but bicondylar-supracondylar Hoffa fractures and femoral fractures accompanied by Hoffa fractures have been reported.^{2,3,8} To our knowledge, the combination of isolated medial condylar Hoffa fracture, eminentia fracture and posterior cruciate ligament (PCL) avulsion has not been documented before. In this report an unusual trauma pattern of a Hoffa fracture accompanied by soft-tissue and bone injury is presented.

Case report

A 32-year-old woman who had been hit in the back by a motor vehicle had knee pain and could not walk. On presentation at the emergency ward, physical examination revealed deformity, swelling and tenderness of the left knee. Plain radiography showed a medial condylar Hoffa fracture (Fig. 1). CT and MR imaging, indicated by the anteroposterior laxity of the



Figure 1 Lateral radiograph of medial femoral condylar Hoffa fracture.

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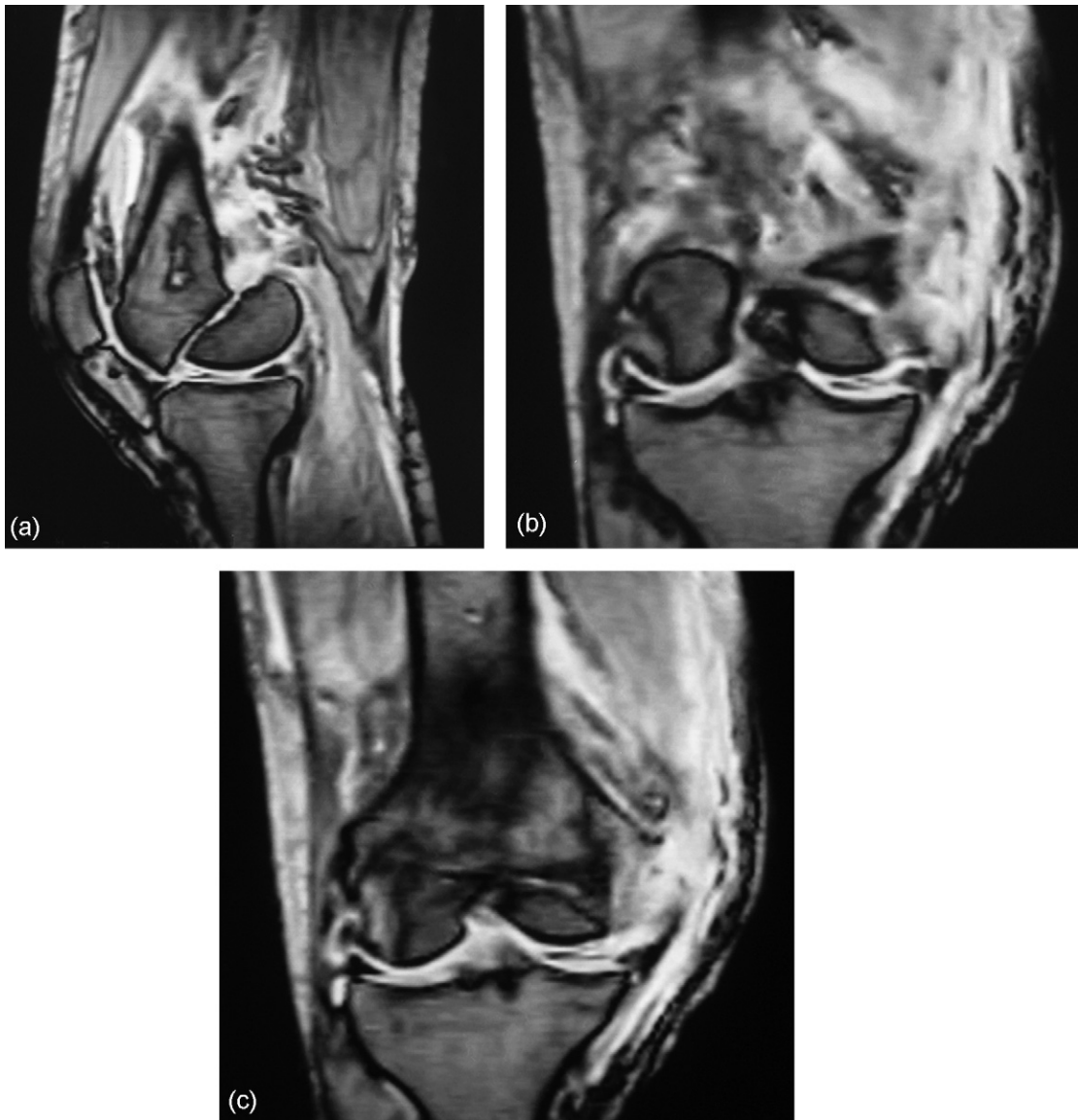


Figure 2 (a–c) Magnetic resonance images show Hoffa and eminentia fractures on coronal and sagittal planes.

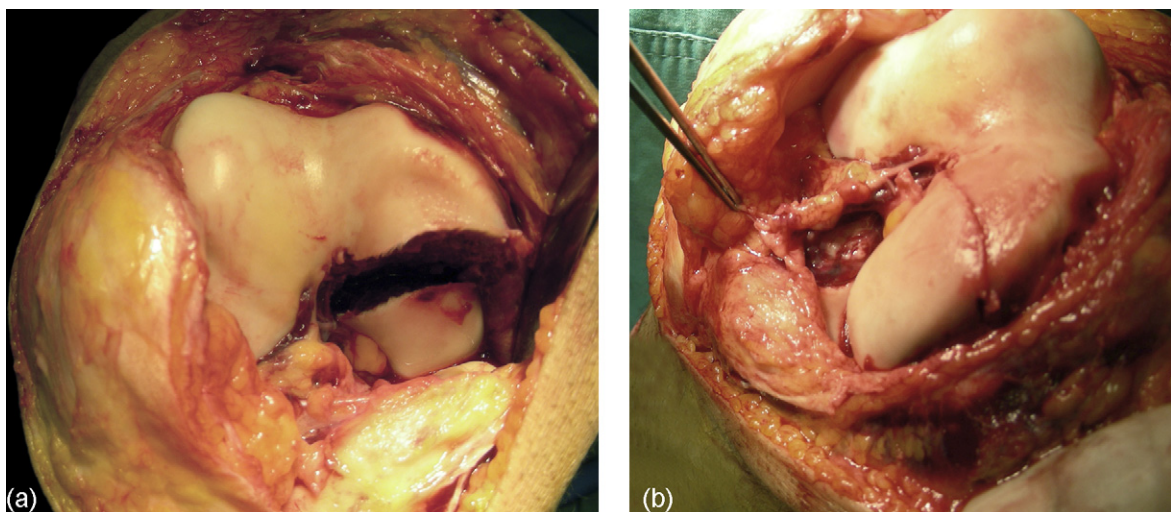


Figure 3 Intraoperative view of (a) the Hoffa fracture and (b) fixation.

knee detected during physical examination, revealed Hoffa fracture combined with eminentia fracture and partial avulsion of the PCL (Fig. 2). No other morbidity was found. Treatment comprised a left knee medial parapatellar incision with open reduction and internal fixation achieved visually. Reduction of the medial condylar Hoffa fracture was followed by fixation with two Acutrak headless screws (Fig. 3). The eminentia fracture was similarly reduced and fixed with an Acutrak headless screw. The PCL was re-attached using a Mitec anchor. After internal knee cleaning, the surgical wound was closed and a brace allowing knee movement was applied. Physiotherapy including controlled knee movement was started 3 weeks postoperatively, and in the 6th postoperative week partial weight bearing was allowed. At 3 months postoperatively, radiological fracture union was achieved and the woman progressed to full weight bearing. However, despite all the exercises, at 5-month follow-up knee flexion was only 35° and modified Judet's quadricepsplasty was performed. A physiotherapy programme was started immediately after the operation, and at 3 and 5 months postoperatively knee flexion was 115° and 130°, respectively (Fig. 4). The woman was able to return to her usual daily activities and was satisfied with the outcome (Fig. 5).

Discussion

Hoffa fractures are rare; lateral are more common than medial Hoffa fractures.¹⁻⁸ Although usually only one condyle



Figure 4 Flexion of the knee at final follow-up.

is involved, bilateral and unilateral bicondylar Hoffa fractures have been reported.^{3,4} A few cases of Hoffa fractures associated with supracondylar-intercondylar femoral fractures have also been described in the literature.^{1,2,8} Our patient had an eminentia fracture with PCL injury in addition to the rarely seen medial Hoffa fracture, which further complicated the damage. In any such unusual pattern of injuries, the diagnosis of additional bone and soft-tissue trauma is important in planning treatment and achieving functionally satisfying results.

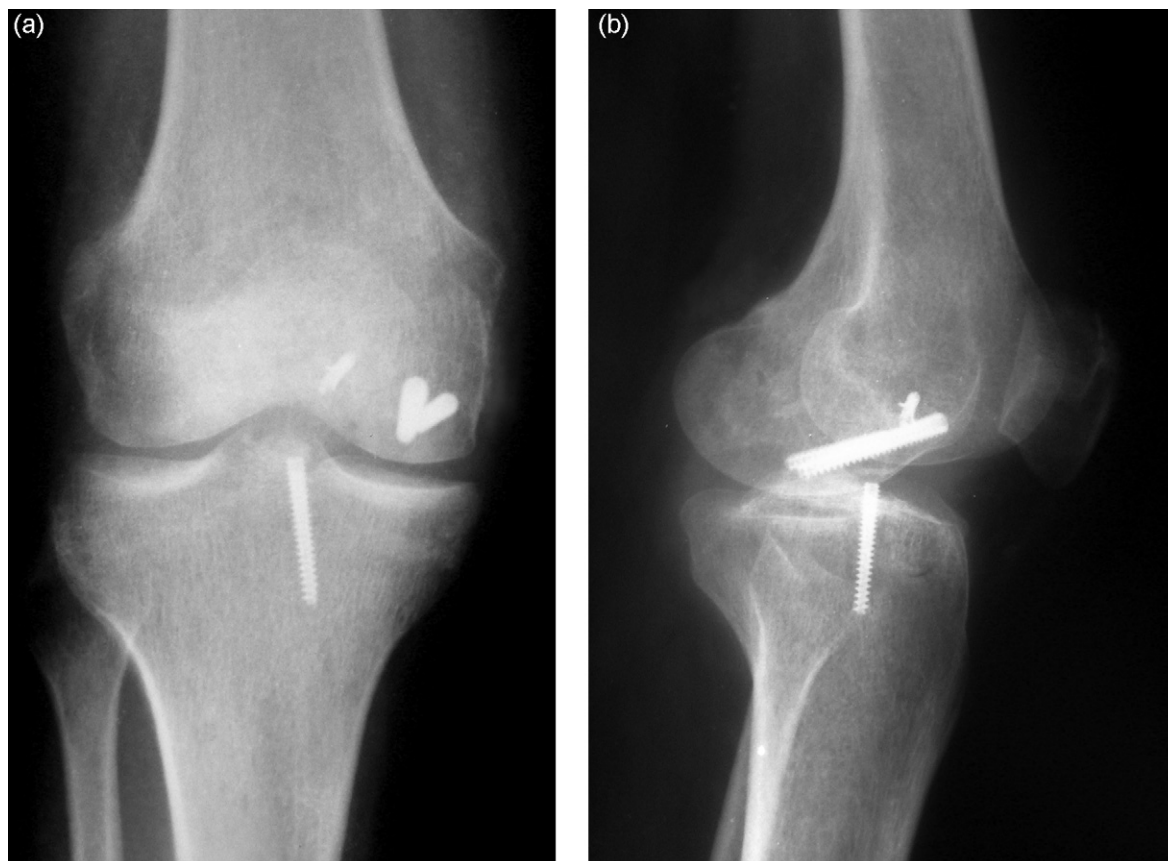


Figure 5 (a) Anteroposterior and (b) lateral radiographs at final follow-up.

The CT images showed an eminentia fracture and so MRI was performed, facilitating investigation of intraarticular soft-tissue lesions. As the woman's knee injuries were severe, arthroscopic treatment as advocated in the literature would have been inappropriate. Both the eminentia fracture and the trauma to the PCL were evaluated through an arthrotomy following internal fixation of the medial Hoffa fracture, and then treated. The complex nature of the damage required 3 weeks' immobilisation, and at subsequent 5-month follow-up it was found that limitation of knee movement had not improved with physiotherapy. Therefore, quadricepsplasty was carried out to restore the range of motion.

As was reported by Holmes et al.⁶ visualisation was best attained by the parapatellar approach; this facilitates the diagnosis of intraarticular injuries as well as their treatment.

In conclusion, the treatment protocol of a Hoffa fracture should include evaluation of possible accompanying injuries in order to provide the best functional outcome.

References

1. Agarwal S, Giannoudis PV, Smith RV. Cruciate fracture of the distal femur: the double Hoffa fracture. *Injury* 2004;35:828–30.
2. Baker BJ, Escobedo EM, Nork SE, Henley MB. Hoffa fracture: a common association with high-energy supracondylar fractures of the distal femur. *AJR Am J Roentgenol* 2002;178:994.
3. Calmet J, Mellado JM, Garcia Forcada IL, Gine J. Open bicondylar Hoffa fracture associated with extensor mechanism injury. *J Orthop Trauma* 2004;18:323–5.
4. Heuschen UA, Gohring U, Meeder PJ. [Bilateral Hoffa fracture—a rarity]. *Aktuelle Traumatologie* 1994;24:83–6.
5. Hoffa A. *Lehrbuch der Frakturen und Luxationen*, 4th ed., Stuttgart: Verlag; 1904. p. 453.
6. Holmes SM, Bomback D, Baumgaertner MR. Coronal fractures of the femoral condyle: a brief report of five cases. *J Orthop Trauma* 2004;18:316–9.
7. Kumar R, Malhotra R. The Hoffa fracture: three case reports. *J Orthop Surg (Hong Kong)* 2001;9:47–51.
8. Nork SE, Segina DN, Aflatoon K, et al. The association between supracondylar-intercondylar distal femoral fractures and coronal plane fractures. *J Bone Joint Surg Am* 2005;87:564–9.