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Case Report

Arthroscopic-assisted fixation of a Hoffa fracture: A Case Report

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Abstract

In this reported case, we have a 26-year-old male patient with a medial condylar Hoffa fracture, an intraarticular injury demanding prompt anatomical reduction and internal fixation. Despite the short interval since the injury, conventional open reduction and internal fixation were compromised by the skin conditions. Recognizing the urgency of addressing an intraarticular fracture, we opted for an arthroscopic assisted minimally invasive approach, aiming to capitalize on its benefits.

Arthroscopy-guided fixation offers advantages such as the avoidance of extensive soft tissue dissection, facilitating a faster recovery process, and enabling early mobilization. The chosen approach in this case not only addressed the challenges posed by delayed presentation but also emphasized the adaptability of arthroscopic techniques in complex orthopedic scenarios. The patient experienced a positive outcome, highlighting the effectiveness of this alternative approach in managing medial condylar Hoffa fractures where traditional methods may be impractical. This case emphasizes the importance of adapting innovative approaches to achieve optimal outcomes in challenging orthopedic scenarios.

Keywords: Hoffa Fracture; Arthroscopy; Medial Hoffa; Coronal Condylar Fractures of Distal Femur; Knee Articular Fractures

Introduction

Coronal plane fractures of the distal femoral condyle, commonly referred to as Hoffa fractures, were initially documented by Albert Hoffa in 1904. This unique type of fracture presents a distinctive challenge as the distal fragment, devoid of muscle attachment, exists as a free floating intra-articular bone piece. Situated within a synovial fluid bath, this fragment poses a significant risk of non-union in cases managed conservatively or when fractures are neglected. Complications may include knee joint osteoarthritis and stiffness, underscoring the critical importance of early anatomical reduction and internal fixation as the preferred treatment modality.

In the forthcoming case presentation, we explore the management of a medial condyle Hoffa fracture with arthroscopy-assisted reduction and internal fixation (ARIF), highlighting the imperative nature of this technique.

Case Report

A 26-year-old man presents to the emergency department with right knee pain after a fall in workplace. He hit his right leg on to the ground with his knee in 20 degrees of flexion, he was unable to weight bear afterwards. The initial AP and lateral radiographs showed a coronal fracture of medial condyle of the distal femur.

This fracture could have been easily missed on the plain radiograph. Further imaging with the CT scan confirmed the fracture and its pattern.

Figure 1: Lateral radiograph right knee.

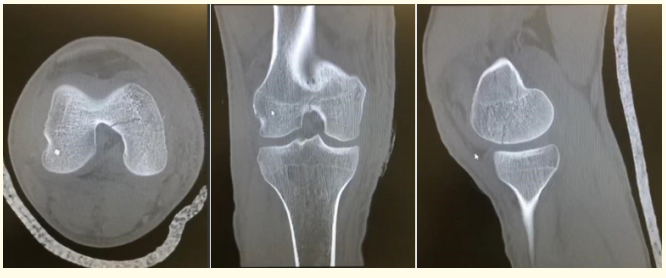

Figure 2: Axial CT of distal femur/Sagital CT of distal femur/ Cornal CT of distal femur.

Figure 3

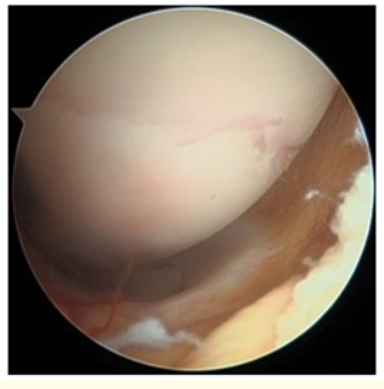

Figure 4

Procedure and management

Surgical options were presented to the patient, and he opted for the proposed surgery.

Patient was given spinal anesthesia and positioned supine with leg on table position. A tourniquet was applied to the upper thigh. Arthroscopy was performed through standard anteromedial and anterolateral portals. After washing off the hemarthrosis, diagnostic arthroscopy was initially performed.

Large coronal fracture was seen in the medial condyle (Figure 3).

The clots between the fracture surfaces were removed by a 3.5 mm shaver. Fracture reduction was achieved with slight manipulation (Figure 4).

Next, two guide wires were inserted just medial to the margin of the cartilage of the distal femur in antero-posterior direction, perpendicular to fracture site. The position and length of the guide wires were checked under C-arm. Following this, anterior to posterior, 4.0 mm cannulated cancellus screws with washers (AutoFix Cannulated Screw System 4.0 mm, Stryker) were inserted over the guide wires (Figure 5,6).

The patient was given above knee slab in the postoperative period for 15 days, following which knee ROM exercises were started. Patient remained non-weight bearing for 4 weeks and then was allowed to bear weight partially for another 4 weeks, with progressively weight bearing. At 3 months, the fracture was well united without any subsidence, so full weight bearing was allowed, and brace was discontinued. The patient had a range of motion 0–100° at knee without any sign of infection. The patient was discharged at 4 months pos-operatively with full weight bearing and full range of motion.

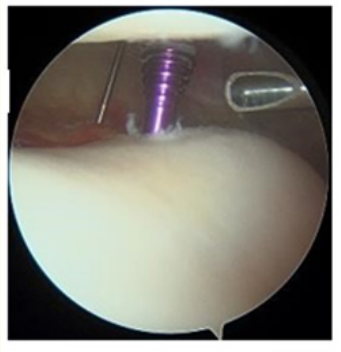

Figure 5

Figure 6

Figure 7: 4 months pos-operatively with full weight bearing and full range of motion.

Discussion

In conclusion, the Hoffa fracture, initially described by Hoffa in 1904, presents a unique intraarticular challenge associated with high-energy trauma. While these fractures are relatively rare, their severity demands a meticulous and multidisciplinary approach for optimal outcomes. Understanding the anatomic-biomechanical vulnerability, particularly the physiological valgus, is crucial. The rarity of Hoffa fractures, especially lateral condylar fractures, emphasizes the need for a high index of suspicion. Imaging modalities, including CT scans and three-dimensional reconstructions, play a pivotal role in accurate diagnosis and preoperative planning.

The described case, a closed unicondylar fracture with no associated ligamentous or meniscal disruptions, highlights the diversity of presentation. In cases where the fracture is not in situ, provisional fixation with K-wires may be necessary, potentially adding complexity to the procedure. Definitive fixation strategies often involve postero-anterior screws, and the advantages of arthroscopy cannot be overstated. Arthroscopy provides direct visualization of the intra-articular environment, aiding in assessing the extent of the fracture and associated injuries. Intra-operative X-ray guidance ensures the precision of reduction and fixation. Utilizing three-dimensional reconstructions from pre-operative imaging enhances the surgeon's understanding of the fracture pattern, contributing to better planning and decisionmaking during surgery. Pre-operative screw medication further streamlines the surgical process, allowing for efficient execution of the fixation strategy.

Conclusion

Overall, the management of Hoffa fractures requires a comprehensive and tailored approach, considering the unique characteristics of each case. The integration of advanced imaging, arthroscopy, intra-operative guidance, and meticulous planning is essential for achieving good long-term function. The reported cases, while highlighting challenges, also underscore the significance of a multidisciplinary team and a high level of surgical expertise in addressing these complex injuries.

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