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Case Report

Bicondylar Hoffa's fracture with patellar dislocation – a rare case

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ABSTRACT

Bicondylar Hoffa's fractures of the femur is very uncommon. Conjoint bicondylar Hoffa fracture with ipsilateral patellar dislocation, Bicondylar Hoffa's with patellar fracture and extensor mechanism rupture has been described in literature. We report a case of unconjoint bicondylar Hoffa's fracture with lateral patellar dislocation in 17-year-old male patient treated with open reduction and cancellous screw fixation that subsequently healed well with good functional outcome.

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1. Introduction

Bicondylar Hoffa's fracture of the femur is very uncommon. Albert Hoffa was credited for describing the unicondylar Hoffa's fracture first in 1904,¹ and treatment protocols have been very well described. Conjoint bicondylar Hoffa fracture with ipsilateral patellar dislocation, bicondylar Hoffa's with patellar fracture and extensor mechanism rupture have all been described in literature.^{2–5} We report a case of unconjoint bicondylar Hoffa's fracture with lateral patellar dislocation in 17-year-old male patient and to our knowledge no case has been described in literature.

2. Case report

A 17-year-old college going student presented to outpatient department with history of road traffic accident 2 weeks back and injury to right knee without any other associated injuries.

On local examination there was swelling of knee joint with altered anterior contour of the knee joint, sutured wound of size 4 cm over the antero-lateral aspect of the knee. On palpation the patella was lying laterally and not mobile. Movements of the knee joint were restricted and there was no distal neurovascular deficit. Radiographs revealed bicondylar Hoffa's fracture with patellar dislocation (Fig. 1).

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Fig. 1 – A & B Pre-operative oblique and lateral view radiographs of knee showing bicondylar Hoffa's fracture with patellar dislocation.

The patient was operated on 2nd day after admission. He was put in supine position under spinal anesthesia, and tourniquet was used. An anterior midline skin incision was followed by a lateral parapatellar arthrotomy as the plane created by trauma in medial retinaculum was not sufficient to reduce the patella, that was impacted in lateral femoral condyle fracture. The patella was found to be displaced laterally and in close approximation with fracture surface of proximal fragment. Dorsal periosteum of patella was stripped off partially and superior patellar articular surface showed minimal contusion. Patella was reduced back to trochlea and everted medially to expose the fracture after flexing the knee to 90°, lateral femoral fragment was migrated proximally and posteriorly with comminution, whereas medial condyle was minimally displaced and there was no connection between

both condyles. Collateral ligaments, cruciates and meniscus were found to be normal.

There was difficulty in reducing the lateral condyle because of soft callus which was debrided for anatomical reduction of the fracture, fixation was accomplished using four 4-mm cancellous screws (2 for each condyle) introduced antero-posteriorly through the non-articular surface, in a direction perpendicular to the fracture line so as to achieve inter-fragmentary compression. Although there was a comminution in the lateral condylar fragment, the strength of screw purchase in the bone was adequate for providing inter-fragmentary compression. The reduction and the alignment of the screws were confirmed by intra-operative fluoroscopy. Intra-articular insertion of the screws was ruled out. Before wound closure, satisfactory stability was tested with complete knee flexion.

Wound was closed in layers taking care to prevent excessive tightness of lateral structures, and patellar tracking was checked and found to be very stable (Fig. 2). Immobilization in tube slab was advised for two weeks, followed by intermittent mobilization of knee passively for two weeks and active mobilization was allowed after four weeks.

The patient was followed up to 9 months post-operatively and sequential radiographs showed successive bony union without further dislocation of patella (Fig. 3). Patient had 120° of flexion by 3rd month after vigorous physiotherapy and complete flexion of the knee without any ligamentous instability at the final follow up (Fig. 4).

3. Discussion

Bicondylar Hoffa's fracture is very uncommon injury resulting from high energy trauma and the probable mechanism of injury is axial compression to the knee with transmission of the ground reaction force through the tibial plateau to the posterior femoral condyles when the knee is flexed more than

Fig. 2 – Intra-operative pictures. A – Lateral condyle fracture with torn periosteum of patella; B – Intra-operative picture showing reduction of bicondylar fracture. C – Fixation of bicondylar fracture with 4 mm cc screws; D – Checking stability of fracture reduction and patellar tracking.

Fig. 3 – A – Immediate post-operative X-ray; B – Post-operative radiograph at 9 months of follow up.

90°. The higher involvement of lateral condylar fractures suggests an anatomic biomechanical vulnerability due to the physiologic valgus.⁶ The exact mechanism of injury of a bicondylar Hoffa fracture has also not been described. Bicondylar Hoffa fracture occurs when the flexed knee is subjected to a posterior and upward directed force without any varus or valgus component.² In our case, patellar dislocation is infero-lateral with bicondylar fracture. We believe there are multiple forces acting during the time of impact to cause such injury.

Routine clinical examination reveal effusion and painful restriction of movements. In our case the contour of the knee joint is altered because of patellar dislocation. Initial antero-posterior and lateral radiographs may be unimpressive because Hoffa fractures, especially when undisplaced, are sometimes difficult to detect.⁷ Oblique radiographs will allow

identifying the fracture morphology more clearly and Computerised Tomography (CT) scan may be required in doubtful cases.

As this kind of fracture morphology is exposed to continual shear stresses in both the coronal and sagittal planes, it is an intrinsically unstable type of intra-articular fracture that warrants operative fixation. Nonoperative treatment in the form of plaster cast or skeletal traction leads to loss of extension, nonunion, instability, joint contracture, and deformity.^{8,9}

For open reduction of bicondylar Hoffa fracture, most authors have used a combined medial and lateral approach. However, we used a swashbuckler approach as advocated by Dua et al¹⁰ as this approach addresses two issues i.e. reduction of patellar dislocation and anatomical reduction and fixation

Fig. 4 – A – Post-operative scar; B – Knee flexion at 2 months of follow up (0°); C – Knee flexion at 3 months of follow up (120°); D – Complete flexion at 9 months of follow up.

of both condyles. In the literature, there are reports of arthroscopically assisted reduction and internal fixation of Hoffa fracture,¹¹ which will be very useful in minimally displaced fractures but not in cases with patellar dislocation which we present here.

Primary traumatic patellar dislocation should be treated surgically¹² and the incidence of recurrent dislocation following conservatively treatment is as high as 40%¹³ and there are no specific guidelines in literature for treating patellar dislocation with bicondylar fractures. In our case bicondylar fracture was reduced without any difficulty and repair of retinaculum over the dorsal surface of patella was done. To prevent the recurrent dislocation of patella, lateral side loose closure was done without repair of medial structures¹⁴ and tracking of patella was checked.

In conclusion, we described a rare case of a bicondylar Hoffa fracture with patellar dislocation managed successfully by open reduction and internal fixation with good clinical outcome at 9 months of follow up. The Swashbuckler approach allows reduction of patella and excellent exposure of the condyles. Anatomic reduction and rigid internal fixation allows early mobilization and excellent long term outcome.

Declaration

- (1) The patient gave the informed consent prior to being included into the study;
- (2) The study was authorized by the local ethical committee and was performed in accordance with the Ethical standards of the 1964 Declaration of Helsinki as revised in 2000.

Conflicts of interest

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

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