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Concomitant Occurrence of Hoffa's Femoral Condyle Fracture and Tibial Condyle Split Fracture on Ipsilateral Side: a Case Report

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Abstract: The aim of this study is to report our experience on concomitant ipsilateral proximal tibia lateral condyle and femoral Hoffa fractures. Patient presented to our Trauma and emergency room with an ipsilateral proximal tibia lateral condyle split-Schatzger Type-I fracture and femoral lateral condyle Hoffa fracture, followingroad traffic accident. Both were closed fracture. Duration of follow-up was 18 months. At final follow-up, both the fractures united. The Knee society score was 79. ROM at knee joint was117°{3o-120°}.Our results prove that in this combination of intraarticular fractures, proper anatomic reduction and rigid internal fixation followed by early mobilization lead to good results.
Keywords: Hoffa's fracture; proximal tibial fracture.

INTRODUCTION

Hoffa fractures or coronal fractures of the femoral condyle were first described by Friedrich Busch in 1869, but these were later named after Albert Hoffa in 1904 [1]. While Hoffa fractures are quite rare, their concomitant occurrence with proximal tibial fractures is even more uncommon. Hoffa fracture is usually associated with supracondylar or intercondylar fracture of the femur [2]. But there is no literature on association of Hoffa fracture and proximal tibial fracture. The aim of this study was to report our experience on concomitant ipsilateral proximal tibia and femoral Hoffa fractures.

METHODS AND MATERIAL

A 42 years old male, with history of RTA presented to emergency department of our hospital. The patient was operated after approximately 14 hours of injury as it was a closed fracture and primary assestment did not show any distal neurovascular deficit warranting urgent operative intervention.

AP and Lateral view of distal femur and proximal tibia were taken which clearly demarcated the fracture line. Hoffas fracture was involving the lateral femoral condyle and Proximal tibia was classified according to Schatzger Classification, Type I. Patient was operated without tourniquet through lateral approach for distal femur in which antero posterior cannulated cancellous screw were inserted followed by a postero lateral buttress plate in femoral condyle. Tibial fracture was compressed by clamp and a Lateral Hockey Anotomical Plate was fixed.

Open reduction and plating for both fractures helped in obtaining anatomical reduction of the fracture thereby helping in early mobilization and weight bearing. Post operatively isometric knee exercises were advised and knee mobilization was done at 15th post operative day after stitch removal. Weight bearing was started after 1 month after a check radiograph. At final follow up at 18 months after operative intervention, Knee Society score and Range of Movement was assessed.

RESULT

Follow up was done for 18 months. Time for fracture union was 12 weeks. Knee society score was 79. Knee flexion was upto 120 Degrees. Extension lag was approximately 3 degrees. Overall, the function was good according to knee society scoring system.

Fig-1: Pre Operative Xray.

Fig-2:Post Operative Xray

DISCUSSION

Distal femoral condyle fracture in Coronal Plane is called as Hoffas Fracture. These can involve either the Medical or Lateral femoral condyle. Lateral Femoral condyle is more common than Medial demoral condyle fracture [3]. Sometimes patient can have both, Medial and Lateral Femoral condyle involvement [4,5]. These are classified as OTA type 33-B3 fractures {frontal, partial articular fracture of distal femur}. Letenneur classified these fractures into types I, II and III, with three subtypes of type II [6]. Type II fractures are those without any soft tissue attachment and are lying completely free in the joint and can lead to nonunion. In type III fractures, fracture line runs obliquely, therefore respond poorly to conservative management.

The mechanism of injury in Hoffa fracture is not clearly defined. The patients have two wheeler related accident. Sitting on a two wheeler requires flexion and abduction at the hip joint and flexion at the knee joint. With sudden deceleration due to accident and impact on the lower limb there is transmission of ground reaction force through the tibial plateau to the posterior femoral condyle and generates a shearing force on femoral condyle which leads to Hoffa Coronal Planefractures, also due to more common valgus position of the knee at the time of accident, the injuries are more commonly involving lateral part of the knee joint.

Type and configuration of proximal tibial injury depend upon ground impaction force and position of the knee.

Simultaneous presence of proximal tibial injury Hoffa fracture can be easily missed. Very high index of suspicion is required for diagnosing these injuries. Up to 30% of coronal plane fractures can be easily missed on plain radiographs. [2]. Appearance ofany foreshortened fractured condyle of femur, varus or valgus malalignment of distal femur and non-superimposition of femoral condyle on lateral view in a plain radiograph should alert the surgeon about this injury. When plain radiographs do not confirm the diagnosis or in case of any suspicion, computerized

tomography will be helpful in diagnosis and also in preoperative planning. The femoral condyle beoing grossly displaced in this radiographs lead to diagnosis easily.

As both the proximal tibia fracture and Hoffa fracture are intraarticular, anatomic reduction and rigid fixation are the preferred mode of treatment, as they permit early mobilization of the knee and good functional recovery. Fixation of proximal tibial fractures is well defined in literature everywhere, but due to rarity of Hoffa's fracture, its treatment is not well studied. Non-operative treatment of Hoffa fractures leads to malunion, nonunion and stiff knee due to prolonged immobilization [7]. In concomitant tibia and Hoffa fractures, the approach depends on the configuration of femur and tibia fracture. The commonly used approaches are parapatellar anterior approach, lateral and medial approach to distal femur, anterolateral and posteromedial approach to proximal tibia. Lieberga et al. described a Gerdy tubercle osteotomybya lateralparapatellar approach by knee arthrotomy for extensile exposure [8]. The extensile Gerdy's tubercle osteotomy approach should be used for comminuted and complex fractures.

As Hoffa fractures are generally described as case reports in literature, there is no standard guideline for treatment. A minimum of two screws holding the fracture fragments together has been recommended to provide rotational stability [9]. The direction of screw insertion is also controversial. A biomechanical study found posterior to anterior (PA) screw insertion to be superior to anterior to posterior (AP) insertion [10]. But the authors concluded that these findings are difficult to be applied in clinical practice as either a lateral or posterior surgical approach is necessary when using the PA direction, which carries a higher complication rate [10]. A cadaveric study compared the stiffness and load to failure of 3.5 mm cortical lag screws, 4.5 mm cortical lag screws and 6.5 mm cancellous screws, to fix experimentally created Hoffa fractures. There was no difference in stiffness between any groups, but the load to failure was significantly higher for 6.5 mm screws compared with 3.5 mm screws [11]. Hak et al. concluded that in the fixation of posterior femoral condyle fractures, two 6.5 mm screws are more rigid than either single or double 3.5 mm screw [12]. Herbert and cannulated screws also may be good fixation option. As per authors experience, any of the above mentioned screws can be used for fixation of these fractures. If cancellous screws are used instead of headless screws, a countersunk should be used to bury the head of the screws. Correct positioning of the screws (in both anteroposterior and lateral plane to allow compression at the fracture site) is more critical than the type of the screw itself, in achieving good functional outcome. We have used a posterolateral buttress plate along with Anteroposterior 6.5mm Cancellous screws for femoral condyle fracture in order to help maintain the appropriate position of femoral codyle. Tibial condyle split fracture was reduced by traction and percutaneous reduction clamp and fixed by locking anatomical plate on anterolateral aspect.

The role of arthroscopically assisted reduction and internal fixation of femoral condyle fractures is not well defined. McCarthy et al. reported arthroscopic reduction of distal intraarticular femoral fractures with good result[13]. They reported decreased blood loss, shortened operative time, excellent intraarticular visualization, decreased soft tissue dissection, and shortened postoperative recovery with arthroscopy. However, the technique is technically demanding [13].

We would strongly recommend a complete radiographs of knee joint, including anteroposterior, lateral, and oblique views for all patients with proximal tibial injuries to not miss this combination of tibial and femoral fractures. A CT scan will also be helpful in the diagnosis of occult cases and preoperative planning. These fractures should be managed by aggressive intervention to achieve anatomical reduction and stable fixation. Along with standard surgical approaches; Gerdy's tubercle osteotomy approach can be used for more extensile exposure for anatomic reduction.

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