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Case Report

Intra-articular osteotomy for correction of neglected malunion of medial femoral condyle hoffa's fracture

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Abstract

Background: Hoffa fractures are distal coronal femoral fractures which are intra-articular and involve one or both of condyles. The lateral condyle is three times more likely to sustain an injury than medial condyle. Malunion is one of the late complications in neglected instances or following non-operative management. Medial femoral condyle injuries are quite uncommon. In this case study, a 23-year-old with a neglected medial Hoffa's malunion is discussed.

Case Report: The patient presented with pain, deformity, and restriction of movements in left knee for six months. Pain aggravates walking and was affecting his daily activities. He allegedly had a past trauma 18 months back for which he took osteopathic treatment. On examination, fixed 10˚ varus knee deformity is noted and there is fixed flexion deformity of 10˚ with further flexion up to 100˚ i.e., there is extension block terminally. X-rays and CT scan showed medial condyle Hoffa's malunion with obvious intra-articular step. Treatment aims to reduce the articular surface anatomically and provide rigid and stable fixation. Treatment's objectives included easing pain and addressing deformities and improving the range of movements and early mobilization. The patient was assessed clinically with a knee society score.

Conclusion: The primary method of treatment for Hoffa's malunion is surgical. Intra-articular osteotomy should be taken into consideration as a salvage option in the younger population to prevent arthritis. The use of an anti-glide plate in conjunction with screws provides rigid and stable fixation.

Keywords: Medial femoral condyle, malunion.

INTRODUCTION

Hoffa originally described tangential plane fractures in 1904, which are uncommon. Isolated femoral condyle fractures constitutes of only 0.65%3. Due to physiological valgus at the knee, the lateral condyle is at higher risk of injury than the medial. The medial fracture has been documented to be a result of trauma on the medial side while the knee is at 90° of flexion. Being intra-articular and unstable fractures, anatomical reduction and fixation is the mainstay of treatment and if neglected or managed conservatively, it can lead to malunion, nonunion, and avascular necrosis [1].

A fairly uncommon injury is an isolated fracture to the medial condyle, with only about ten cases documented in the literature. Malunion with lateral femoral condyle intact is extremely rare. A typical technique for extra-articular malunited fracture is osteotomy, however, only a few studies have been published that describe the outcomes of operative management of symptomatic intra-articular malunited medial Hoffa's fracture. Hereby, presenting a report of a 23 year old male with neglected left medial condyle Hoffa's malunion for whom intra-articular osteotomy was done as a salvage procedure followed by rigid and stable fixation [2-4].

CASE PRESENTATION

This 23 year old male had a history of a self-fall incident 18 months ago. He was not able to stand or walk immediately after the fall. He took osteopathic treatment for one month and started complete weight-bearing mobilization with

Physical examination revealed antalgic gait and fixed 10˚ varus deformity. The knee joint had no effusion. Tenderness was present at the medial knee joint line. The range of movements in the left knee was 10°-100° limited by pain, indicating fixed flexion deformity of 10˚ Preoperative clinical images of the patient; Varus deformity and flexion contracture in the left knee of the patient). The neurovascular examination was found to be normal.

Radiographs showed malunited Hoffa's fracture of the medial condyle of the left femur with an intra-articular step of 13 mm. CT scan was done and revealed malunited intra-articular of femoral condyle with fracture line extending from medial cortex of femur postero-superiorly to the posterior cortex. Preoperative imaging of patient; left knee X-ray showing a Hoffa's medial condyle malunion explaining the extension block and varus.) Preoperative imaging; CT imaging of left knee showing the malunion appeared to be just posterior to the medial epicondyle[5,6].

The surgical concern was fracture line was close to attachments of the collateral ligament of the Medial Side (MCL), adductor tubercle, and origin of the gastrocnemius (medial head) illustration showing the thickest portion of the oblique posterior ligament) Exposure was done through the medial subvastus approach with medial parapatellar arthrotomy, with an additional plane between the adductor Magnus and semimembranosus posteriorly to expose the posterior femoral cortex. The malformed fracture site was observable. Intra-op view; medial femoral condyle defect shown intraoperatively after medial subvastus, with medial parapatellar arthrotomy. Osteoclasis was performed). There were no injuries to the cruciate ligaments. Osteoclasis was done along the fracture line keeping the medial soft tissue sleeve including MCL intact. Malunited portion of the coronal fracture was osteotomized to correct the deformity. Distal radius T anti-glide plate was contoured and fixed posterior to the medial condyle. Additionally, the fragment was fixed by two 4mm screws. Stability was assessed and it was found to be satisfactory. Intra-operatively fluoroscopy showed fracture fragment was reduced and clinically terminal extension improved with full flexion preserved. Postoperative radiographic images of the patient; Left knee x-ray showing fixation with anti-glide plate posteriorly with cancellous screws). There was no medial opening on valgus stress[7,8].

Postoperatively, Quadriceps strengthening, hamstring stretching, and knee range of motion exercises were advised. At four weeks of follow-up, there's 10c extensor lag with pain-free flexion till 110˚ after three months, he was given the go-ahead for partial weight-bearing, with full weight-bearing from six months postoperatively. At twelve months postoperatively, there is no extensor lag with knee flexion till 125˚ as compared to the right knee. Postoperative clinical images; post-operative image showed that the deformity of the right knee has been corrected at 1-year follow-up). His knee society score has improved from 54 pre-operatively to 75 at 10 months postoperatively. His knee's range of motion was enhanced by osteotomy with stable fixation, maintaining articular congruity, and delaying secondary osteoarthritis[9-14].

DISCUSSION

The Hoffa fracture is a fracture of the posterior aspect of the distal femoral condyle in coronal plane. It is the lateral condyle in the foremost aspect of the knee that receives oblique or lateral impacts when the knee is flexed more than 90˚.

Orthopedic Trauma Association have classified these fractures as Type 33-B3 fractures. According to Letenneur et al., another classification system divides these fractures into three categories based on how far the fracture is from shaft margin. Type I fracture is the one that runs parallel to the femur's posterior cortex and affects the whole condyle. A fracture of type II is horizontal to the condyle's base and might vary in size. Oblique femur fractures of type III had the worst outcome. This classification determined that our patient had a Type III fracture.

These injuries usually occur in young, fit men and the long-term social and consequences of malunion, non-union, and degenerative changes in a major weight-bearing joint have to be kept in mind. Usually, direct trauma and an element of abduction led to the fracture4. The main cause of this fracture is a high-energy injury i.e., in traffic collisions (80.5% of cases) and falls (9.1% of cases). Although radiographs could be useful, a scan describing fracture in all 3 planes is typically advised to detect coronal fractures precisely.

The blood supply and the physiological stress during fixation must be kept in mind while approaching these types of fractures. Compared with the lateral condyle, the medial side's intraosseous blood supply has less vascularity. This vascular contribution can be jeopardized by dissection of the posterior condyle, which can lead to medial femoral condyle osteonecrosis. Given the tenuous vascularity of the medial condyle, posterior dissection of the distal femur should be limited. During dissection on the medial side, collateral ligament and oblique posterior ligament femoral attachments should be preserved. When defining the plane of osteotomy, posterior cruciate ligament insertion should be considered.

Non-operative management usually leads to malunion or nonunion of the fracture, therefore surgical management is the mainstay treatment of Hoffa's fracture. In our case, the patient was initially managed non-operatively i.e., he took osteopathic treatment. The patient presented to us with complaints of pain owing to impingement of malunion against the tibial condyle. Physical examination showed knee flexion of 10˚-100˚. This terminal flexion was limited by the posteriorly displaced part of the condyle. Surgical management was advised to prevent secondary osteoarthritis.

There are only a few reports that described corrective osteotomy as a salvage procedure for Hoffa's malunion. In our case, a salvage procedure i.e., osteotomy was done intra-articularly to correct the deformity. The study has found that the fixation construct undergoes continuous physiological shearing force in the sagittal plane during rehabilitation, as well as stress in the coronal plane, and these biplanar forces might cause the construct to fail. Multiple studies are showing different methods of fixation. Jarit et al. showed increasing stability by putting the screws in from the front to the back. But clinically, it is difficult to put screws in that configuration. Headless compression screws were used in Hoffa's fracture, as shown by Borse et al. A study conducted by Tetsunaga et al. applied a technique of placing a buttress plate with a lateral compression plate to enhance the stable fixation of the Hoffa fracture.

In our case of neglected malunion, Hoffa fracture we used an anti-glide T plate posteriorly in adjunct with cannulated screws to neutralize

shearing stress as lag screws alone can offer only interfragmentary compression. Bony union at the osteotomized site was visible on radiographs, and joint flexion and knee discomfort were also improved to 125° as compared to the right knee.

CONCLUSION

Intra-articular osteotomy should be taken into consideration when treating a neglected malunited Hoffa's fracture. In addition to cannulated screws, fixation with an anti-glide plate provides more rigid, stable fixation, overcomes shear stress and it shows favorable outcomes.

INFORMED CONSENT

The patient has given informed consent for the case report to be published.

References:

1. *Sasidharan, Binu, et al. "Reconstructive osteotomy for a malunited medial Hoffa fracture–a feasible salvage option." Journal of Orthopaedics. 13.3(2016):132-135.*
2. *Hoffa A. Lehrbuch der frakturen und LuxationenfürÄrzte und Studierende. F. Enke; 1904.*
3. *Mandredini M, Gildone A, et al. Unicondylar femoral fractures: therapeutic strategy and long-term results. A review of 23 patients. Acta orthopaedicabelgica. 2001 Apr 1;67(2):132-8.*
4. *Lewis SL, Pozo JL, Muirhead-Allwood WFG: Coronal fractures of the lateral femoral condyle. J Bone Joint Surg Br 1989, 71:118–120.*
5. *Nandy K, Raman R, Vijay RK, et al. Non-union coronal fracture femoral condyle, sandwich technique: a case report. Journal of clinical orthopedics and trauma. 2015 Mar 1;6(1):46-50.*
6. *Zhou Y, Pan Y, Wang Q, et al. Hoffa fracture of the femoral condyle: injury mechanism, classification, diagnosis, and treatment. Medicine. 2019 Feb;98(8).*
7. *White EA, Matcuk GR, Schein A, et al. Coronal plane fracture of the femoral condyles: anatomy, injury patterns, and approach to management of the Hoffa fragment. SkeletRadiol. 2015;44(January (1)):37-43*
8. *Reddy AS, Frederick RW. Evaluation of the intraosseous and extraosseous blood supply to the distal femoral condyles. Am J Sports Med. 1998;26:415-419.*
9. *Cheng PL, Choi SH, Hsu YC. Hoffa fracture: should precautions be taken during fixation and rehabilitation? Hong Kong Med J. 2009;15(October (5)):385–387.*
10. *Jarit GJ, Kummer FJ, et al. A mechanical evaluation of two fixation methods using cancellous screws for coronal fractures of the lateral condyle of the distal femur (OTA type 33b). J Orthop Trauma. 2006;20:273–276.*
11. *Borse V, Hahnel J, Cohen A. Hoffa fracture: fixation using headless compression screws. Eur J Trauma Emerg Surg. 2010;36(5):477–479*
12. *LaPrade RF, Engebretsen AH, Ly TV,et al. The anatomy of the medial part of the knee. JBJS. 2007 Sep 1;89(9):2000-10.*
13. *Letenneur J, Labour PE, et al. Hoffa's fractures. Report of 20 cases [Article in French]. Ann Chir. 1978, 32:213-219.*
14. *Tetsunaga T, Sato T, Shiota N, et al. Posterior buttress plate with locking compression plate for Hoffa fracture. Journal of Orthopaedic Science. 2013 Sep 1;18(5):798-802.*