CASE REPORT

A rare case of open bicondylar Hoffa fracture with extensor mechanism disruption

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SUMMARY

The incidence of open bicondylar Hoffa fractures is extremely rare. We report one such case of a 42-year-old woman who presented to the emergency department with an open injury over the knee. Imaging revealed bicondylar Hoffa fracture. The patient was taken up for debridement and internal fixation. Intraoperative findings included an entrapped patella between the fracture fragments and extensor mechanism disruption. Hoffa's fracture was fixed with lag screws and patellar tendon repaired on to the inferior patella. The patient was started on early postoperative range of motion exercises. The fracture united at 12 weeks with 120° knee flexion at 2 year follow-up.

BACKGROUND

Isolated femoral condylar fractures occurring in the coronal plane of the knee are rare lesions. This was first described by Hoffa in 1904.¹ They usually are caused by direct anteroposterior forces applied to a flexed knee in the clinical setting of a high-energy accident. Hoffa fracture most commonly involves the lateral femoral condyle.² Bicondylar involvement is rare. An open bicondylar Hoffa fracture with extensor mechanism injury is extremely rare. To our knowledge, only one such case report has been published till date. We report one such case and discuss its mode of presentation, treatment options and functional outcome

CASE PRESENTATION

A 40-year-old woman presented to the emergency department with an open injury over the right knee. The patient's history revealed that she was a pillion rider on a motorcycle and suffered a direct injury onto the flexed knee as a result of head on collision. Examination revealed a transverse open wound measuring 15×5 cm at the level of the mid-substance of the patellar tendon. The distal thigh was swollen. Patella on the involved side was at a higher level indicating extensor discontinuity. There was no distal neurovascular deficit. Rest of the examination was normal.

INVESTIGATIONS

Radiographs of the knee showed bicondylar Hoffa's fracture (figure 1) with patella alta that was confirmed by CT.

TREATMENT

The patient was planned for emergency debridement and fixation. Examination of the knee under anaesthesia revealed no instability. Peroperatively,

Figure 1 Preoperative radiograph of the knee.

we found that the patella was sandwiched in between the coronal condylar fragments. Patellar tendon was ruptured through the midsubstance. The cruciates and meniscus were found to be normal. We thoroughly debrided the wound, fixed Hoffa's fragments with one 4 mm lag screw for the medial and two lag screws for the lateral condylar fragment (figure 2). The fracture was stable through 120° of knee flexion. The patellar tendon was reattached to the inferior pole of the patella

Figure 2 Intraoperative photograph after fixation of both the condyles.

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with non-reabsorbable sutures. Intravenous antibiotics were continued for 1 week.

OUTCOME AND FOLLOW-UP

Controlled range-of-motion exercises were begun in the first week. Partial weight bearing was allowed after 8 weeks and complete weight bearing was allowed after clinicoradiological union, at 3 months (figures 3 and 4). At the end of the 24 month follow-up, the range of motion was 0–120° with Neer score of 90.

DISCUSSION

Bicondylar Hoffa fractures represent the 33-B 3.2 type according to the AO classification.³ The injury typically results from an injury to the flexed knee. The mechanism usually results from a combination of direct trauma combined with axial loading transmitted to the knee in abduction. Lateral condyle is most commonly involved suggesting biomechanical vulnerability due to physiologic valgus.⁴ On examination, varus and valgus instabilities might be subtle and a thorough neurovascular examination is mandatory. Radiographs and CT scan especially the sagittal images are useful in the diagnosis and management of these fractures.

Open bicondylar Hoffa fractures are extremely rare. Calmet *et al*⁵ reported two cases of open bicondylar Hoffa fracture with extensor mechanism disruption. The first case had associated patellar tendon disruption and the other had quadriceps tendon disruption with ipsilateral shaft femur fracture. Both cases were surgically treated. The first case at the end of the 3-year follow-up had excellent functional and radiographic result with an Neer score of 96 and the range of movement 0–125°. In the second case, at 2 years follow-up, Neer score was 92 and the range of movement was 0–130°.

Figure 3 Radiograph at union—lateral view.

Figure 4 Radiograph at union—anteroposterior view.

Non-operative management of these fractures in the form of cast immobilisation or prolonged traction has given rise to a high rate of unacceptable complications such as rotational malalignment, loss of range of motion, contractures and early osteoarthritis.^{6–7} Operative management in the form of open reduction and fixation with cancellous screws or Herbert screw is the treatment of choice for all bicondylar Hoffa fractures.^{8–9} Cancellous screws if used must be countersunk well below the cortical surface so as to avoid patellofemoral impingement.

The key step during fixation is to keep the knee flexed at all times as this would relax the posterior capsule and the gastrocnemius and also safeguards the neurovascular structures.¹⁰ The key to postoperative protocol is an early non-weight bearing range of motion exercises for the knee. This can progress to partial and full weight bearing as per clinicoradiological picture.

Learning points

- ▶ Open bicondylar Hoffa fractures are extremely rare.
- ▶ All cases of unicondylar fracture must be viewed with a high index of suspicion so as to not miss a bicondylar component.
- ▶ Appropriate radiographs and CT scan as an adjunct remain the mainstay of diagnosis.
- ▶ Open reduction and internal fixation in all cases combined with early functional rehabilitation provides the best chances for good long-term functional outcome.

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Competing interests None.

Patient consent Obtained.

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REFERENCES

- 1 Hoffa A. Lehrbruch der Frakturen und Luxationen. 4th edn. Stuttgart: Fer-dinan Enke Verlag, 1904:453.
- 2 Homes SM, Bombard D, Baumgartner MR. Coronal fractures of the femoral condyle: a brief report of five cases. *J Orthop Trauma* 2004;18:316–19.
- 3 Müller ME, Nazarian S, Koch P, et al. *The AO-classification of fractures*. Berlin: Springer, 1990.
- 4 Lewis SL, Pozo JL, Muirhead-Allwood WFG. Coronal fractures of the lateral femoral condyle. *J Bone Joint Surg Br* 1989;71:118–20.
- 5 Calmet J, Mellado JM, Garcia Forcada IL, et al. Open bicondylar Hoffa fracture associated with extensor mechanism injury. *J Orthop Trauma* 2004;18:323–5.
- 6 Zeebregts CJ, Zimmerman KW, ten Duis HJ. Operative treatment of a unilateral bicondylar fracture of the femur. *Acta Chir Belg* 2000;100:104–6.
- 7 Papadopoulos AX, Panagopoulos A, Karageorgos A, et al. Operative treatment of unilateral bicondylar Hoffa fractures. *J Orthop Trauma* 2004;18:119–22.
- 8 Manfredini M, Gildone A, Ferrante R, et al. Unicondylar femoral fractures: therapeutic strategy and long-term results: a review of 23 patients. *Acta Orthop Belg* 2001;67:132–8.
- 9 Kumar R, Malhotra R. The Hoffa fracture: three case reports. *J Orthop Surg (Hong Kong)* 2001;9:47–51.
- 10 Annamalai SKM, Berstock JR, Shannon MN. The Hoffa fracture: a case report. *BJMP* 2008;1:36–7.

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