Chinese Journal of Traumatology 22 (2019) 246–248

Contents lists available at ScienceDirect

Chinese Journal of Traumatology

journal homepage: http://www.elsevier.com/locate/CJTEE

Case Report

Paediatric conjoint bicondylar Hoffa fracture with patellar tendon injury: An unusual pattern of injury

Julfiqar [a,*], Najmul Huda [b], Ajay Pant [b]

[a] Department of Orthopaedic Surgery, Faculty of Medicine, J.N.Medical College, AMU, Aligarh, UP, India
[b] Teerthanker Mahaveer Medical College and Research Centre, TMU, Moradabad, UP, India

ARTICLE INFO

Article history:
Received 11 June 2018
Received in revised form
15 May 2019
Accepted 30 May 2019
Available online 6 June 2019

Keywords:
Children
Bicondylar Hoffa fracture
Patellar tendon injury

ABSTRACT

Epiphyseal injuries of distal femur are rare with an incidence of 1%–6% among all physeal injuries. Prompt diagnosis and appropriate surgical treatment is crucial to achieve satisfactory functional outcomes. A conjoint bicondylar coronal split (Hoffa) fracture with complete transaction of ipsilateral patellar tendon has been reported in a 12 year old child. The injury was managed by open reduction and internal fixation and bone to tendon repair. This case emphasizes the need of accurate intraepiphyseal fixation for the management of these fractures in skeletally immature patients.

© 2019 Chinese Medical Association. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Introduction

Epiphyseal injuries of distal femur are rare with an incidence of 1%–6% among epiphyseal injuries and less than one percent of all fractures in children.[1] Most of these fractures are Salter and Harris type II injuries.[2,3] Coronal split (Hoffa) fractures of distal femur are rare in adults and even rarer in children.[4] Till now open conjoint bicondylar Hoffa fracture with associated extensor mechanism injury have been reported in adults only, we report a similar injury in a skeletally immature patient.[5] These rare injuries in children have high complication rates including acute neurovascular injuries, growth disturbances and premature arthritis of knee. A 12 year old boy with open bicondylar coronal split fracture of distal femur epiphysis with concurrent complete transaction of ipsilateral patellar tendon was successfully managed by open reduction and internal fixation along with bone to tendon repair. An appropriate consent has been taken from the parents of the patient to publish the present clinical content including clinical images of the patient.

Case report

A twelve year old boy presented following a fall from height when his left knee in flexed position got struck against a sharp agriculture tool. There were minor associated facial injuries, he was conscious and alert at the time of presentation. The injured knee was swollen, tender, with bony crepitation felt at distal end of femur; any movement of the injured left knee was painful. There was palpable step below the left patella with level of patella higher than contralateral side. A transverse stitched laceration was present over anterior aspect of injured knee at the time of presentation (Fig. 1). There was no neurovascular deficit. Radiographic examination of injured knee including an Antero-posterior and lateral views showed a bicondylar Hoffa fracture with left patella located higher than normal location (Fig. 2). A CT scan of the injured knee was not done because presence of anterior knee laceration and completely transacted patellar tendon provided an intraoperative opportunity to assess the fracture morphology. Avoiding a CT examination also has the benefit of preventing the child from radiation exposure during CT scan examination.

A thorough surgical wound debridement and open reduction and intraepiphyseal internal fixation using 4.5 mm cannulated cancellous screw for bicondylar Hoffa fracture and bone to tendon repair was planned under regional anesthesia. Intraoperatively there was conjoint complete bicondylar coronal split fracture of distal femur epiphysis with complete transaction of patellar tendon at inferior pole of patella (Fig. 3). The planned surgery was executed (Fig. 4). The surgical procedure was performed over plane orthopaedic table. During surgery knee was kept flexed to facilitate fracture reduction and internal fixation. An above knee pop slab was given for three weeks. Postoperative radiograph showed

* Corresponding author.
E-mail address: drzulfiqar1983@rediffmail.com (Julfiqar).
Peer review under responsibility of Chinese Medical Association.

https://doi.org/10.1016/j.cjtee.2018.08.008
1008-1275/© 2019 Chinese Medical Association. Production and hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

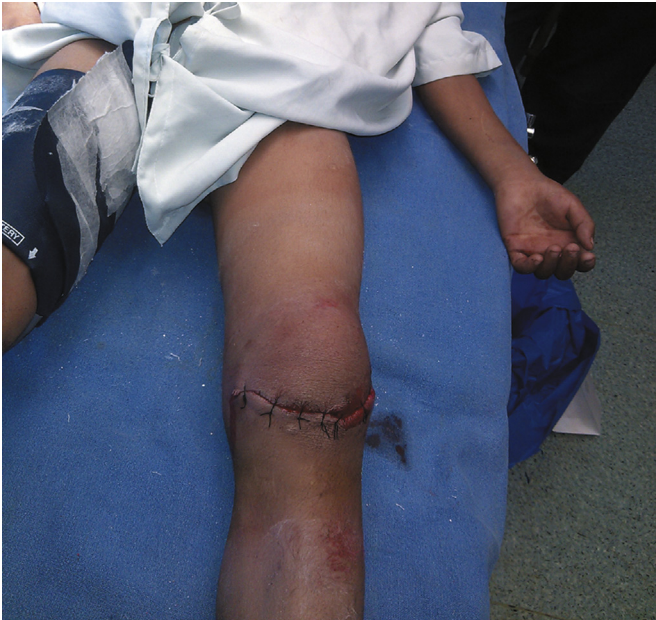

Fig. 1. Preoperative picture of the injured knee showing a transverse stitched laceration over the anterior aspect of injured left knee at the time of presentation.

satisfactory reduction and fixation of the fracture. Patient was allowed non weight bearing walk on third postoperative day. Slab was removed after three weeks followed by Knee range of motion (ROM) exercises. Clinicoradiological union was seen at 12 weeks (Fig. 5), thereafter patient was advised full weight bearing walk. At one year follow up patient had knee ROM 0°–120°, without any limb length discrepancy or deformity around knee. Neer score at final follow up was 90 (Fig. 6).

Discussion

Bicondylar Hoffa fracture typically results from direct trauma combined with axial loading with knee in flexion.[5] Isolated Hoffa's fracture of femoral condyle was described for the first time by Bali et al.[6] Alkhalife et al.[7] have reported that paediatric Hoffa's fracture can be easily missed and has recommended open anatomic reduction to avoid long term complications. Salunke et al.[8] have emphasized the importance of thorough clinical examination followed by appropriate imaging to avoid missing this injury. Harna et al.[9] in their brief literature review about this fracture found that Paediatric Hoffa's fracture is a difficult articular injury commonly described in adults and very infrequently in children.

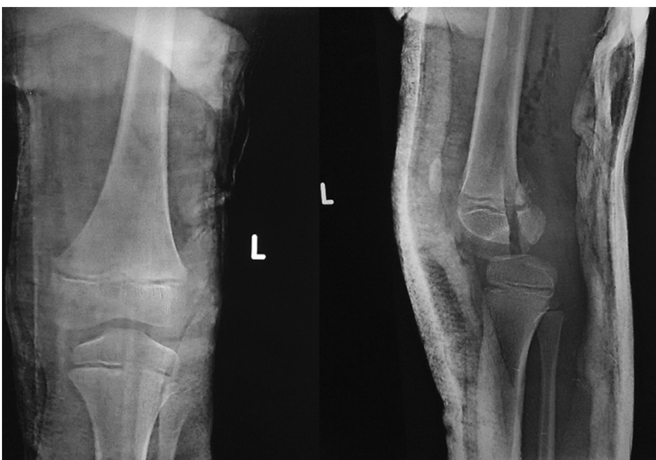

Fig. 2. Deceptively normal preoperative AP radiograph of injured knee. Lateral radiograph of injured knee showing bicondylar Hoffa fracture on lateral radiograph. Level of patella noted higher up.

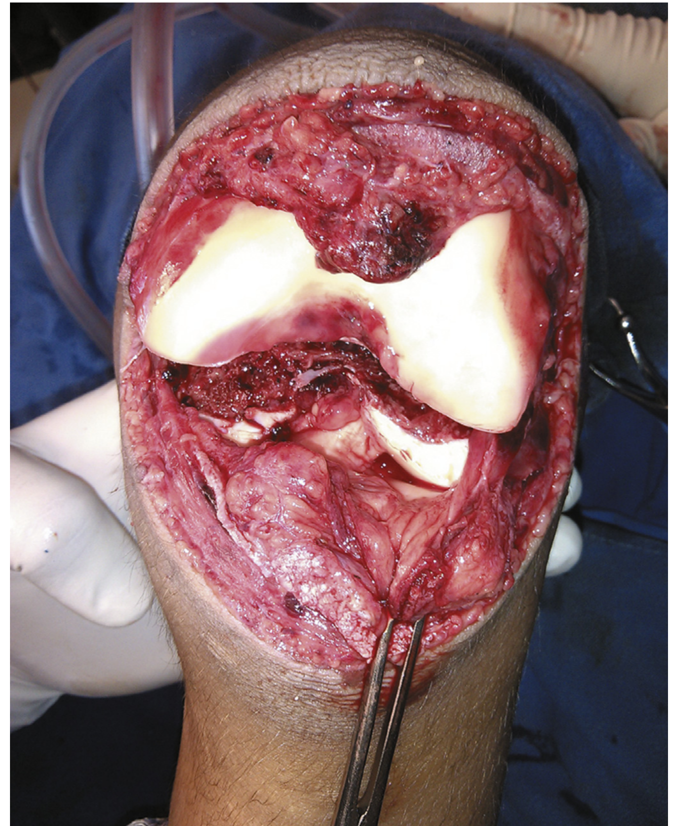

Fig. 3. An Intraoperative photograph showing conjoint bicondylar Hoffa fracture with complete transaction of patellar tendon.

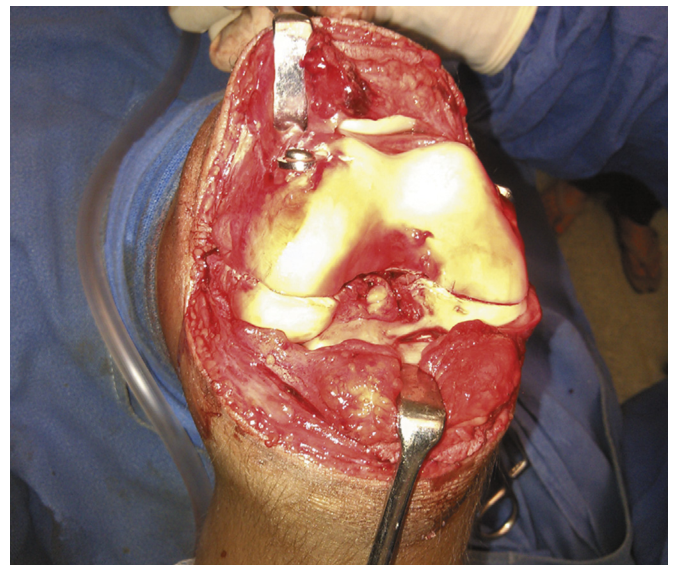

Fig. 4. After open anatomic reduction and internal fixation of conjoint Hoffa fracture. This was followed by bone to tendon repair.

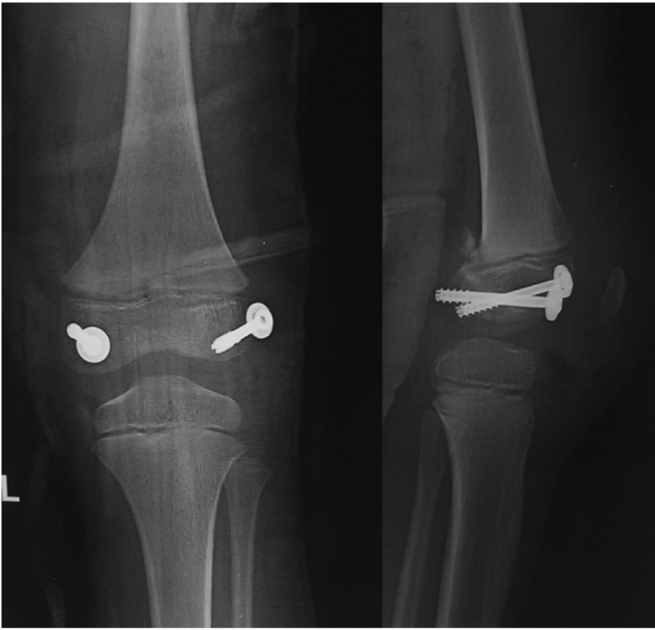

Fig. 5. Follow-up radiograph showing fracture union. Patella is lying at normal position.

A non-operative treatment of these injuries is associated with high rate of complications such as malunion, joint stiffness, premature arthritis.[10,11] An open reduction and internal fixation is the treatment of choice for these fractures.[12,13] In our case presence of an open wound present over the knee favored an open surgical procedure rather than an arthroscopically assisted fixation of the fracture as done by few authors. Our case is unique in that although open bicondylar Hoffa fracture with extensor mechanism injury has been reported in adults[13]; none has reported a similar injury in children. Calmet et al. have reported two cases with similar injury having excellent clinicoradiological outcomes at three year follow up.[14] Average knee ROM in his series was 0°–127° with average Neer score of 94. Our case at final follow up had knee ROM of 0°–120° with Neer score of 90. Final outcomes in our case are comparable to that of cases reported by Calmet. Few authors have treated similar bicondylar Hoffa type fracture by arthroscopic assisted internal fixation, but in our case due to presence of laceration over anterior aspect of injured knee as well as concurrent patellar tendon injury an open surgery was done. Open bicondylar Hoffa fracture with patellar tendon injury is extremely rare in children. Early open reduction and internal fixation along with patellar tendon repair can be helpful to achieve satisfactory functional outcomes in such cases. An intraepiphyseal fixation is required in such cases. Early postoperative rehabilitation is crucial for satisfactory functional outcomes.

Fig. 6. Postoperative follow-up picture showing satisfactory left knee range of motion.

Funding

Nil.

Ethical statement

The study was performed following the Declaration of Helsinki and approved by the institutional committee on research ethics.

Conflicts of interest

The authors have declared no conflicts of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.cjtee.2018.08.008.

References

1. Aydin Ali, Topal Murat, Tuncer Kutsi, Şenocak Eyüp. Salter-harris type III and type IV combined fracture of the distal femoral epiphysis: a case report. *Case Rep Med*. 2012;2012:4. Article ID 317848 https://doi.org/10.1155/2012/317848.
2. Arkader A, Warner Jr WC, Horn BD, et al. Predicting the outcomes of physeal fractures of distal femur. *J Paediatric Orthop*. 2007:27703–27708. https://doi.org/10.1097/BPO.0b013e3180dca0e5.
3. Czitrom AA, Salter RB, Willis RB. Fractures involving the distal epiphyseal plate of the femur. *Int Orthop*. 1981;4:269–277.
4. Lal H, Bansal P, Khare R, et al. Conjoint Bicondylar Hoffa fracture in a child: a rare variant treated by minimally invasive approach. *J Orthop Traumatol*. 2011;12:111–114. https://doi.org/10.1007/s10195-011-0133-3.
5. Kini SG, Sharma M, Raman R. A rare case of open bicondylar Hoffa fracture with extensor mechanism disruption. *BMJ Case Rep*. 2013. https://doi.org/10.1136/bcr-2013-00954.
6. Bali K, Mootha AK, Prabhakar S, et al. Isolated Hoffa fracture of the medial femoral condyle in a skeletally immature patient. *Bull Hosp Joint Dis*. 2011;69:335–338.
7. Alkhalife YI, Alshammari AN, Abouelnaga MA. Hoffa's fracture of the medial femoral condyle in a child treated with open reduction and internal fixation: a case report. *Trauma Case Rep*. 2018;14:20–26. https://doi.org/10.1016/j.tcr.2018.01.002.
8. Salunke A, Nambi GI, Singh S, et al. Hoffa's fracture with ipsilateral fibular fracture in a 16-year-old girl: an approach to a rare injury. *Chin J Traumatol*. 2015;18:178–180.
9. Harna B, Goel A, Singh D, et al. Pediatric conjoint Hoffa's fracture: an uncommon injury and review of literature. *J Clin Orthop Trauma*. 2017;8:353–354. https://doi.org/10.1016/j.jcot.2016.12.001.
10. Zeebregts CJ, Zimmerman KW, Ten Duis HJ. Operative treatment of a unilateral bicondylar fracture of the femur. *Acta Chir Belg*. 2000;100:104–106.
11. Papadopoulos AX, Panagopoulos A, Karageorgos A, et al. Operative treatment of unilateral bicondylar Hoffa fractures. *J Orthop Trauma*. 2004;18:119–122.
12. 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;67:132–138.
13. Kumar R, Malhotra R. The Hoffa fracture: three case reports. *J Orthop Surg (Hong Kong)*. 2001;9:47–51. https://doi.org/10.1177/230949900100900210.
14. Calmet J, Mellado JM, Garcia Forcada IL, et al. Open bicondylar Hoffa fracture associated with extensor mechanism injury. *J Orthop Trauma*. 2004;18:323–325.