

A Rare Variant of Acute Open Fracture Dislocation of Knee Joint

Faaiz Ali Shah ¹, Main Amjad Ali ², Abdur Rehman Qureshi ³, Naeemullah ⁴, Umar Zia Khan ⁵, Muhammad Sarwar Khan ⁶

^{1,3-5} Assistant Professor Orthopaedic A Unit, Lady Reading Hospital Peshawar

² Associate Professor/Head of Department Orthopaedics & Traumatology, Lady Reading Hospital Peshawar

⁶ Post Graduate Trainee, Orthopaedic A Unit, Lady Reading Hospital Peshawar

ABSTRACT

Acute knee dislocation usually results from high-energy trauma like motor vehicle accidents, fall from significant height and sports related injuries. Early intervention to reduce joint and recognize any limb threatening vascular injury and repair is mandatory. Knee dislocations are usually closed and very rarely associated with proximal tibia or patella fractures. We presented a very unique case of open posterior dislocation of knee joint with medial Hoffa fracture and avulsion of ligamentum patellae without any neurovascular injury. We reduced the knee joint, fixed the fracture and stabilized the patellar tendon. The fracture achieved union and patient had full range of knee motion and full weight bearing without any support or pain. To our knowledge this is the first case in the literature which does not fit into any classification system and not yet reported.

Key Words: Knee dislocation, Multi ligament injury, Neurovascular injury, Periarticular fractures

Address of Correspondence

Mian Amjad Ali

Email: drmianamjadali@gmail.com

Article info.

Received: August 24, 2017

Accepted: September 12, 2017

Cite this case Report: Shah FA, Ali MA, Qureshi AR, Naeemullah, Khan UZ, Khan MS. A Rare Variant of Acute open Fracture Dislocation of Knee Joint- A Case Report. 2018; 7(1)78-82

Funding Source: Nil

Conflict of Interest: Nil

Introduction

Acute knee joint dislocation is the disruption of knee ligaments resulting in loss of contact between the tibial and femoral condyles on x-ray.¹ However, if the tibiofemoral alignment on X-ray is maintained after acute knee injury but stress radiographs reveal malalignment, this entity will be termed spontaneous reduction of a dislocated knee joint.¹ Knee joint dislocation constitute 0.02% to 0.2% of all orthopaedic traumas.^{2,3} The usual victims of acute knee dislocation are younger patients with road traffic accidents and sports injuries. Male female ratio is 4:1 and 20% to 30% of knee dislocations are open.⁴ Kennedy proposed the first classification of acute knee dislocation in 1963.⁵ In this classification five types had been described based upon the displacement of tibia on femoral condyles: anterior, posterior, lateral, medial and rotatory. Anterior knee dislocation account for 40%, posterior 33%, lateral 18%, medial 4% and rotatory type

5% of all knee dislocations.⁶ Kennedy's classification was not comprehensive because approximately 50% of the spontaneously reduced knee dislocations were unclassified.⁷ Therefore an improved classification by Wascher⁷ and modified by Schenck⁸ was proposed which includes ligaments injuries, associated peri articular fractures and neurovascular injuries. Wascher (modified by Schenck) classified knee dislocation into five types, i.e., KD I (Multi ligaments rupture with either ACL or PCL rupture), KD II (Both cruciate rupture but collateral intact), KD IIIM (Both Cruciate and medial collateral ligament rupture), KD IIIL (Both cruciate and lateral collateral ligament rupture), KD IV (All ligaments rupture) and KD V(knee dislocation with periarticular fracture). Arterial and nerve injuries when present with the above types are denoted with C and N respectively. The reported incidence of vascular injury with knee dislocation is 18%

but it can be as high as 64%.^{9,10} The incidence of common peroneal nerve injury was reported in 14% to 41% cases specially after posterolateral complex injuries.¹¹ Knee dislocation can be associated with fracture of proximal tibia, patella and distal femur. These fractures usually need operative treatment and make the overall management difficult.¹² We present a very unique case of open posterior dislocation of knee joint with medial Hoffa fracture and avulsed ligament patella tendon in a 25 year old man, who was hit by high speed car. To our knowledge, this is the first case of this type in the literature.

Case Reports

A 25 years old man had a road traffic accident with high-speed car hitting his left knee joint while he was riding his motorbike. He was received in Accident & Emergency department of Lady Reading Hospital where he was resuscitated according to ATLS protocol. The patient's vital signs were stable on admission. He complained of severe pain in his left knee joint. Local examination showed swollen deformed left knee joint with a large circular 7 cm wound around the patella (Figure 1). Distal neurovascular status was intact. No other significant systemic or associated musculoskeletal injuries were noted. X ray of the knee joint showed posterior dislocation of the knee joint with medial Hoffa fracture. (Figures 2 & 3).



Figure 1: Photograph showing wound of posterior dislocated knee joint



Figure.2: X ray showing posterior dislocation of knee joint with Hoffa fracture. Figure. 3: Lateral radiograph showing posterior dislocation of knee joint with Hoffa fracture.

The patient was taken to the operation theatre. Wound was examined under general anaesthesia. Patellar tendon was found to be avulsed from tibial insertion. The knee joint was relocated and wound was thoroughly washed with normal saline and closed. The limb was splinted and intravenous antibiotics started. Angiography of the knee joint was done to exclude vascular injury (Figure 4).

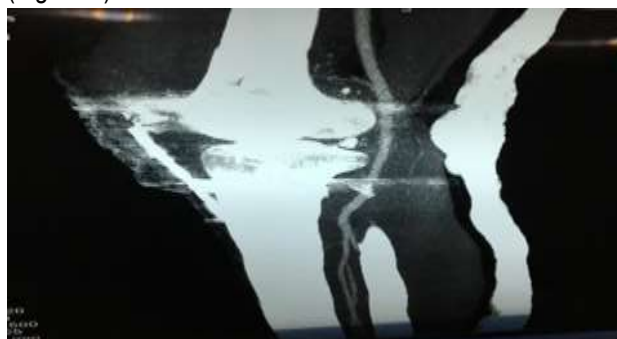


Figure 4: Post reduction angiography of popliteal artery

The case was discussed in the trauma meeting of our department for definitive management. In the second stage after three days under general anaesthesia with a tourniquet, the previous wound was incorporated into an incision and the knee joint was opened. Medial Hoffa fracture was fixed with 3 cancellous screws, two screws directed from posterior side of the femoral condyles and one from anteromedial side. The ligamentum patellae was fixed with a small plate and protected with a circumferential cerclage wire. The knee joint was stabilized with a stemin pin passed from patella to tibial

plateau. The fixation was checked under image intensifier per operatively (Figure 5 & 6).

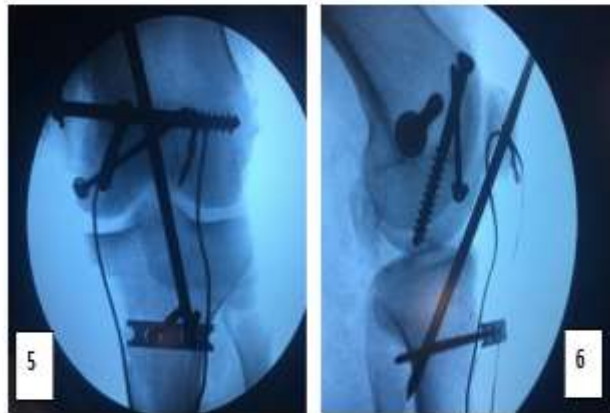


Figure 5: Fixation of Hoffa fracture with cancellous screws, patellar ligament with plate and cerclage wire and knee stabilized with stein pin checked under image intensifier in AP view per operatively. **Figure 6:** Fixation of Hoffa fracture with cancellous screws, patellar ligament with plate and cerclage wire and knee stabilized with stein pin checked under image intensifier in Lateral view per operatively.

The wound was closed and long back slab was given. Check x ray was done on the first post-op day (Figure. 7). Distal neurovascular status was intact post operatively. Wound was examined on third day and dressing was changed. Supervised physiotherapy was started. The patient was discharged home. Stitches and stein pin was removed at 2 weeks (Figure. 8 & 9).



Figure 7: Post op Xray showing fracture fixation and patellar tendon and knee joint stabilization.

Range of motion exercises started at 4th weeks and crutch walking was allowed. Regular follow up at monthly interval was done. The Hoffa fracture healed at 3rd month (Figure 10) and the patient started partial weight bearing. The cancellous screws and cerclage wire was removed at 6th month (Figure.11). The patient had full range of knee

motion (Figure 12,13,14) and had full weight bearing without any pain or support. The patient was offered ACL and PCL reconstruction surgery, which he refused.



Figure 8: Photograph of wound at 02 weeks follow up. **Figure 9:** Photograph at 2 weeks post op after stitch removal and stein pin removal.



Figure 10: Three months follow up radiograph



Figure 11: Radiograph after removal of metal works



Figure 12: Knee scar and extension after removal of implants. Figure 13: Knee flexion after removal of implants. Figure 14: Knee range of motion at last follow up visit.

Discussion

In our case report, we treated the patients in two stages; first, we reduced the knee joint, washed the wound with saline and gave the antibiotic cover. In the second stage, we did the definite fixation followed by intense physiotherapy and the patient regained full knee range of motion. The patient was then offered ligament reconstruction surgery. Literature supports our treatment protocol.^{13,14} The most frequent early complication of knee dislocation is popliteal artery disruption.¹⁵ In the presence of palpable distal pulses and absence of “Hard Signs” of vessel injury many researchers advise measuring ankle-brachial index (ABI) and if <0.90 , angiography is suggested.¹⁶ Others advocate routine angiography for recording partial tear of popliteal artery which is usually missed.¹⁷ Computed Tomographic Angiography (CTA) is a less invasive investigating tool for diagnosing arterial injury in such cases and has sensitivity and specificity of nearly 100%.¹⁸ Early recognition of vascular injuries are very important as the limb ischemia time is directly related to the rate of above knee amputation and amputation rates were reported to be only 11% if repair was done within 8 hours compared to amputation rate of 86% when repair was delayed beyond 8 hours.^{6,19} Our patient had medial Hoffa fracture alongwith posterior dislocation knee. Hoffa fracture refers to an isolated intra articular fracture of femoral condyle in coronal plane and equivalent to the Orthopaedic Trauma Association Type 33-B3 fracture.^{20,21} This fracture needs early open reduction and internal fixation to achieve excellent long term functional outcome.²² We fixed the Hoffa fracture with 3 cancellous screws, two screws directed from posterior side and one from antero-medial direction. We

could not find comparison of various methods of fixation in literature but most surgeons prefer fixation with cancellous or cannulated screws.²²⁻²⁴

Since our case report is unique and similar case report has not been found in literature, we expect that if similar case reports are documented elsewhere it might help us in classifying accurately such fracture dislocation. Moreover, a standard method of treatment can evolve to achieve excellent long-term functional outcome.

Conclusion

Acute knee dislocation must be diagnosed promptly, relocated immediately with careful evaluation of neurovascular status. Effective physiotherapy and regular follow up is advised. We suggest strict vigilance in any high trauma knee injury cases, so that one does not miss any knee dislocation specially the spontaneously reduced knee.

References

1. Schenck RC, Richter DL, Wascher DC. Knee dislocations: Lessons learned from 20 year follow up. *Orthop J Sports Med* 2014;2(5):67-72.
2. Howells NR, Brunton LR, Robinson J, Porteus AJ, Eldridge JD, Murray JR. Acute knee dislocation: An evidence based approach to the multiligament injured knee. *Injury* 2011;42(11):1198-1204.
3. Levy BA, Giuseffi SA, Bishop AT, Shin AY, Dahm DL, Stuart MJ. Surgical treatment of peroneal nerve palsy after knee dislocation. *Knee Surg Sports Traumatol Arthrosc* 2010;18(11):1583-1586.
4. Manske RC, Hosseinzadeh P, Giangarra CE. Multiple ligament knee injury. Complications. *N Am J Sports Phys Ther* 2008;3(4):226-233.
5. Kennedy JC. Complete dislocation of the knee joint. *J Bone Joint Surg Am* 1963;45(5):889-904.
6. reen NE, Allen BL. Injuries associated with dislocation of the knee. *J Bone Joint Surg Am* 1977;59(2):236-239.
7. Wascher DC, Dvirnak PC, DeCoster TA. Knee dislocation: Initial assessment and implication for treatment. *J Orthop Trauma* 1997;11(7):525-529.
8. Schenck R. Classification of knee dislocation. *Oper Tech Sport Med* 2003;11(3):193-198.
9. Medina O, Arom GA, Yeraniosian MG, Petrigliano FA, McAllister DR. Vascular and nerve injury after knee

- dislocation: a systematic review. *Clin Orthop Relat Res.* 2014; 472(9):2621-9.
10. Seroyer ST, Musahl V, Harner CD. Management of the acute knee dislocation: The Pittsburgh experience. *Injury* 2008;39(7):710-8.
 11. Niall DM, Nutton RW, Keating JF. Palsy of the common peroneal nerve after traumatic islocation of the knee. *J Bone Joint Surg Br.* 2005 ; 87(5):664-7.
 12. Peskun CJ, Levy BA, Fanelli GC, Stannard JP, Stuart MJ, MacDonald PB et al. Diagnosis and management of knee dislocations. *The Physican and Sptsmedicine* 2010;4(38):101-111.
 13. Jiang W, Yao J, He Y, Sun W, Huang Y, Kong D. The timing of surgical treatment of knee dislocations: a systematic review. *Knee Surg Sports Traumatol Arthrosc.* 2015 Oct; 23(10):3108-13.
 14. Pardiwala, DN, Rao NN, Anand K, Raut A. Knee dislocations in sports injuries. *Indian J Orthop* 2017;51(5):552-562.
 15. Leonardi F, Zorzan A, Palermo A, Molfetta L. Neglected posterior knee dislocation: An unusual case report. *Joints* 2017;5(4):253-255.
 16. Nicandri GT, Chamberlain AM, Wahl CJ. Practical management of knee dislocations: A selective angiography protocol to detect limb-threatening vascular injuries. *Clin J Sport Med* 2009;19(2):125-129.
 17. Douma MR, Burg MD, Dijkstra BL. Knee Dislocation: A Case Report, Diagnostic Vascular Work-Up, and Literature Review. *Case Reports in Emergency Medicine* 2017;25-28.
 18. Inaba K, Potzman J, Munera F, Mckenney M, Munoz R, Rivas L et al. Multi-slice CT angiography for arterial evaluation in the injured lower extremity. *J Trauma* 2006;60(3):502-507.
 19. Patterson BM, Agel J, Swiontkowski MF, Mackenzie EJ, Bosse MJ. Knee dislocations with vascular injury: outcomes in the Lower Extremity Assessment Project (LEAP) Study. *J Trauma.* 2007; 63:855-858.
 20. Mak W, Hunter J, Escobedo E. Hoffa fracture of the femoral condyle. *Radiol Case Rep* 2008;3(4):231-33.
 21. Marsh JL, Slongo TF, Agel J. Fracture and dislocation classification compendium -2007. *J Orthop Trauma.* 2007;21(Suppl.):S1-S133.
 22. Gao M, Tao J, Zhou Z, Liu Q, Du L, Shi J. Surgical treatment and rehabilitation of medial Hoffa fracture fixed by locking plate and additional screws: A retrospective cohort study. *International Journal of Surgery* 2015; 19:95-102.
 23. Cheng PL, Choi SH, Hsu YC. Hoffa fracture: Should precautions be taken during fixation and rehabilitation? *Hong Kong Med J* 2009; 15(5):385-387
 24. Chang JJ, Fan JC, Lam HY, Cheung KY, Chu VW, Fung KY. Treatment of an osteoporotic Hoffa fracture. *Knee Surg Sports Traumatol Arthrosc.*, 2010;18(6):784-786.