

E-ISSN: 2395-1958
P-ISSN: 2706-6630
IJOS 2023; 9(1): 119-122
© 2023 IJOS

<https://www.orthopaper.com>

Received: 18-11-2022

Accepted: 23-12-2022

Dr. Binoti Sheth

Additional Professor,
Department of Orthopedics,
Lokmanyatilak Municipal
Medical College, Sion, Mumbai,
Maharashtra, India

Dr. Sourav Lal Das

Department of Orthopaedics,
Lokmanyatilak Municipal
Medical College, Sion, Mumbai,
Maharashtra, India

Dr. Sandeep Tukade

Department of Orthopaedics,
Lokmanyatilak Municipal
Medical College, Sion, Mumbai,
Maharashtra, India

Patebond technique of open patella fracture

Dr. Binoti Sheth, Dr. Sourav Lal Das and Dr. Sandeep Tukade

DOI: <https://doi.org/10.22271/ortho.2023.v9.i1b.3295>

Abstract

We report a case of 29 yr old male patient with right sided transverse patella fracture in a grade Iamb open wound as per Gustillo Anderson classification due to road traffic accident. As it was an open wound we wanted an early intervention for better recovery of patients ROM around knee without any morbidity. We utilized a novel technique in which we reinforced the patellar tendons by tying it with Krakow technique and the distal pole of transverse fracture patella was tied with superior pole in a crises cross fashion by passing no 5 ethibond sutures through transosseous route in the patella. A good articular congruity with maintained reduction, a sound union without any implantation, improved ROM with rehabilitation and most importantly without any evidence of infection were the positive outcomes.

Keywords: Patebond technique, patients, intervention, ROM

Introduction

Overall incidence of patella fracture is around 1% ^[2] mostly in 20-50 yrs ^[2] age group, whereas around 7% ^[2] accounts for open patella fracture injuries. Most common mode of injury around 78.3%² – 90% ^[5] are associated with high energy motor vehicle accidents or RTA.

AO Type C3 is 25% ^[1] whereas Type C2 Transverse patella fractures accounts for up to 23% ^[1] of total patella fractures. Mode of injury ^[2] may be from a direct blunt trauma or indirectly due to sudden knee flexion while quadriceps remain contracted. While choosing operative treatment indication ^[3] such as articular displacement >2 mm, distance between fracture fragments >3 mm, open fractures, displaced fracture with extensor mechanism involved are main indications. Whether internal fixation with metallic wires, non-absorbable sutures or its primary partial patellectomy ^[5] in highly comminuted fractures is the current debate in open patella fractures. But immediate ^[5] preservation of bone substance and precise reconstruction of extensor apparatus ^[14] in open fractures have proven beneficial in literature. Infection rates were higher around 10.7% ^[5] as per one of the studies but if cases operated immediately or skin were primarily closed none ^[5] of the case got infected. So fixation has gained priority, we have utilized transosseous suturing in open patella fracture for earlier mobilization and minimal post-operative complications.

Materials and Methods

29 yr old male patient was attended with injury to Right knee and Right elbow at the emergency department in our tertiary care centre, Mumbai. Patient was apparently well before this incident. On physical examination, there is inability to perform straight leg test, there is a Grade IIIB open wound of size 11*8*8 cm with avulsed fragment of lower half of patella popping out from wound as shown in figure 1.

Corresponding Author:

Dr. Sourav Lal Das

Department of Orthopaedics,
Lokmanyatilak Municipal
Medical College, Sion, Mumbai,
Maharashtra, India



Fig 1: Pre-operative Grade IIIB Open wound with transverse open patella fracture

X-ray was advised which revealed transverse patella fracture near to lower pole of patella with small superomedial fragments as shown in figure 2.



Fig 2: Right sided transverse patella fracture near to lower pole

After preoperative stabilization patient was taken for operation with 10 hour of presentation. Skin incision was enhanced from superior aspect of wound like the standard longitudinal incision. Torn ligaments and retinaculum were identified. Thorough saline wash of 3 liters were given followed by freshening of fracture edges from clots. Torn ends of patella tendon with retinaculum were initially tied with no 5 Ethibond and passed transosseously from inferior pole then through the body for tying at the superior pole. Holes were made from 2.5 mm K Wire and sutures were passed with 16G IV Cannula through the Transosseous hole. Then 2 more longitudinal transosseous holes were made and the no 5 Ethibond passed through both the transosseous holes in a 'Z' pattern and then tied over central surface of patella in a criss cross fashion. As illustrated in Fig 3. and Fig 4.

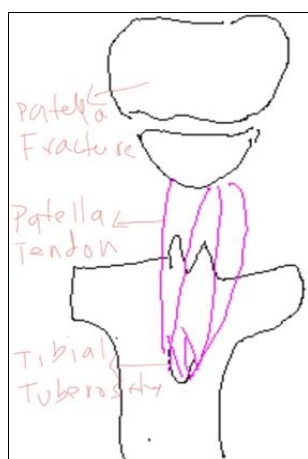


Fig 3: schematic diagram of patellar tendon with transverse patella fracture



Fig 4: Krakow suture tied at superior pole transosseous suture tied in criss cross fashion

After tying the sutures the articular congruity and maintenance of reduction were checked and confirmed under Carm. Skin closure was done cautiously, post-operative skin condition picture and x-ray picture immediately and after 6 weeks shown in Fig 5 & Fig 6. Post operatively patient was encouraged to continue active toe movements, ankle pump exercises, static quadriceps exercises but no active extension and passive flexion too. Pt was given posterior long knee brace for 4 weeks, after 4 weeks range of motion exercises were started, hamstring strengthening exercises started and flexion upto 30 degrees initiated. Later on with post-operative 8 weeks pt was encouraged for active assisted ROM and continuous passive motion therapy which helped the patient by improving his flexion range from 60 degrees to 90 degrees in post-operative 16 weeks. And over 1 year follow up it progressed to flexion ROM of 115 degrees with no extension lag, pt was able to walk and climb stairs without any support.



Fig 5: showing post-operative immediate skin condition on day 2 and x-ray showing maintained articular congruity



Fig 6: showing post-operative 6 week skin condition and evidence of good union with no visible articular step left

Results

In this case report, we came across that in young age group patients even if they have poly trauma history due to RTA with open fracture of patella if managed early with operative intervention with our method then patient can benefit good functional outcomes [14] comparable to other operative fixation techniques. Modified HSS Knee score [15] of our patient at 6wks were 58, at 16wks were 69 whereas with improved rehabilitation and CPM motion it improved to 80 at 1yr follow up. At 1yr follow up flexion ROM [14] achieved was around 115degrees, extension lag was absent, pt was walking and climbing stairs without any support. Knee flexion ROM at the end of 1yr follow up can be seen in figure 7.

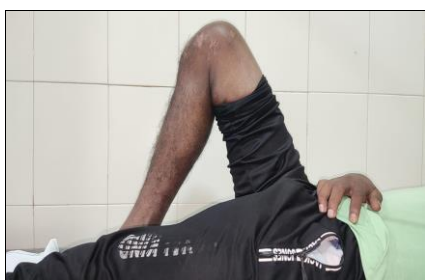


Fig 7: Knee Flexion ROM at the end of 1yr follow up

Discussion

As our study is mainly concentrated over the management of open patella fractures, considering the situation as per literature we can find that most of the study prohibits or doesn't promote to opt for operative intervention unless the precarious skin condition resolves. But a study done by Torchia and lewallen [5] showed good outcome if operated earlier or primary closure was done in terms of infections. J B Catalano [14] *et al.* in his study of open patella fracture long term functional outcome suggested that after 21 months follow up their patients attended ROM around 112 degrees, also 65% of those treated with tension band instrumentation

required secondary surgery for its removal, they also suggested preservation of bony substance along with reconstruction of extensor apparatus being key for earlier ROM improvement. Veselko M [8] *et al.* 2004 in his study described that attainment of patellar tendon length and patellar height by fixing distal pole of patella is crucial for faster recovery. Buezo [12] *et al.* described the technique of 3 longitudinal tunnel crossing double high resistance sutures within these tunnels and suturing among them, functional outcomes were similar to other techniques. Lionel lazaro [13] *et al.* but suggested an important overall concept that even if we quantify functional outcomes for better understanding but despite of adequate advancement in surgical methods functional impairment is a common outcome and so rehabilitation strategies are fruitful [13] domain for future research. Gaining ideas from these studies we found that for better post-operative outcomes there are some important considerations like first maintenance of good articular alignment which also decides future risks of patellofemoral arthritis, second maintenance of patellar length [8] and patellar tendon strengthening because that decides earlier recovery, lesser immobilization [8] and good quadriceps functioning later on. Thirdly if Fixation is comparable [9] and functional outcomes [14] are similar compared to instrumentation group then to avoid any implant related complication like impingement, later removal [7]. Lastly Earlier the buzzer earlier to win the game. Earlier operative intervention in open patella within hours of presentation is a necessity to combat later infection.

Limitation of our study includes it's a single case report; require more number of similar patients for proper extrapolation. A larger follow up of patients in term of activities of daily living, range of movement and future risks of osteoarthritis will uncover some important domains yet to perceive.

Conclusion

This combined technique of transosseous suturing with non-absorbable sutures and Krakow suturing of patellar tendon is an effective technique for achieving fixation, lesser chance of introduction of infection due to metallic implants [10], less implant related complications [11] like impingement also and most importantly it enable patients to gain early equivalent functional outcomes.

Conflict of Interest

Not available

Financial Support

Not available

References

1. Larsen P, Court-Brown CM, Vedel JO, Vistrup S, Elsoe R. Incidence and epidemiology of patellar fractures. *Orthopedics*. 2016 Nov 1;39(6):e1154-8.
2. Gwinner C, Märdian S, Schwabe P, Schaser KD, Krapohl BD, Jung TM. Current concepts review: Fractures of the patella. *GMS Interdisciplinary plastic and reconstructive surgery DGPW*; c2016, 5.
3. Hargett DI, Sanderson BR, Little MT. Patella fractures: Approach to treatment. *JAAOS-Journal of the American Academy of Orthopaedic Surgeons*. 2021 Mar 15;29(6):244-53.
4. Ray JM, Hendrix J. Incidence, mechanism of injury, and treatment of fractures of the patella in children. *Journal of*

- Trauma and Acute Care Surgery. 1992 Apr 1;32(4):464-7.
5. Torchia ME, Lewallen DG. Open fractures of the patella. *J Orthop Trauma*. 1996;10(6):403-9.
DOI: 10.1097/00005131-199608000-00007. PMID: 8854318.
 6. Anand S, Hahnel JC, Giannoudis PV. Open patellar fractures: high energy injuries with a poor outcome? *Injury*. 2008 Apr;39(4):480-4.
DOI: 10.1016/j.injury.2007.10.032. Epub 2008 Mar 7. PMID: 18316085.
 7. Hoshino CM, Tran W, Tiberi III JV, Black MH, Li BH, Gold SM, *et al*. Complications following tension-band fixation of patellar fractures with annulated screws compared with Kirschers wires. *JBJS*. 2013 Apr 3;95(7):653-9.
 8. Veselko M, Kastelec M. Inferior patellar pole avulsion fractures: osteosynthesis compared with pole resection. Surgical technique. *J Bone Joint Surg Am*. 2005 Mar;87(1):113-21.
DOI: 10.2106/JBJS.D.02631. PMID: 15743853.
 9. Patel VR, Parks BG, Wang Y, Ebert FR, Jinnah RH. Fixation of patella fractures with braided polyester suture: a biomechanical study. *Injury*. 2000 Jan 1;31(1):1-6.
 10. Gosal HS, Singh P, Field RE. Clinical experience of patellar fracture fixation using metal wire or non-absorbable polyester-a study of 37 cases. *Injury*. 2001 Mar 1;32(2):129-35.
 11. Chen CH, Huang HY, Wu T, Lin J. Transosseous suturing of patellar fractures with braided polyester - a prospective cohort with a matched historical control study. *Injury*. 2013 Oct;44(10):1309-13.
DOI: 10.1016/j.injury.2013.06.024. Epub 2013 Jul 19. PMID: 23876625.
 12. Buezo O, Cuscó X, Seijas R, Sallent A, Ares O, Álvarez-Díaz P, *et al*. Patellar fractures: an innovative surgical technique with transosseous suture to avoid implant removal. *Surgical innovation*. 2015 Oct;22(5):474-8.
 13. Lazaro LE, Wellman DS, Sauro G, Pardee NC, Berkes MB, Little MT, *et al*. Outcomes after operative fixation of complete articular patellar fractures: assessment of functional impairment. *JBJS*. 2013 Jul 17;95(14):e96.
 14. Catalano JB, Iannaccone WM, Marczyk S, Dalsey RM, Deutsch LS, Born CT, *et al*. Open fractures of the patella: long-term functional outcome. *Journal of Trauma and Acute Care Surgery*. 1995 Sep 1;39(3):439-44.
 15. Hatab S, Tanagho A. Lessons learned using screws and cable in patellar fractures. *International Journal of Orthopaedics*. 2017;3(3):96-100.

How to Cite This Article

Binoti S, Sourav LD, Sandeep T. Patebond technique of open patella fracture. *International Journal of Orthopaedics Sciences*. 2023;9(1):119-122.

Creative Commons (CC) License

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 International (CC BY-NC-SA 4.0) License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.