Case Report
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Case report for neglected patella fracture after simple tension band wiring (TBW), qudricepsplasty, and POP splitting in resource-limited setup: A case report

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Abstract

Background: Patella fractures are common, and they account for about 1% of skeletal injuries. Open reduction and internal fixation is the standard of care to restore quadriceps function and prevent knee stiffness as well as osteoarthritis. Patella fractures rarely progress into nonunion with an incidence of 2.4 to 12.5.

Presentation of case: We present a case of 30 years 30-year-old male patient who presented with a left neglected patella fracture following a fall-down accident 1 and a half years. At presentation, he had left knee pain, and swelling and was unable to flex his knee. Radiographic examination showed displaced, sclerotic patella fracture nonunion.

Conclusion: Preoperative isometric quadriceps exercises, tension band wire with V-Y advancement, short-term splitting with plaster of Paris for soft tissue rest, and early post-op rehabilitation is a good treatment option for neglected patella fracture in a resource-limited setup with less complication.

Keyword: Neglected patella fracture, Tension band wire, Quadricepsplasty

Background

Patella fractures are common, accounting for 1% of skeletal injuries (1,2). Non-union of Patella fracture is rare with an incidence of 2.4 to 12.5 because the patella is a sesamoid bone and is managed mostly with early surgical intervention (3). There are different reasons for the occurrence of patella non-union like noncompliance, delayed care, geographical inaccessibility to hospital and financial constraints (3,4,5). Transverse fractures of the patella and inferior pole patella fractures are most notorious for progressing into non-union (6). In a delayed presentation, the patient will present with a displaced fracture segment, soft tissue contractures mainly quadriceps, retinaculum, ligaments of the knee joint, knee joint stiffness, and extensor lag. The main difficulty in managing neglected patella fractures is to have an acceptable bone reduction and to restore the extensor mechanism (2).

There are three different schools of thought in terms of management for such complex fracture presentation. The first school of thought is to go for conservative management with knee ROM exercises. The second group recommends single-stage procedure in which mobilization of the proximal fragment, followed by fixing with the lower fragment using V-Y or Z-plasty and achieving fractional lengthening. The third group recommend the use of preoperative traction to the proximal fragment using pins or Ilizarov method to approximate the fragments and then fixing the fragments. (7) and we report this case because we know that doing V-Y advancement has post-op complications, particularly on the extensor mechanism but in our case since we do regular and adequate preoperative physiotherapy, we avoid the post-op complication that will happen with V-Y quadricepsplasty.

Case description

A 30-year-old male patient presented with a history of a fall-down accident 1 year and 6 months ago. Historically, the patient had severe pain and swelling on his left knee following the initial injury, and for this, he went to a traditional bone setter and was massaged repeatedly, but there was no improvement. Six months later from his initial trauma he went to a private clinic around his village, and they gave him anti-pain medication and encouraged the patient to use his leg as much as he could, but he wasn't able to use his injured left lower leg properly. Due to this, he decided to be seen again by a medical doctor and was eventually referred to our hospital. On presentation, the patient was complaining of knee pain, was unable to move long distances, was unable to use the toilet properly, had difficulty sitting on a chair, and easily fatigued his left thigh muscle on walking a short distance.

On physical examination, there was a visible deformity and a gap seen on his left knee area, which measured about 5–6 cm. There was quadriceps muscle atrophy, the superior part of the patella was palpable over the distal thigh, and the lower pole of the patella was palpable just above the left tibial tuberosity. With an impression of a neglected left patella fracture, an AP and lateral knee radiography was taken and showed a significantly displaced patella fracture measuring about 6 cm with sclerotic borders. The patient was advised about the clinical condition and the advantages as well as the possible complications related to surgical intervention, and he decided to be operated on.

Figure 1: Figure 1: Preoperative photograph of left knee showing wide gap of patella

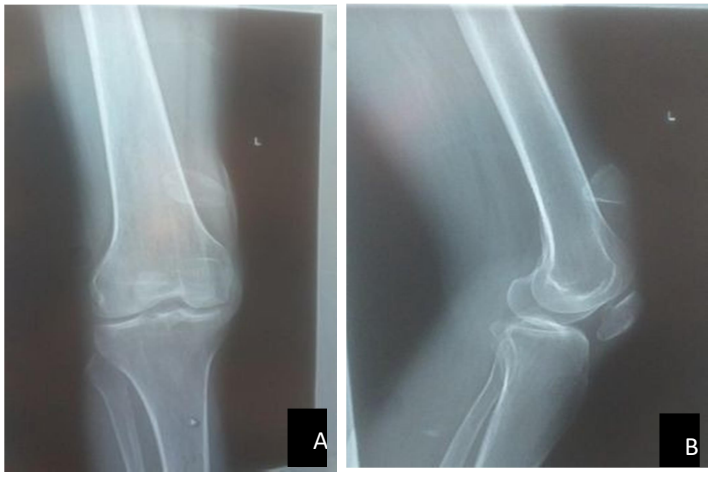

Figure 2: Preoperative Anteroposterior (A) and lateral (B) radiographs showing wide separation of patella fragments with sclerotic margins.

After admitting the patient, isometric quadriceps strengthening exercises were given to him for three weeks together with the physiotherapy unit before the operation because the quadriceps muscle was atrophied, and

contracted and there was a significant change in the muscle bulk. Using an anterior mid-line skin incision, a full-thickness flap was elevated, fibrous tissue on the fracture surface was removed and curated until it bleeds, then quadricepsplasty with V-Y advancement was done to get fractional lengthening of the contracted quadriceps, and tension band wiring for the patella was performed after bringing the superior fragment down using pointed reduction clamp and gentle continuous force.

During the postoperative period, the patient was started on dynamic quadriceps strengthening and active straight-leg-raising exercises. After suture removal, protected passive motion for his knee was added. On the 4th postoperative week, the knee range of motion was from 10 degrees of extension lag to 40 degrees of flexion. At 6 weeks of postoperative follow-up, the patient had 5 degrees of extension lag to 90-degree knee motion. The range of motion improved to 0–100 degrees at 3 months follow-up.

Discussion

The aim of reporting this case is to show the clinical importance of preoperative isometric quadriceps exercises and how effective using the simple tension band wire method with quadricepsplasty and splinting for neglected patella fracture compared with the other methods of surgical intervention to treat neglected patella fracture particularly single and double stage tension band wire technique. Sometimes it can also be treated non-operatively or using patellectomy, but this is not the ideal option for the management of neglected patella fracture. The major risk of conservative management is loss of full extension and stiffness of the knee, which are undesirable, especially in a young patient.(3)

Patellectomy is another commonly practiced salvage procedure but this procedure commonly results in different complications like a long time of rehabilitation, knee pain, limited range of motion, incidents of giving way, swelling, and substantial reduction in strength and bulk of the quadriceps muscle. (8, 9). Patellectomy compromises the length of the lever arm of the external apparatus mechanism, thereby causing excessive stress on the knee joint during extension. This ultimately causes early degenerative changes and is therefore a relative contraindication for young individuals (10,11).

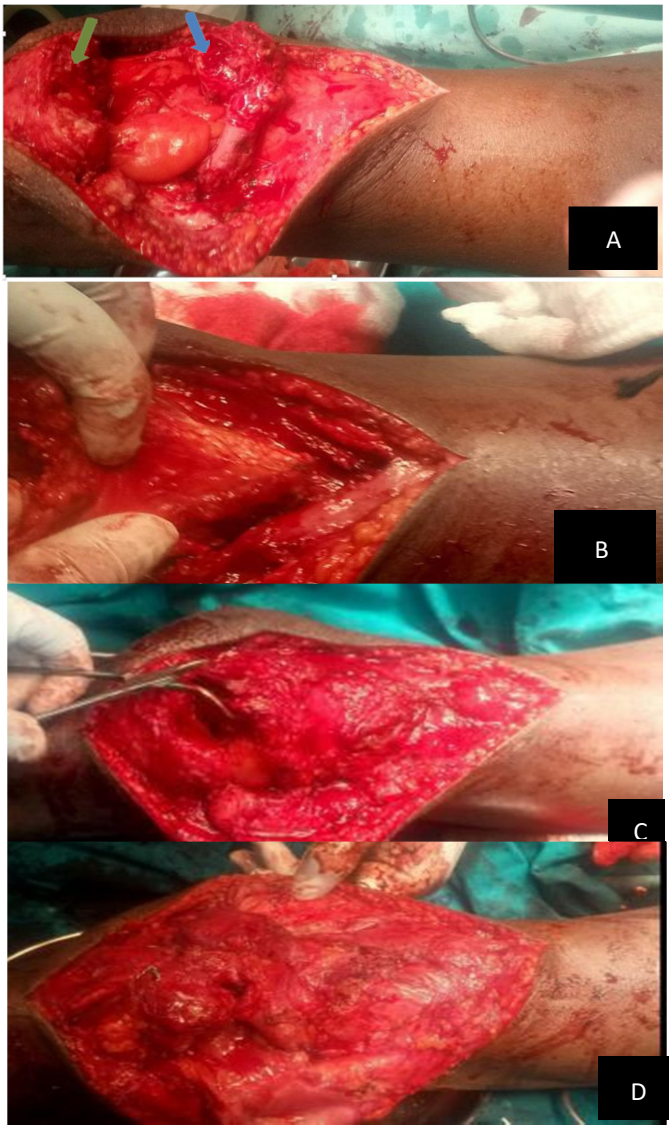

Figure 3: Intraoperative photographs show displaced patella fragments blue arrow showing proximal and the green arrow shows distal fragments (A) V-Y advancement quadricepsplasty (B) after quadricepsplasty patellar fragments easily approximated (C) after tension band wiring (D).

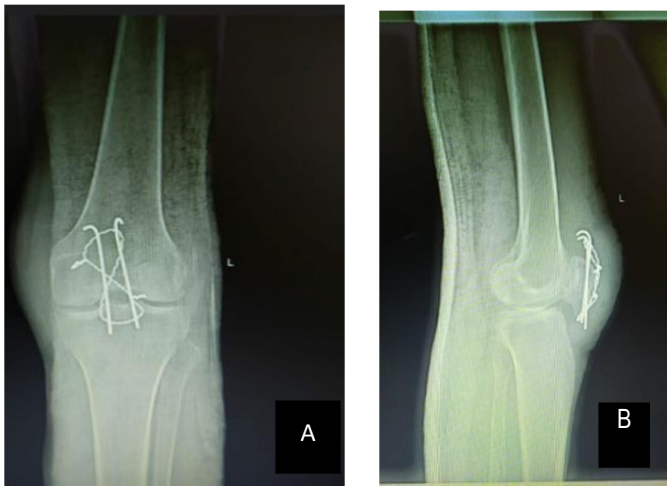

Figure 4: Postoperative anteroposterior (A) and lateral (B) radiographs

Figure 5: Postoperative photographs showing knee flexion in a sitting position at 6 weeks (A), 3 months (B), and 6 months (C, D) postoperative period

The use of the single-stage and double-stage tension band methods for the treatment of neglected patella fracture is mostly applied but they have their limitation for instance in single-stage double tension band wiring methods when the neutralizing wire is applied if the wire is over tightened then the risk of developing patella Baja is high which leads to knee pain, restricted knee range of motion, and it can also result in premature osteoarthritis unless it applied under image intensifier and Double stage surgery has also a problem because the presence of external fixator (iliizarov) or skeletal traction poses mental trauma to the patient along with surgical complication like bone weakening, pin loosening, pin tract infection and prolonged duration of treatment even if it has shown good result by Dhar and mir (8,12) with knee range of motion of 0 to 135-degree flexion.

For our patient, we did simple tension band wire (TBW) with quadricepsplasty with V-Y advancement because intraoperatively there is around a 5-6 cm gap with shortened and contracted quadriceps muscle and it was difficult to have adequate contact and reduced patella bone in addition to this we try to release the quadriceps muscle off the femur shaft and post-operatively we put the patient on the plaster of Paris on full knee extension position to avoid the effect of quadriceps muscle over firing and to give time for the healing of the quadriceps with light isometric exercises.

After the second week of the postoperative period, gentle knee flexion exercises started and during discharge, which was after 4 weeks, the patient had 40 degrees of knee flexion and then continued the physiotherapy. During the 3rd month follow-up the patient had 100 degrees of knee flexion and by the end of 6 months he had 110-to-120-degree knee flexion with comparable quadriceps muscle strength with good extensor mechanism and finally at one year of follow up he had full range of knee motion with adequate and strong quadriceps muscle power. So based on this result even if it is a single case report doing quadricepsplasty with simple tension band wire and short-period immobilization with good preoperative and postoperative physiotherapy can bring comparable results with that of the single or double-stage tension band wire with less complication rate.

In conclusion, preoperative isometric quadriceps excises, Tension band wire with V-Y advancement, short time splitting with plaster of Paris for soft tissue rest, and early post-op rehabilitation is a good treatment options for neglected patella fracture in a resource-limited setup with less complication.

Declarations

Ethical declaration

Informed written consent was obtained from parents/primary caregivers.

Consent for publication

Patient consented to the publication of this case report in the Millennium Journal of Health.

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Competing interest

All authors read and approved the final manuscript. The authors declare that they have no competing interests.

References

1. Heusinkveld MH, den Hamer A, Traa WA, Oomen PJ, Maffulli N. Treatment of transverse 4400 patellar fractures: a comparison between metallic and non-metallic implants. Br Med

Bull. 2013; 4411 107:69-85.

2. Kakazu R, Archdeacon MT. Surgical management of patellar fractures. Orthop Clin North Am.2016;47(1):77-83)
3. Uvaraj NR, Vahanan NM, Sivaseelam A, Sameer MM, Basha IM. Surgical management of neglected fractures of the patella. Injury. 2007;38(8):979–83.
4. Singhal V, Mittal D, Lal H, Khare R, Sharma S. Gap nonunion patella: A treatment dilemma Pb. J Orthop. 2010;12(1):8–11.
5. Dhar SA, Mir MR. Use of the Illizarov method to reduce quadriceps lag in the management of neglected nonunion of a patellar fracture. J Orthop. 2007;4(1):12.
6. Nathan ST, Fisher BE, Roberts CS, Giannoudis PV. The management of nonunion and delayed of union of patella fractures: A systematic review of the literature. Int Orthop. 2011;35(6):791–5.
7. R. K. Baruah, “Modified Ilizarov in difficult fracture of the patella. A case report,” Journal of Orthopaedic Case Reports, vol. 6, no. 1, pp. 26–28, 2016
8. Gwinner C., Märdian S., Schwabe P., Schaser K. D., Krapohl B. D., Jung T. M. Current concepts review: fractures of the patella. GMS Interdisciplinary plastic and reconstructive surgery. DGPW. 2016; 5:1 15. doi: 10.3205/iprs000080.
9. 9. Kfuri M., de Freitas R. L., Batista B. B., et al. updates in biological therapies for knee injuries: 1156 bone. Current Reviews in Musculoskeletal Medicine. 2014;7(3):220–227. doi: 10.1007/s12178- 1167 014-9225-z.
10. 10. Asopa V., Willis-Owen C., Keene G. Patellectomy for osteoarthritis: a new tension preserving surgical technique to reconstruct the extensor mechanism with retrospective review of long-term 2201 follow-up. Journal of Orthopedic Surgery and Research. 2015;10(1):p.107. doi: 10.1186/s13018-015-0237-11.
11. Garg P., Satyakam K., Garg A., Sahoo S., Biswas D., Mitra S. Patellar nonunion: comparison of various surgical methods of treatment. Indian Journal of Orthopedics. 2012;46(3):304–311. doi: 10.4103/0019-5413.96391.
12. S.A. Dhar and M.R. Mir use of illizarov method to reduce quadriceps lah in the management of neglected nonunion of a patellar fracture Journal of orthopedics vol 4, p. 12,2007