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Original Research Article

INFERIOR POLE PATELLA FRACTURE FIXATION WITH SUTURE ANCHOR

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Abstract

Introduction: Traditional treatment for inferior pole patella fractures is excision of the comminuted pole and Repair of a ruptured patellar tendon with the use of sutures that are passed through intraosseous tunnels within the patella. Difficulty with this technique is that Beath pin may penetrate the articular surface or may unduly injure the quadriceps through multiple passes. Obliquely oriented bony tunnels may cause abnormal patellar tilt, leading to uneven force distribution. This technique reports use of suture anchors for inferior pole patella fractures. Retrospective analysis of four cases of patients doing well at follow-up of one year. Materials and Methods: Four patients treated using suture anchors for repair of comminuted inferior pole fractures of patella between June 2020 to September 2020 (range 22 years-38 years).
Results: The average follow-up was 12 months. The patients were evaluated for range of motion, strength, patellofemoral scores and any alteration of patellar height.
Conclusion: Although pullout of the anchors may be a logical concern, but it is a novel technique of the use of suture anchor as this construct is more than sufficient to withstand the forces to which it is subjected.

Keywords: Tendon repair, inferior pole patella fracture, anchor suture

Introduction

Distal pole fractures comprise 9.3-22.4% of all patellar fractures treated operatively [1]. Traditional treatment for inferior pole patella fractures is excision of the comminuted pole and repair of a ruptured patellar tendon with the use of sutures that are passed through intraosseous tunnels within the patella [2, 3]. Difficulty with this technique is that Beath pin may penetrate the articular surface or may unduly injure the quadriceps through multiple passes. Obliquely oriented bony tunnels may cause abnormal patellar tilt, leading to uneven force distribution. This technique reports use of suture anchors for inferior pole patella fractures [4]. The purpose of this retrospective analysis of four cases of patients is to evaluate outcome of surgery using this technique.

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Materials and Methods

This retrospective study includes Four patients treated using suture anchors for repair of comminuted inferior pole fractures of patella between June 2020 to September 2020 (range 22 years-38 years) (Figure 1). All the patients had presented within a few hours after the injury to the hospital. The mechanism of injury was a direct fall on the knee. None of the patients had any other concomitant injury to the ipsilateral limb and none of the fractures were compound. All the patients were operated within 24 hours following the injury. An informed consent was taken from all the patients.

Operative technique

A spinal anesthesia is used for the procedure. The patient is placed on the operating table in the supine position, and a tourniquet placed on the upper thigh is inflated to 300 mm Hg after the lower extremity has been exsanguinated with an Esmark bandage. A midline incision over the patella to the tibial tuberosity was performed, and the fracture was exposed. The hematoma is evacuated and copiously irrigated. The edges of the frayed tendon and the paratenon are freed from the surrounding soft tissue with the use of sharp dissecting scissors. The medial and lateral retinacula, which are usually involved as well, are identified for later repair. Comminuted inferior pole pieces were excised. Two suture anchors Twin Fixit (Smith-Nephew, Ma, USA) of size 3.5 mm, each loaded with 2 Ultra braid sutures were placed in the center of the large proximal piece. The distance between the two anchors was 1 cm (Figure 2). With the help of free Mayo needle the ultrabraid sutures were applied to the smaller fragment using the modified Kessler [5] or the Krakow [6] technique (Figure 3,4). Intra operative X-rays were taken to ensure that there was no tilting of the patella in the sagittal plane and knots were tied in the standard fashion. (Figure 5,6). All the patients had varying degrees of retinacular tears which were repaired with Vicryl. Knee flexion was checked at this time average flexion achieved on table was 95 degrees (range 95°-100°) and the fixation was stable at this angle. Wound was irrigated and closed in the standard fashion. Patients received two more doses of antibiotics in the postoperative period (eight hours and 16 hours after the completion of the procedure). Patients were placed in knee immobilizer in full extension for four weeks to allow for healing of retinaculum repair as well as allowing healing of ligament to bone. X-rays were done at first postoperative day. Postoperative management included a straight knee brace or cast and full weight bearing for six weeks followed by gradual physiotherapy to regain knee range of motion. All surgeries were performed by orthopaedic surgeons of our medical institute.

Result

The average follow-up was 12 months. The patients were evaluated for range of motion, strength, patellofemoral scores and any alteration of patellar height. The outcome of the procedure was assessed with use of the patellofemoral scoring system of Noyes *et al*., [7] as adapted by Saltzman *et al*. [8] To address problems of the patellofemoral joint, evaluation involved the completion of a questionnaire (maximum score, 45 points), a clinical evaluation (maximum score, 43 points), and a radiographic analysis (maximum score, 12 points). The overall score was rated as excellent (90 to 100 points), good (80 to 89 points), fair (70 to 79 points), or poor (< 70 points). The patients had a final mean range of movement 130° which was comparable to the other side. The time required to recover full range of motion following discontinuation of immobilizer was 3 weeks (range 2.5-4.5 weeks). The time required to achieve strength (as checked by the dynamometer) comparable to the other side was four months (range four to five months) following surgery. None of the patients had any flexion deformity or extensor lag at three months and at final follow up [Figures 2 and 3] the final patellofemoral score (maximum 100 points) was 94.6 (range 93-96).

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Fig 1

Fig 2

Fig 3

Fig 4

Fig 5

Fig 6

Discussion

The use of suture anchors was initially used for Rotator cuff repairs but gradually the indications have expanded. Anchors are impacted in cancellous bone of the tuberosity of the humerus and the preloaded sutures are shuttled through the rotator cuff. The suture material used is non-absorbable and composed of a special ultra-high molecular weight (UHMW) polyethylene fiber and features a unique braid configuration. As a result, ultrabraid suture offers special advantages over traditional polyester suture, including higher knot breaking

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strength, increased lubricity, and a stronger resistance to fraying. This is preloaded on to Twinfix suture anchor which has two ultrabraid sutures. Numerous surgical options have been described for repair of a ruptured patellar tendon. The most commonly used technique involves the use of sutures through intraosseous patellar bone tunnels. Although this method is successful, several caveats must be noted. In an attempt to re-create the patellar tendon footprint, the articular surface may be penetrated, causing chondral damage. Numerous passes with the drill or Beath pin may injure the quadriceps unnecessarily. It is important to protect the repair because the powerful forces are generated by the quadriceps mechanism. This is usually accomplished by figure of eight, load sharing wire or cable [9]. The cable protects the patellar tendon repair by transmitting loads directly from the Quadriceps tendon or proximal pole of the patella to the tibial tubercle. The disadvantage of using cable wire is that they create additional stress risers in the Patella and the Tibial Tubercle. Secondly, they usually require removal one to two years after surgery. As mentioned by Ho and Lee [10] intraosseous wires that pull the free tendon edges through the tunnels carry the theoretical risk of shortening the already debrided tendon, resulting in patella Baja. In addition, loosening through bone tunnels, which has been shown to occur after as few as 25 cyclic loads, may lead to eventual cutout of the sutures through the tunnels. Use of the suture anchor as described here has number of advantages. Chances of penetrating the articular surface and injuring the intact quadriceps are greatly diminished by the low-profile nature of the anchor. Additionally, although obliquely oriented bone tunnels can theoretically create abnormal patellar tilting and force distribution, suture anchors do not convey this risk. Excessive tendon shortening does not occur because the tendon edges do not penetrate into the long tunnels. Loosening or expansion of the bone tunnels is not an issue. The incision is smaller and subsequent dissection is less extensive than with the conventional method because the superior pole of the patella does not have to be exposed. Subsequently, operative (tourniquet) time is decreased. Additionally, in contrast to the use of cerclage wires (another method), no reoperation for removal of broken or painful hardware is necessary. A logical concern relates to pullout of the suture anchors themselves. However, the pullout strength of the suture anchor construct significantly exceeds the force to which it is exposed. In fact, the most likely mode of biomechanical failure results from cutting of suture through the tendon; this is the rationale for the use of the strong Krackow stitch, which affords greater force dispersion and cutting restraint. In addition, reinforcement of traversing suture strands with horizontal mattress sutures leads to greater dissipation of load, further minimizing the possibility of cutout. Six traversing sutures are used because the strength of the repair is increased in proportion to the number of strands that cross the site. Finally, meticulous retinacular repair adds to the strength of the construct. Suture anchor fixation in patellar tendon rupture is an excellent technique that enables strong fixation with minimal dissection and eliminates various complications associated with alternative techniques. This results in effective healing and a fast return to functional activities and is a viable alternative to the intraosseous suture technique.

Conclusion

Although pullout of the anchors may be a logical concern, but it is a novel technique of the use of suture anchor as this construct is more than sufficient to withstand the forces to which it is subjected.

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References

1. Neumann HS, Winckler S, Strobel M. Long-term results of surgical management of patellar fractures. Unfallchirurg. 1993;96:305-310.
2. Andrews JR, Hughston JC. Treatment of patellar fractures by partial patellectomy. South Med J. 1977;70(809-813):817.
3. Böstman O, Kiviluoto O, Nirhamo J. Comminuted displaced fractures of the patella. Injury. 1981;13:196-202.
4. Anand A, Kumar M, Kodikal G. Role of suture anchors in management of fractures of inferior pole of patella. Indian J Orthop. 2010;44:333-335. Doi: 10.4103/0019-5413.65149
5. Sebastin SJ, Ho A, Karjalainen T, Chung KC. History and evolution of the Kessler repair. J Hand Surg. 2013;38:552-561. Doi: 10.1016/j.jhsa.2012.11.033
6. Krackow KA, Thomas SC, Jones LC, A new stitch for ligament-tendon fixation. Brief note. J Bone Joint Surg Am. 1986;68:764-766.
7. Noyes FR, McGinniss GH, Mooar LA. Functional disability in the anterior cruciate insufficient knee syndrome: Review of knee rating systems and projected risk factors in determining treatment. Sports Med. 1984;1:278-302.
8. Saltzman CL, Goulet JA, McClellan T, Schneider LA, Matthews LS. Results of treatment of displaced patellar fractures by partial patellectomy. J Bone Joint Surg Am. 1990;72:1279-85.
9. Perry CR, Mccarthy JA, Kain CC, Pearson RL. Patellar fixation protected with a load sharing cable: A mechanical and clinical study. J Orthop Trauma. 1988;2:234.
10. Ho HM, Lee WK. Traumatic bilateral concurrent patellar tendon rupture: An alternative fixation method. Knee Surg Sports Traumatol Arthrosc. 2003;11:105-111.