

Treatment of Comminuted Fracture of Inferior Pole of Patella Using Partial Patellectomy And Patellar Tendon Repair Using Transosseous Sutures.

B.Punithavasanthan¹, Pheiroijam Bhupes², A Mahendra singh³,
S Nongthon singh³, prabhu shrinivas prashant¹, Prabhat rai¹,
Rajkumar debbarma¹, shams gulrez¹.

¹ Postgraduate Trainee, Department Of Orthopaedics, Regional Institute Of Medical Sciences, Imphal.

² Senior Resident, Department Of Orthopaedics, Regional Institute Of Medical Sciences, Imphal.

³ Professor, Department Of Orthopaedics, Regional Institute Of Medical Sciences, Imphal.

Abstract

Background: The incidence of inferior pole fractures of patella is around 5% and the various treatment options include tension band wiring, circumferential wiring, or use of screw¹. The traditional recommendation for severely comminuted inferior pole fractures is excision of the comminuted pole followed by reattachment of the patellar tendon with transosseous suture to the superior fragment².

Materials and methods : This prospective study involves 10 patients with comminuted inferior pole of patella fracture operated between may 2015 to may 2017. there were nine male patients and one female patient.

Result: The outcome of the procedure was assessed with use of the Saltzman patellofemoral scoring system⁵. The final patellofemoral score (maximum 100 points) 93 (range 91-95).

Conclusion: We conclude that treatment of comminuted inferior pole patella fracture using partial patellectomy and patellar tendon repair using transosseous sutures is a very effective method of treating comminuted fractures inferior pole of patella.

Keywords: comminuted fracture patella, partial patellectomy, patellar tendon reconstruction.

I. Introduction

The incidence of inferior pole fractures of patella is around 5% and the various treatment options include tension band wiring, circumferential wiring, or use of screw¹. The traditional recommendation for severely comminuted inferior pole fractures is excision of the comminuted pole followed by reattachment of the patellar tendon with transosseous suture to the superior fragment². the superior fragment is an important part of extensor mechanism and should be preserved, the details of suture of patellar tendon to the superior fragment should be done carefully to prevent a tilt of the fragment which can cause erosion of the patellar groove³.

II. Materials And Methods

This is a prospective study involving 10 patients, the study was done for a period of two year (may 2015 – may 2017) in the Regional Institute of Medical sciences – Imphal, one patient had type 3 open fracture, all the patients presented to us within 3-4 hours. The mechanism of injury was direct fall on knee, all patients were operated within 24 hours. except the type three open fracture patient as it was operated after a period of 1 week. none of the patients had any other injury in the ipsilateral limb, informed consent was taken from all patients prior to surgery.



Figure 1: pre operative x ray showing inferior pole fracture



Figure 2: Intra operative picture



Figure 3: After repair

III. Operative procedure

All the patients were operated under spinal anaesthesia and tourniquet was applied, third generation cephalosporin (inj. ceftriaxone) was given intravenously 45 minutes before operation. A standard anterior midline incision was given from superior pole of patella to tibial tuberosity, then fracture ends were exposed, hematoma removed and washed with plenty of normal saline. In case of open fracture the wound was thoroughly debrided and washed with three litres of normal saline, then the comminuted inferior pole was excised and all the loose pieces were removed. Usually a small piece of bone was left attached to the patellar tendon, then the articular edge of proximal fragment was trimmed and smoothed, then using a 2 mm K wire three parallel holes were made in proximal direction near the articular surface of patella (one in centre, one each in middle and lateral thirds), then two heavy nonabsorbable sutures (Ethibond 5) were weaved through medial and lateral half of patellar tendon using augmented Becker technique. Then the proximal end of the sutures were passed through the holes in the patella, place one suture end each through medial and lateral holes and two through central holes, with the knee slightly hyperextended the tie the sutures securely over the superior pole of patella, the patellar tendon was slightly evaginated and made to lie against the raw fractured surface of the patellar remnant near the articular surface, this prevents tilting of patellar fragment and prevents contacting of raw surface of patella with the femur⁴. Then the retinacular tears were repaired with Vicryl. Knee flexion was checked at this time. The average flexion achieved on table was 90 degree (range 85-100 degree), then wound was again washed with normal saline and closed in standard fashion, then posterior slab was applied from mid thigh to medial malleoli with knee in extension. In the immediate postoperative period patients were encouraged to do isometric quadriceps exercises and ankle movements. No knee motion was allowed for the first four weeks. Patients were allowed weight bearing as tolerated with the help of crutches on posterior plaster slab. The posterior slab was discontinued and range of motion, quadriceps strengthening and hamstring strengthening exercises were started at four weeks following surgery. At the same time crutches were discontinued. All the exercises were done under the direct supervision.



Figure 4: post operative xray after partial patellectomy and repair



Figure 5: post operative xray after partial patellectomy and repair



Figure 6: follow up at 1 year



Figure 7: follow up at 1 year



Figure 7: follow up at 1 year

IV. Result

The patients were followed up for 1 year. There were nine males and one female patient. There were no postoperative infections. The outcome of the procedure was assessed with use of the Saltzman patellofemoral scoring system⁵. 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 110°(range 100° -120°). The time required to recover full range of motion following discontinuation of immobilizer was 4 weeks (range 3.5-5.5 weeks). The time required to achieve strength comparable to the other side was five months (range five to six months) following surgery. X-rays were done at one month, three months, five months, seven months and one year. None of the patients had any suture pull out at one year, No patients had any flexion deformity or extensor lag at final one year. The final patellofemoral score (maximum 100 points) was 93 (range 91-95).

V. Discussion

Not all patellar fractures are amenable to ORIF, in most cases of comminuted patellar fracture, one large fragment of patella can be preserved, most often the distal pole is comminuted, whereas superior pole is intact, however, as a principle, the larger fragment is preserved, goal is to minimize any abrupt change in articular surface⁶. The patellar ligament should be reattached near the articular surface of patella and it should be evaginated to avoid tilting of patella⁴. 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. The cable protects the patellar tendon repair by transmitting loads directly from the Quadriceps tendon or proximal pole of the patella to the tibial tubercle⁷. 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 surgery⁸. In our study we did not use any tension band wiring as the suture material we used (Ethibond 5) is non-absorbable, high molecular weight, long chain linear polyester and features a unique braid configuration. As a result, Ethibond 5 suture material offers higher knot breaking strength, and superior strength. Gunal et al (2001)⁹, concluded that the core suture technique was the most important element in establishing both strength and stiffness of the repair - the augmented Becker technique involves 4 strand repair with two knots outside of the repair site, repair consists of criss-crossing running suture using a double armed needle¹⁰, postoperatively patients should be kept in a posterior slab to fasten retinacular healing⁷.

Limitations

The limitations of this study are single hospital bias, less number of cases and absence of controls.

VI. Conclusion

We conclude that treatment of comminuted inferior pole patella fracture using partial patellectomy and patellar tendon repair using transosseous sutures is a very effective method of treating comminuted fractures of inferior pole of patella. It provided excellent results in our study and further studies with more number of patients are required.

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