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Original Research Article

Fixation of extra articular fracture of inferior pole of patella by on needle stainless steel suture wire

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Abstract: The patella is the largest sesamoid bone in the body. As the patella bone is responsible for the strong extensor mechanism of the knee joint, its reconstruction and anatomical restoration after fracture is always desirable over excision. Extra articular fracture of lower pole of patella accounts for less than 10 percent of all patellar fractures. The treatment of these fractures is complicated, as many a times the small fragment is communited and difficult to reduce & fix. Various methods have been described for fixation of these fractures but excision of lower pole with repair of patellar tendon to proximal fragment has also been advocated by many authors. We treated nine patients with extra articular displaced fracture of the inferior pole of the patella by operative fixation. All were fresh fractures. A different technique of fixation with on needle stainless steel suture wire was used. A transverse tunnel was made in the mid part of the proximal fragment with the help of a 2 mm K-Wire. An on needle stainless steel suture was taken and one of its ends was passed through this tunnel. Now the suture was passed in the patellar tendon just distal to the lower pole fragment. This loop was tightened to approximate the fracture fragments. All nine patients showed good signs of radiological healing at around 12 weeks. This technique of fixation of extra articular fracture of lower pole of patella by on needle SS suture wire is a safe, easy and effective option for fixation of these fractures.
Keywords: Avulsion Fracture Patella, Encirclage Wiring.

Introduction

The patella is the largest sesamoid bone in the human skeleton, located within the extensor mechanism. It is roughly triangular in shape, with its base superiorly and apex inferiorly. The patella serves to centralize the divergent forces at the Quadriceps and increase the movement arm of extensor mechanism. It improves the efficiency of knee extensor mechanism by elevating the extensor mechanism away from the axis of rotation of the knee joint [1]. As the patella bone is responsible for the strong extensor mechanism of the knee joint, its reconstruction and anatomical restoration after fracture is always desirable over excision.

Patella fractures account for approximately 1 percent of all fractures [2]. The mechanism of injury is generally a direct fall or blow on the patella. The fracture of patella are classified in many ways, but in most classification systems, avulsion fracture or extra articular fracture of inferior pole of patella are classified as separate category. In AO classification system extra articular lower pole fractures are classified as 34-A1. This fracture results from an indirect mechanism by an unexpected sudden flexion against a forceful contracture of quadriceps muscle.

The treatment of these fractures is complicated as many a times the small fragment is communited and difficult to reduce & fix. Various methods have been described for fixation of these fractures but excision of lower pole with repair of patellar tendon to proximal fragment has also been advocated by many authors [3].

Patients and methods

We treated nine patients with extra articular displaced fracture of the inferior pole of the patella. All were fresh fractures. Six patients were male and three were female. All patients were young in the age group of 21 to 38 years. All patients were managed by operative fixation. A different technique of fixation with on needle stainless steel suture wire was used.

The operative procedure & technique

The fracture was exposed through anterior mid-line vertical skin incision. Fracture ends were cleaned. A transverse tunnel was made in the mid part

of the proximal fragment with the help of a 2 mm K-Wire. An on needle stainless steel suture was taken and one of its ends was passed through this tunnel. Now the suture was passed in the patellar tendon just distal to the lower pole fragment. This loop was tightened to approximate the fracture fragments. Both medial and lateral retinaculums were repaired with No. 1 polyglactin suture. The wound was closed and a plaster cylinder was applied.

Post- operatively the knee joint was immobilized in plaster cylinder for four weeks, although static quadriceps exercises were started on the second post – operative day. At four weeks the plaster was removed and knee mobilization and resistance quadriceps exercises were started. Patients were made to walk with support once the extensor lag is less than 5 degree. All patients were followed-up clinically as well as radiologically every four weeks.

Results

All nine patients showed good signs of radiological healing at around 12 weeks. By this time all of them gained full range of movement and there was no extensor lag. None of the patients complained of implant related problem like pain or irritation. We did not remove any implant in any of these nine patients.

Discussion

Extra articular fracture of lower pole of patella accounts for less than 10 percent of all patellar fractures [4]. These fractures are frequently communited and displaced. They are difficult to reduce and fix firmly enough to allow early mobilization of knee joint. The small fragment of bone does not allow fixation by ordinary wires and screws.

Many authors have advocated partial Patellectomy or excision of inferior pole and repair of Patellar tendon to the proximal fragment of the Patella [5-7]. This leads to reduction of Patellar height leading to loss of efficiency of extensor mechanism. So this is not advocated as the choice of treatment for such fractures now a day.

Saltzman *et al.;* [6] reported a reduction of patellar height after pole resection and 8 % (3 out of 40) poor functional outcome after partial patellectomy. Resection of lower pole of Patella causes shortening of Patellar tendon length and Patella Baja, leading to shortening of the extensor mechanism. As a result of this shortening, compression forces in the patellofemoral joint increase, which may lead to cartilage damage. In contrast, retaining the inferior patellar pole preserves the functional length of the extensor mechanism.

Many authors have recommended an additional Patello Tibial circlage wire or figure of eight wiring to protect the repair of Patellar tendon but this is also not without complications. The breakage of wire loop has been reported frequently. The wire loop causes discomfort at the anterior aspect of knee joint because of the tenting of the wire loop during knee movement. In addition tightening of Patello Tibial wire loop often decreases the length of the Patellar tendon.

Various methods have been described for the fixation of these fragments. Puljiz *et al.;* [8] reported basket plate osteosynthesis for communited fracture of lower pole of patella in 71 patients. He reported excellent or good results in around 90 percent of cases.

Vaselko *et al.;* [9] compared the long-term functional results of internal fixation with pole resection in 28 patients (14 in each group). He concluded that the normal height of patella can be maintained by preserving the Patellar pole. In contrast with pole resection, which requires postoperative immobilization, internal fixation with a basket plate allows for immediate mobilization and early weight bearing.

Yang *et al.;* [10] reported a technique of separate vertical wiring for the fixation of the communited fracture of Patella. They made a vertical oblique tunnel in the proximal fragment. They reported excellent functional outcome in 25 patients.

In our study of nine patients, we had excellent functional outcome. Preservation of lower pole ensured normal Patellar height and hence efficient extensor mechanism. The technique is relatively easy and the best part is, as there is very little hardware, it does not irritate the patient hence does not require to be removed.

Conclusion

Our method of fixation of extra articular fracture of inferior pole of Patella by an on needle stainless steel suture wire provides an easy, low cost and effective alternative to conventional circlage wiring. The operative procedure is simple and technique is easy to learn. It does not require any costly or special instruments. Implant removal is also not required.

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