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Surgery

A STUDY OF FUNCTIONAL OUTCOME OF PATELLAR FRACTURES TREATED WITH PARTIAL PATELLECTOMY

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ABSTRACT We have done a prospective study for the management of inferior pole patellar fractures treated by partial patellectomy in 20 patients over a period of 18 months from February 2014 to July 2015 in the Department Of Orthopaedics, Govt. Medical College Hospital, Thrissur.
All the patients were pre -operatively assessed both clinically and radiologically and operated by partial patellectomy, out of which 5 cases also required protection of the repair with stainless steel wire. Follow up of the patient was done at 3rdweek, 4th week, at one month intervals for 3 months and then at 4.5 months and 6 months.
In our study, 12 patients had excellent functional outcome, 6 patients had good functional outcome, and 2 had fair outcome as assessed by knee society scoring system. The results of our study were comparable with other studies in the literature. Physiotherapy is a very essential tool of success in the management of these fractures, which helps in reducing complications like stiffness of the knee and in providing good functional outcome. Long term follow up is necessary to assess late complications like osteoarthritis and late functional outcome.

KEYWORDS :

INTRODUCTION

The patella or knee cap, is a triangular sesamoid bone about 5cm in diameter, which is embedded in the tendon of insertion of quadriceps femoris muscle. The main function of patella is to improve the efficiency of quadriceps muscles by improving the mechanical leverage of the quadriceps muscles.

Although patellar fractures appears to be simple injury they do have an important bearing on subsequent knee function. There is no universally accepted treatment for patellar fractures. However, the preference is being shifted from patellectomy to reconstruction and preservation of patella and restoration of extensor mechanism[(1)]. There are various surgical ways to treat the fracture of patella. Currently there are four forms of operative treatment and they are ORIF with screws, various forms of internal fixation with an anterior tension band wire, partial patellectomy and total patellectomy[(2)].

When comminution exists at either pole or in a transverse fracture that is not amenable to fixation, a partial patellectomy may be used. Several surgeons have described this technique of partial patellectomy and repair of soft tissue envelope in injuries that involve severe comminution of one pole that are not amenable to internal fixation. Because of the forces generated across the patella from the extensor mechanism, many surgeons have recommended protection of partial patellectomy with an encirclage wire.

This is a prospective study to assess the functional outcome of patellar fractures treated with partial patellectomy using the knee society scoring system.

MATERIALS AND METHODS

This prospective study is done in Department of Orthopaedics, Govt. Medical College Hospital, Thrissur during the period from February 2014 to July 2015.This study consists of 20 cases of inferior pole patellar fractures treated by partial patellectomy, out of which 5 cases also required protection of repair with stainless steel wire.

After proper history recording, clinical examination, radiological and preoperative work up, informed written consent, fracture patella taken up for surgery- partial patellectomy. All the patients are personally interviewed for mode of injury and duration is recorded, thorough general and clinical examination will be carried out and radiographs are taken. The patients were selected according to the protocol and routine laboratory investigations were carried out.The limb was immobilized by an above knee plaster of Paris cylinder slab and operation was done at the earliest.

In cases where stability is doubtful after the procedure, protection of the repair is often necessary. This was accomplished by an encirclage wire in 5 cases. The wire protects the patellar tendon repair by transmitting tensile loads directly from the quadriceps tendon or proximal pole of the patella to the tibial tubercle. This technique allows more aggressive rehabilitation.

The operated knee was immobilized in extension in an above knee posterior splint in full extension. Isometric quadriceps drills and active straight leg raising were stared from the first post operative day. After 3 weeks the posterior splint was removed and range of movement exercises were started and the patent was allowed partial weight bearing in the crutches or walking stick. At 4 weeks stability of knee was assessed and if stable, full weight was started. Flexion exercises were continued till maximum knee flexion was achieved. In the five cases where encirclage wire was used, the wire was removed as an outpatient procedure at 3 months, after healing of the fracture.

Follow Up: The discharged patients were advised to report for follow up on every month, during each follow up the patients were examined for both subjective symptoms and objective signs which was recorded. The patients were questioned about subjective complaints like pain, difficulty in walking, squatting, climbing, and getting down stairs and ability to perform routine work. The patient's objective assessment was done for Extensor lag, Range of knee movement, and efficacy of quadriceps (power).The functional outcome was assessed using the knee society scoring system at 6 months.

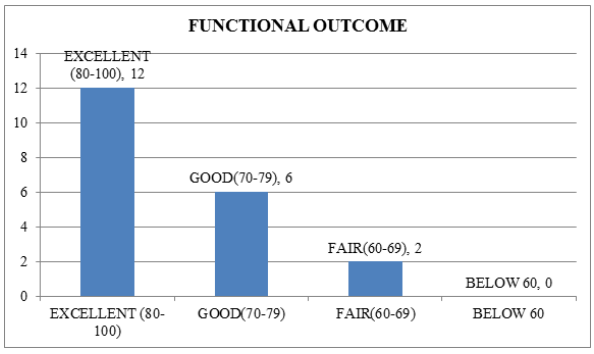
RESULTS

In our series the range of age was between 20 and 65 years and the mean age is 46.05 years .The incidence was highest in the age group of 51 – 65 years .Among 20 cases , 13 cases (65 %) were males and 7 cases (35%) were females. 10 cases (50%) patients sustained fracture on the right side and 10 cases (50%) sustained fracture on the left side.14 (70%) fractures were sustained as a result of fall where as 6 (30%) fractures were due to RTA. 18 cases (90%)were closed and 2 (10%) were open.

The average duration of stay in the hospital was 10.7 days.2 patients had a prolonged stay in view of superficial surgical site infection. All the other patients were discharged on postoperative day 10 after suture removal. 5 patients in among 20 had been treated with an augmentation with encirclage wiring along with patellectomy, whereas the rest 15 had only patellectomy alone.

2 cases out of 20 had a complication of superficial infection which were treated with intravenous antibiotics and had a positive outcome. There were no other complications reported.

The functional outcome was assessed via knee society scoring system, the results were graded as



DISCUSSION

Patellar fractures are common and it constitutes about 1% of all skeletal injuries resulting from either direct or indirect trauma. The subcutaneous location of the patella makes it vulnerable to direct trauma as in dashboard injuries or a fall on the flexed knee, whereas violent contraction of the quadriceps results in indirect fractures of patella. These fractures are usually transverse and are associated with tears of medial retinacular expansions. Any improper and inadequate treatment would inevitably lead to a great deal of disability which would be most perceptibly felt in a country like India, where squatting is important in daily activities.

Based on the energy of injury and strength of repair, construct may be protected with a circlage wire. The strength of the repair should always be evaluated intra operatively, observing for interfragmentary motion and the integrity of the tendon bone interface with progressive knee flexion. Rigid constructs may allow for early, controlled motion of the knee. In this study, a series of 20 cases of inferior pole patellar fractures treated by partial patellectomy have been studied. The age of patients ranged from a minimum of 21 years to a maximum of 63 years. The average was found to be 46.05 years. K Srinivas et al obtained an average age of 40 years in their study, evaluation of results of surgical treatment of closed fractures of patella.[1]R Das et al obtained an average age of 39.9 years in their comparative study of partial and total patellectomy for comminuted fractures.[3]

There was equal involvement of both right and left sides in this study. Kesemenli CC et al in their study obtained 55 % involvement of the right side and 45 % involvement of the left side[4]. 14 cases (70%) were due to fall on a flexed knee against the contracted quadriceps and 6 cases (30%) were due to road traffic accidents suggesting a direct injury. In our study only 2(10%) cases were open and 18 (90%) cases were closed which is comparable to the study by R Das et al 25.71 % cases were open fractures[3]

The functional outcome was assessed according to the knee society scoring system. 60% showed excellent results where as 30 % showed good results 10 % showed fair results. Nummi and Seligo in 1971 in two separate studies reported 62 % and 33% excellent or good results respectively after partial patellectomy[5,6].Bostrom in his study of 422 patellar fractures in 1972 reported 82 % excellent or good results after partial patellectomy[7].Mishra in his study, late results of patellectomy in fractured patella in 1972 reported 75 % excellent or good results after partial patellectomy[8]

CONCLUSION

Thus we can conclude that

1. With inferior pole patellar fractures, partial patellectomy can be performed as a definitive procedure with minimum complications.
2. Since most cases are associated with extensor retinacular tear, meticulous repair of the tear is necessary for better functional outcome.
3. In cases where stability is doubtful because of the strong forces generated by the quadriceps protection of the repair with stainless steel wire can be performed with no significant difference in the functional outcome.
4. Early post operative physiotherapy plays an important role in final outcome.

The limitations in our study are that, our study only had a sample size of 20 which is lesser compared to many other studies, and the follow up period is only up to 6 months which may be inadequate to assess the patellofemoral arthritis that is common to develop in late stages.

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