



Functional and radiological outcome of PCL avulsion fractures treated operatively

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Type of Publication: Original Research Paper

Conflicts of Interest: Nil

Abstract

Background: Avulsion fractures of the posterior cruciate ligament (PCL) are uncommon. Chronic instability and early degenerative changes will develop as a result of delayed diagnosis. This study were undertaken to study the result of avulsion fracture of PCL injury treated with open reduction and fixation.

Objectives : This study were designed to see the result of avulsion fracture PCL treated with CC screw fixation using posteromedial approach.

Materials and Methods: A total of 35 patients undergoing treatment for PCL avulsion fracture treated with posteromedial approach from year 2017 at MGM medical college and hospital Kamothe were selected in which we selected 30 with isolated PCL avulsion fracture who came for regular follow up.

Results: Preoperatively patients had severe instability but after 6 weeks postoperatively not a single patients was found to have severe instability. According to Lysholm score, in this study 14(46.66%) patients showed excellent result, 9 (30%) showed good result and 7 (23.33%) showed fair result.

Conclusion: Avulsion fracture of PCL injury fixed with partially threaded CC screw with minimal soft tissue damage using posteromedial approach give good to excellent result.

Introduction

Avulsion fractures of the posterior cruciate ligament (PCL) are uncommon. A few mechanisms of PCL injuries have been proposed on the basis of the site of injury of the PCL [1]. The foremost common mechanism of avulsion fractures of the PCL at the tibial insertion is a dashboard injury, during which the knee is in a flexed position, and a posteriorly directed force is applied to the pretibial area [1]. The posterior cruciate ligament plays a significant role in knee stabilization.[2] various harmful effects of PCL injuries have been recognized and reportable.[3] Unlike PCL ligamentous tears, PCL avulsion fractures can be anatomically reduced and rigidly fixed, and the prognosis is far more favorable. Chronic instability and early degenerative changes will develop as a result of delayed diagnosis. Analysis of the PCL is notoriously difficult, both clinically and arthroscopically. Isolated PCL disruption most commonly happen as avulsion at its tibial insertion as opposed to its femoral origin or as a midsubstance tear. On imaging, this injury seems as focal separation of the posterior tibial articular surface. The mechanisms of injury of the PCL are multiple and include a direct blow to the anterior tibia with the knee flexed (as happen with dashboard injury during a motorized vehicle collision) or severe hyperextension (which normally occurs in the setting of athletic trauma). Despite the actual fact that injury to the PCL could be an isolated finding,

concurrent damage to the other major stabilizing structures of the knee is common. This is often significantly true when the mechanism of injury involves severe rotational forces [4]. The PCL plays a significant role in knee stabilization [5]. Isolated tear or avulsion of the PCL can be caused by a fall on a flexed knee or by striking of the flexed tibia on the dashboard in a motor vehicle accident [6].

Objective

To assess functional and radiological outcome of PCL avulsion fracture treated operatively.

Materials and methods

A total of 35 patients undergoing treatment for PCL avulsion fracture treated with posteromedial approach from year 2017 at MGM medical college and hospital Kamothe were selected in which we selected 30 with isolated PCL avulsion fracture who came for regular follow up.

Inclusion criteria

1. PCL avulsion fractures from tibial insertion.
2. Fresh fractures
3. Age 15-50 year

Exclusion criteria

1. Compound fractures
2. Associated other ligament injury
3. Patient treated conservatively

Contact details of these patients were retrieved from the in patients records. All patients were then contacted by phone and asked to come for follow up in opd. 30 patients had a minimum of 6 month follow up and were included in our study.

At follow up, consent was obtained from the patients and a detailed clinical examination was done by followed by specific functional scores.

Functional Scores (Clinical Assessment)

The functional outcome was calculated using a standard set of questions. We used the Lysholm scores.

Lysholm Score

The Lysholm score is a self administered patients questionnaire. The least possible score was (totally impaired) to maximum possible score of 100 (completely normal).

It is based on eight different aspects.

1. Limp
2. Using cane or crutches
3. Locking sensation in knee
4. Giving way sensation from the knee
5. Pain
6. Swelling
7. Climbing stairs
8. Squatting

| Score | Grade |
|--------------|-----------|
| 91-100 | Excellent |
| 84-90 | Good |
| 65-83 | Fair |
| Less than 65 | Poor |

Surgical technique

After administering anesthesia the patient is positioned in the prone position and the lower extremity is held in 30° of flexion at the knee joint over a bolster. An inverted L incision is made over the posteromedial corner of the knee joint. Transverse limb incision is begun in midpopliteal space, 1–2 cm below the popliteal crease and slightly medial to the midline of the knee. The incision is then extended and curved distally following the posteromedial aspect of the upper leg, ending 4–5 cm distally. The skin and subcutaneous flap are inferolaterally reflected. This area is devoid of subcutaneous neurovascular elements, but the posterior cutaneous nerve of the calf and short saphenous vein are located superficially to the fascia and

should be preserved at lateral extension of the incision. The fascia overlying the medial head of the gastrocnemius is identified and opened in line with the longitudinal limb that is incised. The dissection is continued by longitudinal splitting of the fibers of the medial head. Medial and lateral divisions of the medial head are held separate to expose the posterior capsule of the knee joint; then capsulotomy with a longitudinal incision is made to expose the avulsed bony fragment. If there is more than one bony fragment or lateral extension of the bony fragment, pulling the lateral half of them medial head could improve the exposure. The middle geniculate artery may be encountered near the midposterior capsule and can be ligated if necessary. After cleaning the crater and the avulsed fragment, the bony fragment is reduced into its bed and fixed with 4.5mm CC screw.



Result

In this study 30 patients were selected out of which 27 were male and 3 were female. The mean age at time of injury 27.3 (range 24-33). There were 29 patients with history of injury in RTA and one had while playing

football. 22 patients had involvement of Rt limb while others have Lt limb involvement. 2 patients had contralateral femur fracture and one had ipsilateral tibia fracture. According to Lysholm score, in this study 14 (46.66%) patients showed excellent result, 9 (30%) showed good result and 7 (23.33%) showed fair result. 2 patients had superficial infection and 2 had stiffness of knee joint.

The knee were immobilized for 4 weeks in cast followed by quadriceps and hamstring strengthening exercise with guarded flexion and extension and partial weight bearing. After 6 weeks full weight bearing were started.

| | |
|------------------------|-------------------------|
| Average | |
| age in years | 27 |
| sex(M/F) | 27/3 |
| Side(L/R) | 8/22 |
| Partial weight bearing | 4 weeks |
| Full weight bearing | 6 weeks |
| Wound infection | 2 Superficial infection |
| stiffness | 2 |
| Return to work | 10 weeks |

Discussion

Injury to the PCL is not common. Avulsion of the tibial attachment of the PCL is less frequent and found more often in the older age group [7].

The so-called ‘isolated’ PCL is often overlooked; the presence of ecchymoses and abrasions on the anterior surface of the proximal tibia are suggestive of PCL injury. Clinical examination confirmed a posterior sag and a positive posterior drawer test.

Radiographs showed a fragment of bone detached from the back of the intercondylar space of the tibial plateau, slightly displaced, or pulled upward and rotated.

Although surgical indications for midsubstance tear of the PCL remains controversial, surgical fixation of the PCL avulsed fragment is the accepted treatment of choice in

PCL avulsion fractures [8,9]. Piedade and Mischan [10] reported 20 out of 21 patients after surgical treatment of avulsion fracture of the PCL from tibial attachment as having posterior laxity of at least 5–10 mm. In our study, nine patients were rated good (30%), fourteen were rated excellent (46.66%), and seven patients was rated fair(23.33%) in a subjective evaluation (Lysholm).

Conclusion

Avulsion fracture of PCL from tibial insertion constitute small group of all PCL injury patients . Surgical treatment is recommended in all PCL avulsion fracture, various modality of treatment is recommended in the literature. Fixation with partially threaded CC screw with minimal soft tissue damage using posteromedial approach give good to excellent result.

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