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Isolated posterior cruciate ligament injuries: Results of arthroscopic management

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ABSTRACT

Aim: Isolated posterior cruciate ligament (PCL) injuries are considered as benign and treated conservatively. Aim of this study is to determine the functional outcomes, efficacy of isolated PCL injuries treated by arthroscopic PCL reconstruction or fixation. **Materials and Methods:** A total of 24 patients, each with an isolated PCL injury, (17 with complete PCL tear and 7 with PCL avulsion fracture) were enrolled in this prospective study. Patients with complete tear underwent PCL reconstruction with hamstring tendon autograft and the patients with displaced avulsion fractures underwent arthroscopic fixation with suture bridge technique. The patients underwent regular follow-up postoperatively with clinical and radiographic evaluation. Follow-up examinations comprised the Lysholm knee score, International Knee Documentation Committee (IKDC) score. **Results:** Mean pre-operative lysholm score for 24 knees was 41; mean post-operative lysholm score was 90. 18 of 24 patients had excellent results, 4 patients had good results, and 2 patients had fare result at final assessment. In final IKDC ratings, 21 patients were assessed as normal or near normal (Grade A or B). **Conclusions:** The short-term follow-up showed good function after arthroscopic management in isolated PCL injuries. Hence, we recommend surgical intervention in isolated PCL injuries.

KEY WORDS: posterior cruciate ligament, arthroscopic management, hamstring tendon autograft

To determine the functional outcomes of isolated posterior cruciate ligament (PCL) injuries treated by arthroscopic PCL reconstruction or fixation.

INTRODUCTION

The PCL is the strongest ligament of the knee. PCL injuries account for more than 20% of reported knee injuries [1], but injuries to the PCL are commonly missed and left undiagnosed.

The PCL's most important function are to prevent posterior translation of the knee at higher knee flexion angles [2], thus patients commonly complaints of problems with deceleration.

It is well-documented that the PCL has intrinsic capacity to heal following injury unlike anterior cruciate ligament (ACL) [3,4]. The treatment of isolated PCL injuries is controversial [5]. Various researchers have proved that neglected Grade III PCL injuries lead to early patellofemoral and medial compartmental osteoarthritis.

MATERIALS AND METHODS

A total of 24 patients who were enrolled this prospective study, underwent surgery between September 2009 and October 2013. All the patients had a traumatic etiology. Inclusion criteria were isolated PCL injury either complete rupture or PCL avulsion fracture. Patients with associated ACL injury or PLC injury were not taken into study. All patients were clinically evaluated and found to have definite posterior sag and positive posterior drawer. Preoperatively, the diagnosis of PCL rupture was also confirmed with a magnetic resonance imaging.

Seventeen patients with complete tear underwent PCL reconstruction with hamstring tendon autograft and 7 patients with avulsion fractures underwent arthroscopic fixation of PCL avulsion fracture with suture bridge technique. Average age at time of surgery was 33 years. All patients were followed up at regular intervals for a minium period of 1 year. Average follow-up period was 18 months. Postoperatively patients were evaluated using lysholm knee score and the International Knee Documentation Committee (IKDC) objective score with translation documented by KT-2000.

Surgical Procedure

Patients underwent either arthroscopic PCL reconstruction or fixation of the avulsion fracture depending on the pathology in the individual patient.

Single bundle arthroscopic PCL reconstruction was done using transtibial technique with semi tendonus and gracilis autograft. Surgery was performed under general anesthesia with patient in supine position with involved knee in thigh holder under tourniquet control. Diagnostic arthroscopy was done using standard anterolateral and anteromedial portals. Under arthroscopic guidance posteromedial portals placed. PCL tear was confirmed arthroscopically. Autografts were obtained from ipsilateral leg. The graft was prepared and doubled. Tibial and femoral tunnels were reamed at anatomical footprints of PCL. Tibal tunnel is reamed at a jig angle of 60° and wire catcher protects popliteal vessels. Femoral tunnel reamed outside in with the jig. Graft was passed through the femoral tunnel and fixed with biodegradable interference screw. Tibial fixation was done with knee in 70' flexion and anterior drawer thrust using biodegradable interference screw.

Post-operative Rehablitation

Patients were immobilized in long knee brace with posterior support for tibia. Patients were mobilized from the first post-operative day full weight bearing. Knee bending started from the fourth post-operative week onward. Knee brace was weaned off after 4 weeks and range of motion and strengthing exercise were taught.

Arthroscopic PCL Avlusion Fracture Fixation

Arthroscopic PCL avlusion fracture fixation was done using suture bridge technique. Surgery was performed under general anesthesia with similar set up. Diagnostic arthroscopy was done using standard anterolateral and anteromedial portals. Under arthroscopic guidance high posteromedial and low posteromedial portals were placed. PCL avulsion fracture was confirmed arthroscopically. Fracture bed was debrided. Fracture fragment is fixed by suture bridge technique and secured by the typing knots over an anterior tibial bone bridge.

Post-operative Rehablitation

Patients were immobilized in long knee brace. Patients mobilized from first post-operative day with partial weight bearing. Knee bending started from the fourth post-operative week onward. Knee brace was weaned off after 6 weeks. Quadriceps and hamstring strengthening exercise were encouraged.

RESULTS

Average age at time of surgery was 33 years. Male: Female ratio was 4:1. Average time from injury to surgery was 1 month. Average follow-up period was 18 months mean pre-operative lysholm score for 24 knees was 41; mean post-operative lysholm score was 90. Patients had a significant improvement in lysholm score from 3rd month follow-up onward. 18 of 24 patients had excellent results, 4 patients had good results, and 2 patients have fare result at final assessment.

Objective IKDC ratings showed significant improvements on subsequent follow-ups. In final IKDC ratings, 21 patients were assessed as normal or near normal (Grade A or B) from Grade C or D on initial evaluation.

DISCUSSION

Isolated PCL injuries treated conservatively resulted in residual instability and early patella femoral arthritis [5]. In this study, we have evaluated the outcome of both arthroscopic PCL reconstructions and arthroscopic PCL avulsion fracture fixation.

All arthroscopic PCL avulsion fracture fixations were done on the 2nd or 3rd week following the injury. Since the incidence of compartment syndrome is higher if higher arthroscopy is performed in the acute stage, the surgery was avoided during the 1st week after injury. Surgeries were not postponed after 4th week following injury due to anticipated difficulty in reduction of the fracture fragment. All arthroscopic PCL reconstructions using hamstrings grafts were done within 2 years from the time of injury.

The advantage of PCL avulsion fracture fixation and arthroscopic PCL reconstruction over open techniques is that it has lesser morbidity. Moreover, arthroscopy also allows the assessment and management of associated meniscal and chondral injuries. Posterolateral and posteromedial injuries can be identified during arthroscopy. Other advantages include less hospital stay and less incidence of post-operative knee stiffness due to early mobilization.

The functional outcomes of our study are comparable with study by Chan *et al*. [6] which showed 90% good or excellent results in lysholm score after arthroscopic PCL reconstruction. Our study showed 91.67% good or excellent results in lysholm score. In the same study, 85% of patients had normal or near normal IKDC scoring and our study showed 87.5% normal or near normal IKDC score. Sekiya *et al*. [7] evaluated functional outcome of single bundle arthroscopic PCL reconstruction and had 62% normal to near normal IKDC scores in their study.

Complexities in structures make PCL reconstruction a challenge. By understanding surgical principles and techniques, patients with posterior knee instability undergoing PCL reconstruction can achieve satisfactory results. Recently, progress has been made in basic knowledge and surgical techniques in PCL injuries.

CONCLUSION

Arthroscopic PCL reconstruction with hamstring graft gives good stability and excellent clinical outcomes. Arthroscopic PCL avulsion fracture fixation safely done on the 2nd week after the injury gives excellent clinical outcomes and achieves good bony union.

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