International Journal of Research in Orthopaedics
Perumal S et al. Int J Res Orthop. 2016 Dec;2(4):411-413
http://www.ijoro.org

Original Research Article

DOI: http://dx.doi.org/10.18203/issn.2455-4510.IntJResOrthop20164178

Clinical outcome of arthroscopic management of isolated posterior cruciate ligament injuries

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Received: 17 October 2016
Revised: 08 November 2016
Accepted: 11 November 2016

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ABSTRACT

Background: Isolated posterior cruciate ligament (PCL) injuries are considered as benign and treated conservatively. But studies have shown the long term outcomes of these patients are poor. Aim of this study is to determine the functional outcomes, efficacy, and complication of isolated PCL injuries treated by arthroscopic PCL reconstruction or fixation.
Methods: 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 patients with displaced avulsion fractures underwent arthroscopic fixation with suture bridge technique. Average age at time of surgery was 33 years. Average time from injury to surgery was 1 month. Average follow-up period was 18 months. Patients underwent regular follow-up postoperatively with clinical and radiographic evaluation. Follow-up examinations comprised the Lysholm knee score, the International Knee Documentation Committee (IKDC) score.
Results: Mean preoperative Lysholm score for 24 knees was 41; mean postoperative Lysholm score was 90. Eighteen of 24 patients had excellent results, and 4 patients had good results and 2 patients have fare result at final assessment. 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).
Conclusions: The short-term follow-up, analytical results showed good function after arthroscopic management in isolated PCL injuries. Hence we recommend surgical intervention in isolated PCL injuries.

Keywords: Posterior cruciate ligament, Hamstring tendon autograft, Lysholm knee score, IKDC score

INTRODUCTION

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

The posterior cruciate ligaments most important function is to prevent posterior translation of the knee at higher knee flexion angles, thus patients commonly complaints of problems with deceleration.[2]

It is well documented that the PCL has intrinsic capacity to heal following injury unlike ACL.[3,4] There are lots of controversies in treatment of isolated PCL injuries.[5] Various researchers have proved that neglected grade III PCL injuries lead to early patellofemoral and medial compartmental osteoarthritis.

The study aimed to determine the functional outcomes of isolated PCL injuries treated by arthroscopic PCL reconstruction or fixation.

METHODS

Twenty-four patients who were enrolled this prospective study, underwent surgery between September 2009 and October 2013. All the patients had traumatic aetiology. 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 (MRI).

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 minimum period of 1 year. Average follow-up period was 18 months. Post operatively patients were evaluated using Lysholm Knee Score and the International Knee Documentation Committee (IKDC) score.

Surgical procedure

Patient underwent both arthroscopic PCL avulsion fracture fixation and arthroscopic PCL reconstruction by standardized surgical procedure.

Single bundle arthroscopic PCL reconstruction

Single Bundle Arthroscopic PCL Reconstruction was done using trans tibial technique with semi tendonus and gracilis autograft. Surgery was performed under GA with patient in supine position with involved knee in thigh holder under tourniquet control. Diagnostic arthroscopy was done using standard anteriolateral and anterio medial portals. Under arthroscopic guidance postero medial portals placed. PCL tear was confirmed arthroscopically. Semitendnosis and gracilis auto graft obtained from ipsilateral leg. The graft was prepared and doubled. Tibial and femoral tunnels were reamed at anotomical foot prints of PCL. Graft passed through the tibial tunnel and fixed with bio interference screw. Tibial fixation was done with knee in 70’ flexion and anterior drawer thrust using bio interference screw.

Postoperative rehablitation

Patients was immobilised in long knee brace with posterior support for tibia. Patients mobilised from first post op day with full weight bearing walking. Knee bending started form 4 weeks. Knee brace was weaned off after 4 weeks and ROM 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 GA with similar set up. Diagnostic arthroscopy was done using standard anterolateral and antero medial portals. Under arthroscopic guidance high postero medial and low postero medial 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.

Postoperative rehablitation

Patients was immobilised in long knee brace. Patients mobilised from first post op day with partial weight bearing. Knee bending started from 4 weeks. Knee brace was weaned off after 6 weeks. Quadriceps and hamstring strengthening exercise were encouraged.

RESULTS

Mean preoperative Lysholm score for 24 knees was 41; mean postoperative Lysholm score was 90. Patients had a significant improvement in Lysholm score from 3rd month follow up onwards. Eighteen of 24 patients had excellent results, and 4 patients had good results and 2 patients have fare result at final assessment.

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).

Table 1: Comaprison of pre and postoperative scores.

Score	Mean preoperative	Mean postoperative
Lysholm	41	90
IKDC	C	A

Table 2: Comparison of IKDC scoring.

IKDC grades	Number of patients	Inference
A	17	Normal
B	4	Nearly normal
C	3	Abnormal
D	0	Severly Abnormal

Table 3: Comparison of Lysholm score.

Lysholm Score	Number of patients	Score
Excellent	18	>90
Good	4	84-90
Fair	2	64-83
Poor	0	<64

DISCUSSION

Isolated PCL injuries are no longer considered to be benign and have to be treated aggressively. 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 second or third 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 first 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.

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 postoperative knee stiffness due to early mobilisation.

The functional outcomes of our study is comparable with study by Chang et al which showed 90% good or excellent results in Lysholm score after arthroscopic PCL reconstruction.[6] 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 JK et al evaluated functional outcome of single bundle arthroscopic PCL reconstruction and had 62% normal to near normal IKDC scores in their study.[7]

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 second week after the injury gives excellent clinical outcomes and achieves good bony union.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the institutional ethics committee

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Cite this article as: Perumal S, Amer S, Ayyadurai P, Sivaraman A. Clinical outcome of arthroscopic management of isolated posterior cruciate ligament injuries. Int J Res Orthop 2016;2:411-3.