

Evaluation of Functional Outcome of Anterior Cruciate Ligament Reconstruction using Bone-patellar Tendon-bone Graft

K P Saravanakumar¹, S Madhu²

¹Associate Professor, Department of Orthopaedics, Government Tirunelveli Medical College, Tirunelveli, Tamil Nadu, India, ²Assistant Professor, Department of Orthopaedics, Government Medical College, OGE, Chennai, Tamil Nadu, India

Abstract

Introduction: Anterior cruciate ligament (ACL) reconstruction nowadays is probably the most common arthroscopic procedure of the knee and the choice of graft to be used for it is probably the most important decision to be made during the surgery. Various options are available and patellar tendon graft is one of them.

Purpose: The purpose of this study was to evaluate the midterm functional outcome of ACL reconstruction done by arthroscopic method using the bone-patellar tendon-bone graft fixed with interference screws.

Materials and Methods: The study was conducted in the Department of Orthopaedics, Government Madurai Medical College. A total of 36 cases were operated out of whom only 32 were available for a follow-up period of 18 months. The outcome was measured using Lysholm scoring.

Results: At the end of 24-month follow-up period, almost 80% of the patients had good to excellent results with no major graft-related complications.

Conclusion: Bone-patellar tendon graft is a good option for ACL reconstruction with early rigid fixation permitting earlier rehabilitation and good functional outcome.

Key words: Anterior cruciate ligament, Arthroscopy, Lysholm score, Patellar tendon, Reconstruction

INTRODUCTION

Anterior cruciate ligament (ACL) reconstruction is nowadays one of the most common procedures in the knee. Initially, most of the ACL tears were treated conservatively, but the increased incidence of late meniscal tears and subsequent degenerative arthritis has resulted in many ACL tears being managed now by arthroscopic reconstruction. The procedure which routinely is done as an arthroscopic procedure has many factors to be considered for a good functional outcome. The selection of graft is one such issue.

Patellar tendon graft was once considered the gold standard, but now, variety of other types of grafts are also used common ones being hamstring tendon graft and quadriceps tendon graft. The advantage of the patellar tendon graft is the strong initial fixation, easy graft harvest, and good bone-to-bone healing it achieves. The problems of iatrogenic patellar injury and quadriceps weakness can be minimized by a good surgical technique. Lysholm scoring is the one of the most common scoring system used to evaluate the functional outcome after any ligamentous reconstruction of the knee. The purpose of this study was to evaluate the midterm functional outcome of ACL reconstruction done by arthroscopic method using the bone-patellar tendon-bone graft fixed with interference screws.

MATERIALS AND METHODS

The study was conducted in the Department of Orthopaedics, Madurai Medical College. A total of 36 cases

Access this article online



www.ijss-sn.com

Month of Submission : 08-2017
Month of Peer Review : 09-2017
Month of Acceptance : 10-2017
Month of Publishing : 10-2017

Corresponding Author: Dr. K P Saravanakumar, Department of Orthopaedics, Government Tirunelveli Medical College, Tirunelveli, Tamil Nadu, India. Phone: 9943776245. E-mail: drsmadhu2k@gmail.com

Table 1: Lysholm knee scoring

Post-operative duration (months)	<68 poor	69-76 fair	77-90 good	>90 excellent
6	6	17	10	5
9	2	11	13	12
12	2	6	12	15
18	2	4	9	17

Table 2: Frequency

score	Frequency (%)	Valid percentage	Cumulative percentage
Post-operative duration - 6 months			
Valid			
Poor	6 (15.8)	15.8	15.8
Fair	17 (44.7)	44.7	60.5
Good	10 (26.3)	26.3	86.8
Excellent	5 (13.2)	13.2	100.0
Total	38 (100.0)	100.0	
Post-operative duration 9 months			
Valid			
Poor	2 (5.3)	5.3	5.3
Fair	11 (28.9)	28.9	34.2
Good	13 (34.2)	34.2	68.4
Excellent	12 (31.6)	31.6	100.0
Total	38 (100.0)	100.0	
Post-operative duration 12 months			
Valid			
Poor	2 (5.3)	5.6	5.6
Fair	6 (15.8)	16.7	22.2
Good	12 (31.6)	33.3	55.6
Excellent	16 (42.1)	44.4	100.0
Total	36 (94.7)	100.0	
Missing			
System	2 (5.3)		
Total	38 (100.0)		
Post-operative duration 18 months			
Valid			
Poor	2 (5.3)	6.3	6.3
Fair	4 (10.5)	12.5	18.8
Good	9 (23.7)	28.1	46.9
Excellent	17 (44.7)	53.1	100.0
Total	32 (84.2)	100.0	
Missing			
System	6 (15.8)		
Total	38 (100.0)		

of complete ACL tear who underwent arthroscopic ACL reconstruction using bone-patellar tendon graft were followed up for 2 years. The period of study was between January 2013 and January 2017 was included in the study. All the patients who were having chief complaints of instability were diagnosed clinically by anterior drawer test, Lachman test, and pivot shift test and were confirmed by MRI. ACL tears that were more than 3 weeks old were included in this study. All patients had pre-operative quadriceps strengthening and range of movement exercises. All patients underwent standard arthroscopic ACL reconstruction using bone-patellar tendon-bone

graft which was fixed on either side with stainless steel interference screws. All patients underwent a standard post-operative rehabilitation program. They were evaluated at the end of 6, 12, 18, and 24 months using lysholm scoring system.

RESULTS

Among 36 patients, in this study, 32 were male and 4 were females. Right knee was involved in 21 and left knee was involved in 15 cases. 28 patients had sustained due to road traffic accident (RTA) and 8 had accidental fall. The average age of the patients was 30 years. All patients were operated at an average of 7-10 weeks since injury. Most of the patients had sustained injury due to RTA (70%), next common was sports activities (20%) such as kabaddi, football, cricket, and athletics, and few had injuries due to accidental fall. Four patients were lost to follow-up during the course of the study. The mean age of our study was 27 years. The youngest patient was 18 years and the eldest one 42 years. Skeletally immature patients were not included in this study as bone-patellar tendon graft ideally should not be harvested in skeletally immature patient for chances of growth disturbance. A maximum number of patients were in the age group of 26-30 years (60%), next large group was 20-25 years (25%). There were many associated injuries found during arthroscopy. Nine patients had lateral meniscal tear, 15 had medial meniscal tear, and 5 had both. Table 1 shows lysholm knee scoring recorded during subsequent postoperative visits at 6,9,12 and 18 months. Table 2 shows the detailed statistics which classify the results and gives us the frequency of poor to excellent results in the 6 to 18 months follow up period

At the end of 24 months, around 80% of patients had good to excellent results. The average range of knee motion was 127-135°. Loss of knee extension was noticed in three patients. Two patients developed superficial infection which subsided with oral antibiotics anterior knee pain was reported in six patients. The limitation of the study is its small sample size.

DISCUSSION

After ACL reconstruction most patients expect an early return to function and athletes especially want to return to sports earlier. patellar tendon graft with its strong bone to bone fixation achieved after fixation favours early aggressive rehabilitation protocols which are the key to a good long term functional outcome. Many new graft options have evolved over a period of time with pros and cons like hamstring tendon and quadriceps tendon. inspite

of many options available bone patellar tendon bone graft and hamstring tendon graft have been most popular ones because of their consistent good results. though initially considered to be gold standard patellar tendon graft had some donor site morbidity because of which hamstring tendon graft has been increasingly used nowadays. but studies have shown that with a proper surgical technique these problems can be avoided and still remains to be the gold standard graft option for ACL reconstruction. Dai et al found six strand hamstring graft superior to PTB graft in a study. Yao and kratler in 2015 showed PTB graft to be a good choice. Barber described good results even with BPTB autograft similar to allograft. Niu showed better results with double layered BPTB graft. Riff showed around 3 % revision rates after ACL reconstruction with PTB graft in there 30 year follow up. Hardy studied complications following graft harvest and concluded that effective means of prevention exist to reduce the risk of these complications. Samuelson in their meta analysis showed there was no significant difference in failure rates of ACL reconstruction using PTB and hamstring grafts. Ali described patellar bone tendon bone graft was a reliable method of reconstruction of ACL. Hence these studies show results similar to our study showing good functional outcome following ACL reconstruction using Bone patellar tendon Bone autograft

CONCLUSION

The patellar bone tendon-bone graft is a very reliable graft for reconstruction of ACL. Although it has an increased incidence of anterior knee pain and quadriceps weakness initially, but the midterm results are good.

REFERENCES

1. Dai C, Wang F, Wang X, Wang R, Wang S, Tang S. Arthroscopic single-bundle anterior cruciate ligament reconstruction with six-strand hamstring tendon allograft versus bone-patellar tendon-bone allograft. *Knee Surg Sports Traumatol Arthrosc* 2016;24:2915-22.
2. Joyce CD, Randall KL, Mariscalco MW, Magnussen RA, Flanigan DC. Bone-Patellar tendon-bone versus soft-tissue allograft for anterior cruciate ligament reconstruction: A systematic review. *Arthroscopy* 2016;32:394-402.
3. Yao LW, Wang Q, Zhang L, Zhang C, Zhang B, Zhang YJ, *et al*. Patellar tendon autograft versus patellar tendon allograft in anterior cruciate ligament reconstruction: A systematic review and meta-analysis. *Eur J Orthop Surg Traumatol* 2015;25:355-65.
4. Kraeutler MJ, Bravman JT, McCarty EC. Bone-patellar tendon-bone autograft versus allograft in outcomes of anterior cruciate ligament reconstruction: A meta-analysis of 5182 patients. *Am J Sports Med* 2013;41:2439-48.
5. Barber FA, Cowden CH rd, Sanders EJ. Revision rates after anterior cruciate ligament reconstruction using bone-patellar tendon-bone allograft or autograft in a population 25 years old and younger. *Arthroscopy* 2014;30:483-91.
6. Niu Y, Duan G, Wang F, Tang S, Li Y, Lu J, *et al*. Better 4-year outcomes for anterior cruciate ligament reconstruction with double-layer versus single-layer bone-patellar tendon-bone allografts. *Knee Surg Sports Traumatol Arthrosc* 2017;25:1443-8.
7. RiffAJ, Luchetti TJ, WeberAE, Chahal J, Bach BR Jr. Thirty-Year experience with ACL reconstruction using patellar tendon: A critical evaluation of revision and reoperation. *Orthop J Sports Med* 2017;5:2325967117724345.
8. Hardy A, Casabianca L, Andrieu K, Baverel L, Noailles T, Junior French Arthroscopy Society. Complications following harvesting of patellar tendon or hamstring tendon grafts for anterior cruciate ligament reconstruction: Systematic review of literature. *Orthop Traumatol Surg Res* 2017. pii: S1877-056830240-2.
9. Samuelson BT, Webster KE, Johnson NR, Hewett TE, Krych AJ. Hamstring autograft versus patellar tendon autograft for ACL reconstruction: Is there a difference in graft failure rate? A Meta-analysis of 47,613 patients. *Clin Orthop Relat Res* 2017.
10. Ali SD, Noor S, Shah SD, Mangi IK, Ali Shah SK, Sufyan M. Functional outcome of ACL reconstruction using patellar bone tendon bone graft. *J Pak Med Assoc* 2014;64 12 Suppl 2:S79-82.
11. Eriksson E. Hamstring tendons or patellar tendon as graft for ACL reconstruction? *Knee Surg Sports Traumatol Arthrosc* 2007;15:113-4.

How to cite this article: Saravanakumar KP, Madhu S. Evaluation of Functional Outcome of Anterior Cruciate Ligament Reconstruction Using Bone-patellar Tendon-bone Graft. *Int J Sci Stud* 2017;5(7):53-55.

Source of Support: Nil, **Conflict of Interest:** None declared.