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Original Research

Arthroscopic ACL reconstruction- PLT vs Semitendinosus graft- A Comparative study

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Abstract

Background: The anterior cruciate ligament (ACL) is recognized as the most frequently injured ligament within the knee joint. The present study was conducted for comparing the outcome of Arthroscopic ACL reconstruction by PLT vs Semitendinosus graft.

Materials & methods:A cohort of 40 patients diagnosed with anterior cruciate ligament (ACL) tears, confirmed through both clinical assessment and radiographic imaging, underwent arthroscopic ACL reconstruction. Of these patients, 20 received semitendinosus grafts, while the remaining 20 were treated with peroneus longus tendon grafts. All surgical procedures were performed under spinal or epidural anesthesia, utilizing a tourniquet, and the postoperative recovery was without complications. A uniform rehabilitation protocol was implemented for all patients following the ACL reconstruction. Postoperative outcome was evaluated using Lysholm score.

Results: Mean age of the patients of Semitendinosus grafts group and PLT group was 38.3 years and 40.7 years respectively. Mean postoperative Lysholm score among patients of the Semitendinosus grafts group and PLT group was 91.3 and 93.7 respectively. Excellent results were seen in 85 percent of the patients of the semitendinosus group and in 90 percent of the patients of the PLT group. non-significant results were obtained while comparing outcome among patients of both the study groups.

Conclusion: The semitendinosus muscle contributes to knee internal rotation and flexion strength. PLT also has significant tensile strength and the potential for regeneration post-replacement. Arthroscopy-assisted anterior cruciate ligament (ACL) reconstruction utilizing either a semitendinosus autograft or a peroneus longus tendon autograft result in enhanced knee stability, minimizes postoperative complications, and facilitates prompt rehabilitation.

Key words: Arthroscopic, Anterior cruciate ligament,Semitendinosus

Introduction

The anterior cruciate ligament (ACL) is recognized as the most frequently injured ligament within the knee joint. In individuals who are young and physically active, surgical intervention is regarded as the optimal approach.[1]The conventional surgical procedure for addressing ACL injuries involves the reconstruction of the ligament. Despite the favorable outcomes associated with this surgical method, certain drawbacks persist due to the invasive nature of the procedure.[2] Recently, there has been a renewed interest in the preservation of the ACL, as it may offer benefits such as the retention of native tissues and the potential to sustain proprioceptive function.[3]

The semitendinosus (ST) and gracilis (GRA) muscles play a significant role in the internal rotation and flexion strength of the knee. Consequently, the strength of the hamstrings is influenced by the utilization of an autologous ST/GRA tendon graft. Studies have demonstrated that there is bilaterally symmetrical peak knee flexion torque at multiple intervals, specifically at 12 months, 24 months, and between 18 to 51 months following reconstruction. Additionally, there is evidence of hypertrophy in the hamstring muscles as a compensatory mechanism occurring after a period exceeding 10 years.[4- 6]The peroneus longus tendon (PLT) has been used for ACL reconstruction in recent years. This tendon is superficially located and easy to harvest. Biomechanical experiments have proven that PLT has similar biomechanical properties to ACLs and can be used as a graft substitute for cross-ligament reconstruction.[7]Hence; the present study was conducted for comparing the outcome of Arthroscopic ACL reconstruction by PLT vs Semitendinosus graft.

Materials & methods

The present study was conducted for comparing the outcome of Arthroscopic ACL reconstruction by PLT vs Semitendinosus graft. A cohort of 40 patients diagnosed with anterior cruciate ligament (ACL) tears, confirmed through both clinical assessment and

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radiographic imaging, underwent arthroscopic ACL reconstruction. Of these patients, 20 received semitendinosus grafts, while the remaining 20 were treated with peroneus longus tendon grafts. All surgical procedures were performed under spinal or epidural anesthesia, utilizing a tourniquet, and the postoperative recovery was without complications. A uniform rehabilitation protocol was implemented for all patients following the ACL reconstruction. Postoperative outcome was evaluated using Lysholm score. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software. Chi-square test was used for evaluation of level of significance.

Results

Mean age of the patients of Semitendinosus grafts group and PLT group was 38.3 years and 40.7 years respectively. Majority proportion of patients of both the study groups were males. Main etiologic factor responsible for in jury was road traffic accident among patients of both the study groups. Mean postoperative Lysholm score among patients of the Semitendinosus grafts group and PLT group was 91.3 and 93.7 respectively. Excellent results were seen in 85 percent of the patients of the semitendinosus group and in 90 percent of the patients of the PLT group. non-significant results were obtained while comparing outcome among patients of both the study groups.

Table 1: Demographic data

Variable		Semitendinosus grafts	PLT grafts
Mean age (years)		38.3	40.7
Gender	Males	15	13
	females	5	7
Etiology	Road traffic accident	14	13
	Fall from height	6	7

Table 2: Comparison of postoperative Lysholm score

Postoperative Lysholm score	Semitendinosus grafts	PLT grafts	p-value
Mean score	91.3	93.7	0.452
Good	3 (15 %)	2 (10 %)	0.665
Excellent	17 (85 %)	18 (90 %)	
Total	20 (100 %)	20 (100 %)	

Discussion

The anterior cruciate ligament (ACL) plays a vital role in the biomechanics of the knee, contributing to both stability and proprioceptive feedback. ACL injuries are prevalent, and surgical intervention has become the conventional approach to restore the functionality of the affected knee. The initial surgical method involved repairing the ACL via open arthrotomy, a common practice during the 1970s and 1980s. However, this approach was ultimately discontinued due to unsatisfactory mid-term outcomes, as reported by Feagin et al. Subsequent prospective clinical trials corroborated these findings, demonstrating that ACL reconstructions yield superior results. Over the past twenty years, there has been a marked increase in the rates of ACL reconstruction procedures.[8-11] Hence; the present study was conducted for comparing the outcome of Arthroscopic ACL reconstruction by PLT vs Semitendinosus graft.

Mean age of the patients of Semitendinosus grafts group and PLT group was 38.3 years and 40.7 years respectively. Majority proportion of patients of both the study groups were males. Main etiologic factor responsible for in jury was road traffic accident among patients of both the study groups. Mean postoperative Lysholm score among patients of the Semitendinosus grafts group and PLT group was 91.3 and 93.7 respectively. Excellent results were seen in 85 percent of the patients of the semitendinosus group and in 90 percent of the patients of the PLT group. Asif N et al, in a previous similar study compared Hamstring Graft and Peroneus Longus Tendon Graft in Arthroscopic ACL Reconstruction.One hundred and twenty patients who sustained an isolated ACL injury were enrolled and underwent ACLR using tripled or quadrupled PLT autograft or quadrupled HT autograft. Patients were followed for 24 months. Functional scores were assessed preoperatively and at 3, 6, 12, and 24-month post-operatively. The mean diameter of the PLT autograft was significantly larger than that of the HT autograft, and the mean graft harvesting time was less. Patients in the PLT group returned to sports a mean of 36 days earlier than those in the HT group and had a lower rate of donor-site morbidity, and better patient-reported outcomes at the knee. There was a significant difference between the groups in IKDC and Tegner-Lysholm scores at the 24-month follow-up.Despite some donor site complications, such as numbness and infection, both PLT and HT grafts offer acceptable knee stability. However, PLT grafts seem to provide superior subjective functional outcomes based on patient-reported scores.[11]

In the present study, non-significant results were obtained while comparing outcome among patients of both the study groups. Ambulgekar RK et al analyzed 30 patients having ACL tear (clinically and

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radiographically) and treated with arthroscopic reconstruction of ACL. Among these, 15 cases were operated using semitendinosus graft and 15 cases by using peroneus longus tendon graft. The study was conducted in a tertiary care hospital from January 2021 to June 2022 with minimum follow up of 6 months and maximum follow up of 15 months.Mean Lysholm score (post op) in Group ST was 90.6 and in Group PLT was 92.2. The Lysholm Score and IKDC grading between the two groups was comparable and showed no significant difference. Post-Op laxity assessed using the Lachman's grading showed normal findings in 70% patients, and of the remaining 30% (9 patients), 5 patients from ST group and 4 patients from PLT group showed 1+ laxity at follow up examination.Arthroscopy assisted ACL reconstruction with peroneus longus tendon autograft provides a steady knee, reduces postoperative donor site morbidity and enables early rehabilitation, similar to the traditional semitendinosus tendon autograft.[12]

Conclusion

The semitendinosus muscle contributes to knee internal rotation and flexion strength. PLT also has significant tensile strength and the potential for regeneration post-replacement. Arthroscopy-assisted anterior cruciate ligament (ACL) reconstruction utilizing either a semitendinosus autograft or a peroneus longus tendon autograft result in enhanced knee stability, minimizes postoperative complications, and facilitates prompt rehabilitation.However; further studies are recommended for better exploration of results.

References

1. Sanders T.L., Maradit Kremers H., Bryan A.J. Incidence of anterior cruciate ligament tears and reconstruction. Am J Sports Med. 2016;44:1502–1507.
2. Carey J.L., Dunn W.R., Dahm D.L., Zeger S.L., Spindler K.P. A systematic review of anterior cruciate ligament reconstruction with autograft compared with allograft. J Bone Joint Surg Am. 2009;91:2242–2250.
3. van der List J.P., DiFelice G.S. Primary repair of the anterior cruciate ligament: A paradigm shift. Surgeon. 2017;15:161–168.
4. Lipscomb A, Johnston R, Snyder R, Warburton M, Gilbert P. Evaluation of hamstring strength following use of semitendinosus and gracilis tendons to reconstruct the anterior cruciate ligament. Am J Sports Med. 1982;10:340–343.
5. Nakamura N, Horibe S, Sasaki S, et al. Evaluation of active knee flexion and hamstring strength after anterior cruciate ligament reconstruction using hamstring tendons. Arthroscopy. 2002;18:598–602.
6. Ohkoshi Y, Inoue C, Yamane S, Hashimoto T, Ishida R. Changes in muscle strength properties caused by harvesting of autogenous semitendinosus tendon for reconstruction of contralateral anterior cruciate ligament. Arthroscopy. 1998;14:580–584.
7. Wiradiputra AE, Febyan AG. Peroneus longus tendon graft for anterior cruciate ligament reconstruction: a case report and review of literature. Int J Surg Case Rep. 2021;83:106028.
8. Marshall J.L., Warren R.F., Wickiewicz T.L. Primary surgical treatment of anterior cruciate ligament lesions. Am J Sports Med. 1982;10:103–107.
9. Warren R.F. Primary repair of the anterior cruciate ligament. Clin OrthopRelat Res. 1983;(172):65–70.
10. Feagin J.A., Jr., Curl W.W. Isolated tear of the anterior cruciate ligament: 5-year follow-up study. Am J Sports Med. 1976;4:95–100.
11. Asif N et al, Randomized Controlled Study Comparing Hamstring Graft and Peroneus Longus Tendon Graft in Arthroscopic ACL Reconstruction.Journal of Orthopaedic Case Reports 2024 November:14(11):Page 240-245.
12. Ambulgekar RK, Chhabda GK, Malu M, SangnodP.Comparative study of the functional outcome of semitendinosus graft versus peroneus longus graftin arthroscopic reconstruction surgeries of anterior cruciate ligament.Int J Res Orthop2023;9:721-7.