

Functional outcome of single bundle anatomical anterior cruciate ligament reconstruction using either quadruple hamstring or bone patellar tendon bone graft by medial portal technique

Thapa SS, Neupane P, Lamichhane AP, Mahara DP

Sports and Arthroplasty unit, Department Of Orthopedics, Institute of Medicine, Maharajgunj, Kathmandu, Nepal

Corresponding author: Dr. Sunil Singh Thapa

Email: drsunilsinghthapa@hotmail.com

Abstract

Introduction: The anterior cruciate ligament (ACL) is the most frequently injured knee ligament. Abnormal knee kinematics in ACL deficient knee causes early osteoarthritis. Single bundle anatomical ACL reconstruction by medial portal technique provides better knee stability than transtibial technique. Many studies suggest that there is no difference in outcome of ACL reconstruction using hamstring or bone patellar tendon autograft. In this study we evaluated functional outcome (based on mean Lysholm score) at 6 months of single bundle ACL reconstruction by medial portal technique using bone patellar tendon bone or quadruple hamstring graft.

Methods: This was a prospective longitudinal study on functional outcome (using Lysholm score) of 75 patients who underwent single bundle anatomical ACL reconstruction by medial portal technique by using either quadruple graft hamstring or bone patellar tendon bone graft in sports and arthroplasty unit in Tribhuvan University teaching hospital, Kathmandu, Nepal between March 2014 to February 2016. Mean Pre op and 6 months postop Lysholm score of two groups was compared using paired-t test to evaluate the functional outcome of the surgery.

Results: In this study overall mean preop Lysholm score was 48.48 ± 6.50 (36-62) and 6 months postop Lysholm knee score was 91.58 ± 3.10 (85-95), with p value 0.0000. The mean preop and post op Lysholm score for Quadruple hamstring group was 47.7 and 91.5 respectively, while that for bone patellar tendon bone group was 54 and 91.7.

Conclusion: The functional outcome (based on mean Lysholm score) at 6 months postop of single bundle anatomical ACL reconstruction was similar irrespective of type of graft used.

Keywords: Anterior Cruciate Ligament (ACL), Lysholmscore, Medial Portal technique

Introduction

The anterior cruciate ligament (ACL) is the most frequently injured knee ligament.¹ Abnormal knee kinematics in ACL deficient knee causes early osteoarthritis.^{2,3} Complete restoration of the native ACL may not be possible, due to the complex nature of the ligament.⁴ Anatomic ACL reconstruction is defined as the functional restoration of the ACL to its native dimensions, collagen orientation, and insertion

sites.⁵ Anatomical single bundle ACL reconstruction provides better knee kinematics than traditional transtibial single bundle ACL reconstruction.⁶ Many studies suggest that there is no difference in outcome of ACL reconstruction using hamstring or bone patellar tendon autograft.⁷⁻¹⁰ The present study aims at evaluating patients' functional outcome (using Lysholm knee score) of single bundle anatomical ACL reconstruction via medial portal technique using either quadruple hamstring or bone patellar tendon autograft.

Methods

This was a prospective longitudinal study carried out in department of Orthopedics and trauma surgery, sports and arthroplasty unit in Tribhuvan University teaching hospital, Kathmandu, Nepal between March 2014 to February 2016. Ethical approval was taken as per requirement from institutional review board of institute of medicine. All patients aged between 18 and 45 years with clinical diagnosis of ACL tear with or without meniscus. Tear were screened for inclusion in this study. Patient with bilateral knee ligament injury, multi ligamentous knee injury and revision cases were excluded. Informed consent was taken and details including Preoperative Lysholm knee score were recorded in patient proforma designed for this study. These cases were asked for Knee MRI to confirm ACL tear before surgery. Of them 75 patients underwent single bundle anatomical ACL reconstruction by medial portal technique, in which the ACL femoral tunnel is drilled through an accessory anteromedial (AAM) portal with the knee flexed to 120° or more. (Fig.1) Ipsilateral Quadruple hamstring autograft was used in 66 cases and bone patellar tendon autograft was used in 9 cases. (FIG.2) Femoral fixation was done by using endobutton in 63 cases, bioabsorbable screw in 8 cases and titanium screw in 4 cases; While tibial fixation was done by using bioabsorbable screw in 71 cases, titanium screw in 4 cases and 4mm partially threaded screw was used as post in 2 cases. Postoperatively all cases had physiotherapy (accelerated ACL rehabilitation) and regular follow up at 2, 6, 12, 18 and 24 weeks. At 6 month follow up Lysholm knee score was recorded for all cases. Functional outcomes was measured by comparing mean preop and postop Lysholm knee score among quadruple hamstring and Bone patellar tendon bone group. Final result were graded by Lysholm grading as Poor <65, Fair 65-83, Good 84-90, Excellent >90.

Results

The mean age of patient was 26.7 years (range 18-45 years). Of them 62 were male, 13 were female. 40 had right knee ACL tear and 35 had Left knee ACL tear. Mean duration of ACL injury was 24.3 ± 15.98 (range 5 -80 wks). Isolated ACL tear was found in 43 cases, 22 cases had associated medial meniscus tear 10 cases had lateral meniscus tear. On follow-up 4 cases had synovitis, 2 cases had superficial wound infection (cured with antibiotic).

In this study overall mean preop Lysholm score was 48.48 ± 6.50 (36-62) and 6 month postop Lysholm knee score was 91.58 ± 3.10 (85-95) with p value 0.0000 (FIG.3)

The mean preop Lysholm knee score for quadruple hamstring group was 47.7 and bone patellar tendon bone group was 54 while Mean postop Lysholm knee score for quadruple hamstring group was 91.5 while for bone patellar tendon bone group was 91.7. (FIG.4)

36 (48%) case had excellent result and 39 (52%) cases had good functional outcome as per Lysholm grading.

Discussion

The aim of Anterior Cruciate Ligament (ACL) reconstruction is the restoration of normal knee kinematics. Over decade, a renewed interest in the native anatomy of the ACL has facilitated the progression of reconstruction techniques from non-anatomic to more anatomic techniques.¹¹

There is a learning curve of the medial portal technique for ACL reconstruction. Surgeons making the transition from the transtibial to the medial portal technique may experience some unique issues and challenges (hyperflexion of knee compromises visualization; spatial disorientation of notch, short tunnel).¹²

In our study mean (Of both group) Preop and 6 month Postop Lysholm score was 48.48 ± 6.50 (36-62) and 91.58 ± 3.10 (85-95) with p value 0.0000, it could be seen that there was significant improvement in Lysholm knee score after ACL reconstruction in all patients.

In our study mean Preop and Postop Lysholm score for BPT and STG group were 54/47.7 and 91.7/91.5 respectively, which shows that both group were similar regarding preop Lysholm score and both showed nearly equal improvement in the 6 month postop Lysholm score. In similar study by de Souza Leao MG et al¹³ mean Preop and Postop Lysholm score for BPT and STG group were 60.5/56.5 and 90.5/92.5 respectively.¹⁴ Similarly Boonriong T et al¹⁴ found Lysholm score [median (range)] for BPT and STG-pre-operative 74 (37-95)/ 75 (43-90) -at follow-up 95 (74-100)/ 99 (75-100). In 2014, Papalia et al¹⁵ showed that there was no difference between two groups (BPT or STG) in any of the clinical scores or functional tests. Eriksson K et al⁹ also concluded that there are no significant differences in the clinical results and stability after ACL reconstruction, in relation to the type of graft or fixation

device chosen. Surgeons should select the “ideal” ACL reconstruction method according to the patient’s conditions and the surgeon’s experience.^{7, 10}

In our study 39(52%) cases rated good and 36(48%) cases were rated excellent functional outcomes after 6 month followup. In similar study by AL ZarahiniS¹⁶ 41 (82%) patients were rated good and excellent after an average follow up of 24 months. Jonathan M ¹⁷found 90% of patients scored good or excellent at 24 months of follow up. It shows that patient experiences significant improvement in there functional activity after ACL reconstruction form as early as 6 month of surgery.

Limitation of the present study are short postoperative follow up(6 months), unmatched study group with regards to use of graft type (most of the case were STG group) and use of only Lysholm score (subjective functional score) for assessment.



FIG.1. Medial portal technique for anatomical ACL reconstruction.

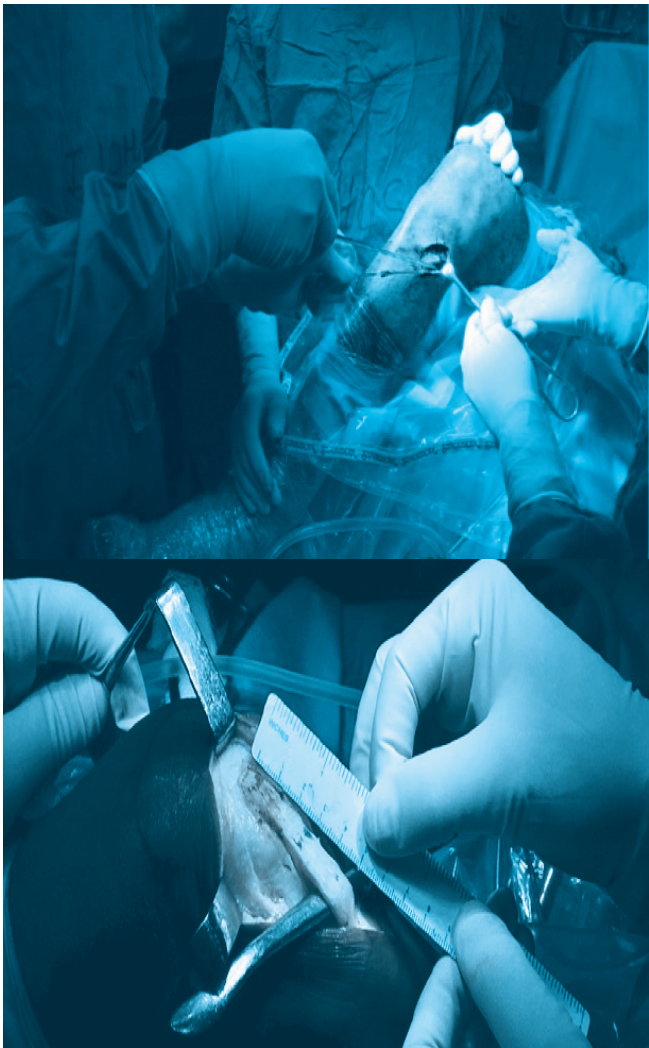


FIG.2. Harvesting Hamstring (STG) and Bone patellar tendon bone (BPT) graft

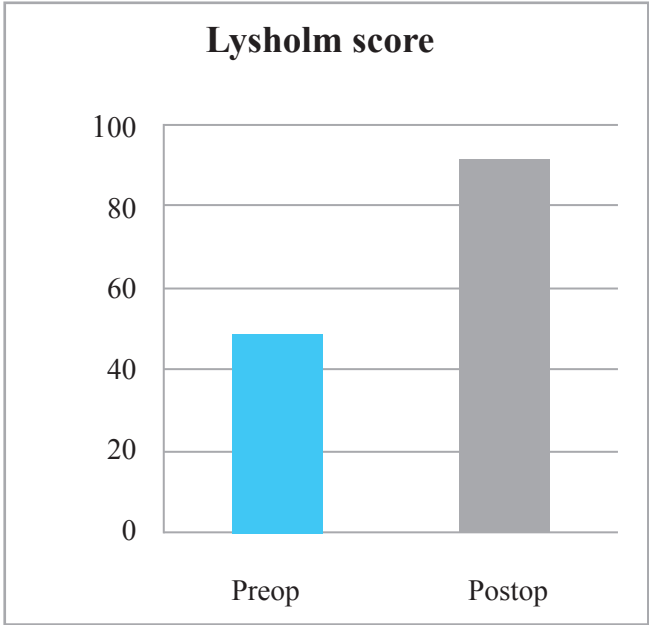


FIG. 3. Bar graph comparing overall Preop and Postop Lysholm knee score

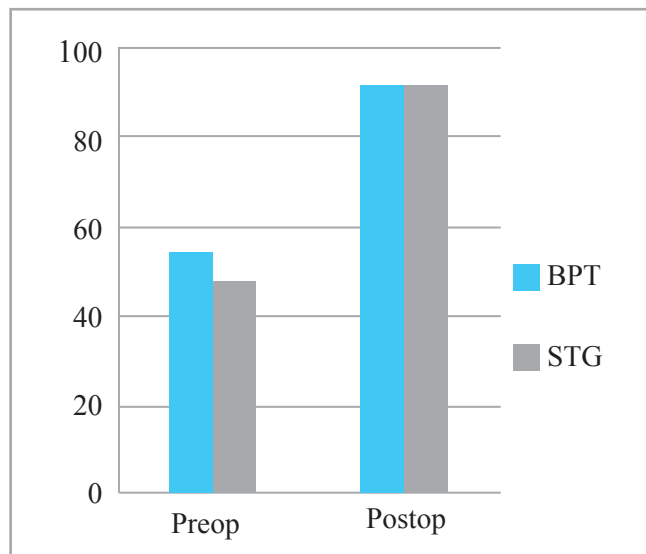


FIG. 4. Bar graph comparing Preop and Postop Lysholm knee score among quadruple hamstring graft and Bone patellar tendon bone graft group

Conclusion

The functional outcome (based on Lysholm score) at 6 month postop of single bundle anatomical ACL reconstruction was similar regardless of type of graft (BPT or STG). The surgeon's clinical, technical experience and patient factors determines the choice of graft.

Conflict of Interest: None declared

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