

A pre-operative anterolateral ligament injury of the knee leads to inferior outcomes after isolated acute ACL reconstruction with hamstrings graft: A prospective study with minimum five-year follow-up

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INTRODUCTION:

Clinical investigations have elucidated that combining an ALL reconstruction with anterior cruciate ligament (ACL) reconstruction in high-risk patients yields a diminished risk of failure and enhanced functional outcomes.

The primary objective of this prospective cohort study is to compare clinical and functional outcomes and the failure rate in patients undergoing isolated ACL reconstruction in acute cases, with or without concurrent anterolateral knee structure injuries documented in preoperative MRI, in a minimum follow-up period of five years. We hypothesize that patients with a preoperative ALL injury will have worse functional outcomes and a higher failure rate than patients without anterolateral injuries.

METHODS:

The study was approved by the ethics committee of our institution, and informed consent was obtained. Between 03/2015 and 01/2018, patients with an acute ACL injury with indication for surgical treatment were included in a prospective cohort. Patients with associated injuries requiring additional surgical procedures, such as osteotomy, peripheral ligament reconstruction, posterior cruciate ligament reconstruction or cartilage injury requiring treatment or in whom the ALL was not visualized on MRI were excluded from the study.

All patients with a clinical diagnosis of acute ACL injury underwent confirmatory MRI examination in the acute phase (less than three weeks after the injury) and were evaluated for injury of the ALL.

The ALL injury MRI examination criteria used included proximal or distal bone detachment, discontinuation of its fibers or irregular contour associated with periligamentous edema. The MRI examinations were evaluated by a musculoskeletal radiologist and by a knee surgeon and correlation tests were performed. Two evaluations were performed per evaluator with a minimum interval of 30 days. All patients underwent isolated intra-articular anatomic single-bundle ACL reconstruction with autologous hamstrings grafts.

Patients were divided into two groups according to the presence (ALL injury group) or absence (control group) of an anterolateral injury based on the initial MRI examination. The demographic data of the two groups was compared, and the following criteria were evaluated: physical examination before and after surgery, including the KT-1000 and pivot shift tests, failure rate, subjective IKDC and Lysholm scores and incidence of contralateral ACL injury. Risk factors such as the presence of associated meniscal injuries, intra-articular ACL graft size and the degree of knee hyperextension were evaluated. ACL reconstruction failure was considered when the patient presented KT-1000 greater than 5 mm or pivot-shift 2+ or 3+, or when the graft was torn on postoperative magnetic resonance imaging (MRI). The groups were compared with each other with a minimum of 5 years of follow-up and a comparison was also carried out within the same group of patients with a minimum of 2 and 5 years of follow-up.

Statistical analysis was performed using the Pearson's chi-square and Fischer's test for categorical variables and the Mann-Whitney test for continuous variables. Statistical significance was considered when the p-value was less than 0.05.

RESULTS:

A total of 156 patients were evaluated after a minimum 5-year follow-up of the study. This accounts for a loss of 26 patients (14%) in comparison to the minimum 2-year follow-up evaluation. The ALL injury Group comprised 91 patients, while the control group consisted of 65 patients. The overall rate of ALL injury was 58,3%.

The groups exhibited no significant differences in age, sex, duration of injury until surgical treatment, follow-up duration, intra-articular ACL graft diameter, knee hyperextension, preoperative pivot shift grade, and preoperative KT-1000 values. The prevalence of meniscal injury and type of treatment also did not display significant disparities between the groups.

Upon final evaluation, patients in the control group (no ALL injury) demonstrated superior postoperative outcomes in the Lysholm scale ($p < 0.0001$), albeit not in the IKDC functional scales ($p = 0.10$), after an average follow-up period of 70.9 \pm 6.9 months for the ALL injury group and 72.3 \pm 8.6 months for the control group ($p = 0.33$). Assessment by the KT-1000 revealed worse results for the ALL injury group (2.8 \pm 1.4 mm) compared to the control group (1.9 \pm 1.3 mm) ($p = 0.00018$). The pivot shift test did not reveal any difference between the two groups ($p = 0.77$). The rate of reconstruction failure in the entire cohort was 10.2% ($n = 16$), with 14.3% ($n = 13$) in the ALL injury group and 4.6% ($n = 3$) in the control group. This difference was statistically significant ($p = 0.049$).

Regarding the ALL group, the postoperative KT-1000 measurements (mm) increased from 2.4 ± 1.6 mm to 2.8 ± 1.4 mm when comparing the 2-year and 5-year minimum follow-up periods. No differences were observed in other variables examined. In the control group, there were no variations in postoperative clinical results when comparing evaluations with a minimum follow-up of 2 years and a minimum of 5 years for ACL reconstruction across all studied variables.

The interrater agreement for ALL injuries on MRI ranged from 0.71 to 0.82 (kappa test), and the agreement between the 2 reviews by the same evaluator ranged from 0.73 to 0.83.

DISCUSSION AND CONCLUSION:

Combined ACL and ALL injuries were associated with significantly less favorable outcomes than were isolated ACL injuries at a minimum follow-up of 5 years after isolated ACL reconstruction. Patients with concomitant ALL injury showed a higher failure rate and worse functional scores. Also, knee stability tends to slightly worsen from 2 to 5 years in cases of associated ALL injury.