

Revision Surgery in Anterior Cruciate Ligament Reconstruction - A Cohort Study of 17,682 Patients Using the Anatomic Anterior Cruciate Ligament Reconstruction Scoring Checklist Applied to the Swedish National Knee Ligament Register

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Summary:

Anatomic ACL reconstruction as a predictor for revision surgery

Abstract:

Background

Revision surgery is an important endpoint during follow-up after anterior cruciate ligament (ACL) reconstruction. The anatomic anterior cruciate ligament reconstruction scoring checklist (AARSC) is a tool to evaluate anatomic ACL reconstruction and surgical technique.

Purpose

To investigate the association between surgical variables and the risk of revision surgery after ACL reconstruction in The Swedish National Knee Ligament Register.

Study Design

Cohort study; Level of evidence, 3.

Methods

This cohort study was based on data from the Swedish National Knee Ligament Register during the period of January 1, 2005, through December 31, 2014. Patients who underwent primary single-bundle ACL reconstruction with hamstring tendon were included. Follow-up started with primary ACL reconstruction, and ended with ACL revision surgery or on December 31, 2014, whichever occurred first. Details on surgical technique were collected using an on-line questionnaire. All group comparisons were made in relation to an "anatomic" reference group, comprised of essential AARSC items, defined as utilization of accessory medial portal drilling, anatomic tunnel placement, visualization of insertion sites and pertinent landmarks. Study endpoint was revision surgery. Kaplan-Meier was used to assess graft survival. Results were expressed as hazard ratios (HR) with 95% confidence intervals (CI) and adjusted for confounding factors using Cox regression.

Results

A total of 108 surgeons (61.7%) replied to the questionnaire. A total of 17,682 patients were included (n = 10,013 males [56.6%] and 7669 females [43.4%]). The overall revision rate was 3.1%. The group using transtibial drilling and non-anatomic bone tunnel placement was associated with a lower risk of revision surgery (HR=0.694 [95% CI, 0.490-0.984]; P = 0.041) compared with the anatomic reference group. The anatomic reference group showed no difference in risk of revision surgery compared with the transtibial drilling groups with partial anatomic (HR 0.759 [95% CI, 0.548-1.051], P = 0.097) and anatomic tunnel placement (HR 0.944 [95% CI, 0.718-1.241], P = 0.679). The

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anatomic reference group showed a decreased risk of revision surgery compared with the transportal drilling group with anatomic placement (HR 1.310 [95% CI, 1.047-1.640]; $P = 0.018$).

Conclusion

Overall crude revision rate was low. Anatomic ACL surgery, characterized by the presence of essential AARSC items, was associated with a lower risk of revision surgery compared with anatomic bone tunnel placement via transportal drilling. Non-anatomic bone tunnel placement via transtibial drilling resulted in the lowest risk of revision surgery after ACL reconstruction. Potential confounders are in effect when only comparing femoral bone tunnel drilling methods.