Five-year Survival Analysis of ACL Graft and Contralateral ACL Ruptures from the OrthoSport Victoria Longitudinal ACL Outcomes Study

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INTRODUCTION:
Graft survivorship is a critical measure of surgical success after anterior cruciate ligament (ACL) reconstruction surgery. Contralateral ACL injury also represents a significant secondary complication. Reported rates of both graft rupture and contralateral ACL injury vary and have been shown to be dependent on factors such as patient age and sex. This study reports on both graft rupture and contralateral ACL injury rates from a large clinic cohort that were prospectively followed for a 5-year period.
METHODS: Between December 2013 and June 2018, 683 patients (692 knees) who were scheduled for primary ACL reconstruction surgery within one clinic were enrolled in a prospective longitudinal study. Patients were consecutively invited to participate and were evaluated at regular intervals following surgery with standard clinical measures and bespoke patient reported outcome surveys. At the 5-year post operative review, graft rupture and contralateral ACL rupture events were recorded and are the primary variable of interest for the current report. Survival rates were assessed using the Kaplan-Meier method. Log rank tests were used to compare survival functions between different patient groupings (i.e. sex, age, activity level, graft type).
RESULTS:
ACL graft rupture occurred in 78 knees (11.3%) and contralateral ACL rupture in 60 knees (8.7%) within 5 years after the reconstruction. The 5-year graft survivorship was significantly higher for females (92%) than males (86%, $p=0.02$). The survivorship of the contralateral ACL did not differ by sex (female 92% and male 90% survivorship). Patients under 20 years of age had significantly lower graft and contralateral ACL survival rates than patients aged 20 and above (graft survivorship 82% and 91%; contralateral ACL survivorship 83% and 94%, respectively, $p<0.001$). Patients with a higher level of activity (i.e. Marx Activity score ≥ 10) at 6 months post operatively also had significantly lower survival rates for the contralateral ACL (86% vs 92% survival) as did patients with a quadriceps tendon autograft (79% survival) compared to a hamstring autograft (92% survival, $p=0.001$). Further ACL injury to the graft or contralateral knee occurred in 33% of males and 30% of females aged under 20 years, whereas only 8% of females and 19% of males aged over 20 years had a further ACL graft or contralateral ACL injury.
DISCUSSION AND CONCLUSION:
The prevalence of graft rupture and contralateral ACL injury was similar over a 5-year period in this large prospective study cohort. Young age and male sex are related to both increased rates of graft rupture and contralateral ACL injury. An early return to activity and the use of a quadriceps tendon graft were related to increased rates of contralateral ACL injury but not ACL graft rupture. These findings extend our understanding of factors influencing ACL reconstruction outcomes and highlight the importance monitoring high-risk populations such as young patients with higher activity levels. The cohort will continue to be monitored to help assess whether these trends observed at 5 years continue.