The Risk of Knee Arthroplasty Following Cruciate Ligament Reconstruction: A Population-Based Matched Cohort Study

Timothy S. Leroux, MD, Toronto, Canada
Darrell J. Ogilvie-Harris, MD, Toronto, Canada
Tim Dwyer, MBBS, Toronto, Canada
Jaskarndip Chahal, MD, Toronto, Canada
Amir Khoshbin, MD, Toronto, Canada
Rajiv Gandhi, MD, Toronto, Canada
Nizar Mahomed, MD, Toronto, Canada
David Wasserstein, MD, MSc, North York, Canada

INTRODUCTION: Evidence regarding the risk of end-stage osteoarthritis (OA) following cruciate ligament reconstruction (CLR) is based upon small sample sizes and radiographic, rather than clinical criteria to diagnosis OA. The goals of this study were to: (1) determine the risk of knee arthroplasty (KA) - a surrogate for end-stage OA - following CLR, and (2) identify patient, provider and surgical factors that influence KA risk.

METHODS: Using administrative databases we identified all patients aged 16 to 60 years who underwent CLR in ON between July 1993 and March 2008. Patients were matched by demographic variables to five persons from the general population in ON, Canada. The main outcome was KA. Kaplan-Meier (KM) survival curves were generated for both cohorts. A Cox proportional hazards model determined those factors that influenced KA risk.

RESULTS: We identified 30,301 CLR patients, of which, 30,277 were matched to 151,362 individuals from the general population (median age 28 years; 65% male). Primary anterior CLR accounted for >98% of index cases. In follow up, 209 CLR patients (0.68/1000 person-years) and 125 control patients (0.10/1000 person-years) underwent KA. At 15 years, the cumulative incidence of KA among the case and control cohorts was 1.4% and 0.2%, respectively (p<0.001). Older age (50 years or older: HR 37.28, p<0.001), female sex (HR 1.58, p=0.001), high comorbidity score (HR 5.91, p<0.001), low surgeon volume of CLR (cases ≤12/year: HR 2.53, p<0.001) and CLR undertaken in university-affiliated hospitals (HR 1.51, p=0.008) increased KA risk, while male sex (HR 0.61, p<0.001) and young age (<20 years: HR 0.07, p=0.009) were protective. Concurrent meniscal repair or debridement had no effect.

CONCLUSIONS: After 15 years, the cumulative incidence of KA following CLR was extremely low (1.4%), however it was seven times greater than the cumulative incidence of KA among matched control patients from the general population (0.2%). Older age, female sex, higher co-morbidity, low surgeon
annual volume of CLR and CLR performed in a university-affiliated hospital were factors that increased KA risk.