

Age-Related Risk of Conversion to Total Knee Arthroplasty After Mobile-Bearing Unicompartmental Knee Arthroplasty: A Survival and Competing Risk Analysis

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INTRODUCTION: Mobile-bearing unicompartmental knee arthroplasty (UKA) is a well-established treatment for isolated compartment osteoarthritis. However, long-term outcomes may vary with patient age. This study evaluated the association between age and the risk of conversion to total knee arthroplasty (TKA), reoperation, and polyethylene exchange.

METHODS: A consecutive series of 486 patients who underwent mobile-bearing UKA between December 2006 and June 2024. Patients were divided into two cohorts: age ≤ 60 years ($n = 184$) and age > 60 years ($n = 302$). Mean follow-up duration was 9.6 years. Kaplan-Meier survival curves assessed survivorship free from conversion to TKA. Cumulative incidence functions were calculated using competing risk analysis with death as a competing event. Multivariate Cox proportional hazards regression was used to identify independent predictors of TKA conversion.

RESULTS: Kaplan-Meier analysis demonstrated significantly lower conversion free-survivorship in the younger group compared with the older group (log-rank $p = 0.016$). Competing risk analysis showed cumulative incidence of TKA conversion at 1, 5, 10, and 15 years was 0.5%, 5.5%, 10.1%, and 14.9% in the younger group, compared to 0%, 3.2%, 5.1%, and 6.0% in the older group, respectively ($p = 0.009$). The younger cohort also exhibited a higher incidence of reoperation ($p = 0.013$). Multivariate Cox analysis identified younger age (HR, 2.22; 95% CI, 1.08–4.57; $p = 0.030$) and longer operative time (HR, 1.01 per minute; $p = 0.017$) as independent predictors of conversion to TKA. Gender, body mass index, and smoking history were not significant predictors.

DISCUSSION AND CONCLUSION: Patients ≤ 60 years old undergoing mobile-bearing UKA have a higher risk of TKA conversion with a 1% risk of failure per year. Despite this higher revision rate seen in younger patients, mobile bearing UKA is a reasonable option for the majority of these patients. Appropriate patient selection and thorough preoperative counseling are essential for younger individuals considering UKA.