

Activity outcomes from past patients after total knee arthroplasty: regression tree analysis to generate insights for new patients

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Introduction

We aimed to develop a tool to provide patients considering a primary total knee arthroplasty (TKA) and clinicians with information about how previous patients “like them” performed regarding the most relevant activity outcomes over 5 years postoperatively.

Materials and Methods

Data from patients who underwent a TKA between 2012 and 2023 collected prospectively in an institutional arthroplasty registry were included. Five activity outcomes at 1 and 5 years were assessed prospectively: difficulty climbing stairs, rising from sitting, walking, and getting in/out of car from the WOMAC questionnaire, and activity level from UCLA. Patients’ clusters with homogeneous outcomes were generated at each time point postoperatively using conditional inference trees based on known predictors at baseline. Missing data were imputed using multiple imputation methods.

Results

2597 and 1532 TKAs were included at 1- and 5-years follow-up, respectively. 25 pre-specified baseline predictor candidates were tested. WOMAC function score, SF12 self-rated health (SRH) and mental component score were the most common predictors determining the activity outcome clusters. For difficulty climbing stairs (no difficulty at baseline, 1- and 5-years in 0.9%, 22.1% and 26.1% patients overall), clusters at 1 year were generated primarily based on SRH, WOMAC function score and climbing stairs.

Outcome profiles varied markedly by clusters. For UCLA (low activity at baseline, 1- and 5-years in 82.2%, 62.5% and 65.5% patients overall), 11 1-year clusters defined primarily by baseline UCLA, WOMAC function, education and ASA score were identified, with low activity ranging from 0% to 80.8%. At 5 years, there were 5 clusters determined by UCLA, age, number of comorbidities and education, with low activity ranging from 36.2% to 81.5%.

Discussion

Activity outcomes improved in most patients postoperatively. However, patient clusters with distinct activity outcomes were identified. This information can help new patients and their clinicians inform expectations and treatment decisions.