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

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Abstract (max 2500 characters, including spaces) 2052 characters

Introduction

This study aims to develop an information 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 pain outcomes over 5 years postoperatively.

Methods

Data from patients who underwent a TKA between January 2012 and December 2023 collected prospectively in an institutional arthroplasty registry were included. Four pain outcomes at 1- and 5-years follow-up were assessed prospectively: pain walking, climbing stairs, and night pain from WOMAC questionnaire, as well as neuropathic pain (NP) from DN4 questionnaire. Patients’ clusters with homogeneous outcomes were generated at each time point postoperatively using conditional inference trees (CITs) 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. 27 pre-specified baseline predictor candidates were tested. WOMAC and VAS pain scores, SF12 self-rated health (SRH) and mental component score were the most common predictors determining the pain outcome clusters. For pain walking (absent at baseline, 1- and 5-years in 1.4%, 52.1% and 54.2% patients overall), 1-year clusters were generated primarily based on SRH, WOMAC and VAS pain.

Outcome profiles varied markedly by clusters. For NP (present at baseline, 1- and 5-years in 20.2%, 11.2% and 8.5% patients overall), 4 1-year clusters defined by NP pre-surgery and age were identified, with NP percentages of 6.1%, 16.8%, 18.6% and 34.6%. At 5 years, these clusters presented NP percentages of 4.7%, 9.4%, 18.5% and 16.7%, respectively, with three of the four clusters showing a decrease in patients with NP.

Conclusion

Pain outcomes improved in most patients after surgery. However, clusters of patients with distinct outcomes were identified for the pain outcomes studied. This information can help new patients and their clinicians inform expectations and treatment decisions.