

Have People Like Me Experienced A Complication After Primary THA?: Insights From An Information Tool Based On Registry Data

Orthopaedics / Pelvis, Hip & Femur / Joint Replacement - Primary

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Background

A common concern amongst prospective total hip arthroplasty (THA) patients is whether, or when, the surgery will lead to complications and how long the prosthesis might function before a revision is needed. There is a need for patient-friendly tools to support shared decision making between patients and clinicians when considering an elective THA.

Objectives

To inform expectations of future patients considering elective THA about the likelihood of complications (prosthetic joint infection (PJI), dislocation, periprosthetic fracture) and all-cause revision based on registry data from previous patients “like them” over 20 years after index surgery.

Study Design & Methods

We surveyed patients’ and surgeons’ views about risks and benefits of THA. Based on their views about their most important concerns, we retrieved relevant data from an institutional arthroplasty registry about patients receiving a THA during 1996 to 2019. We excluded patients with large head metal-on-metal bearing or a bilateral operation on the same day.

Two sets of patient clusters were generated representing groups with homogenous risk of PJI, dislocation, fracture and all-cause revision at different time periods: one set at 1-year post index THA reporting distinct event risks within the first year, and a second set of clusters reporting distinct survival curves of all-cause revision over 20 years after index THA. A conditional Inference tree was used for clusters at 1 year, and a survival tree using classification and regression tree method for the longitudinal analysis. Regression models were estimated based on 14 pre-specified baseline predictor candidates. Missing data were imputed using Multivariate Imputation by Chained Equations.

Results

The risk of experiencing PJI, dislocation, fracture, or revision were confirmed to be an important concern for patients and surgeons. 6836 operations were included in the analysis. Clusters within the first year were generated for PJI based on BMI; those with BMI>40 had a risk of PJI =9.2% vs 0.6% for all others.

For dislocation they were generated based on comorbidity count and indication. For patients with >4

comorbidities and secondary osteoarthritis (OA; mainly aseptic necrosis), the risk of dislocation was 11.3%; with >4 comorbidities and primary OA 2.4%; and with ≤ 4 comorbidities it was 1.6%. For fracture they were based on sex and ASA score. For women with ASA ≥ 3 the risk of fracture was 6.3%, for women with ASA 1-2 it was 2.8%, and for men 1.1% independent of ASA. For all-cause revision, clusters were based on comorbidity count and indication. For patients with ≥ 4 comorbidities and secondary OA the risk of revision was 9.8%, with ≥ 4 comorbidities and primary OA it was 3.6%, and with <4 comorbidities it was 0.9%.

Patient clusters with homogenous incidence of all-cause revision over 20 years were generated based on comorbidity count and age. Survival tree analysis showed that patients <62.5 years at surgery had the highest cumulative incidence: 16.8% at 20 years. Patients ≥ 62.5 years with ≥ 4 comorbidities had a cumulative incidence of 7.1% at 20 years. The 'flattest' survival curve (20 year-cumulative incidence 4.9%) was seen in those ≥ 62.5 years with <4 comorbidities.

Conclusions

Better risk prediction of complications and revision is of great importance to patients and surgeons. The tool we developed can provide them with valuable cluster-specific, short- and long-term incidences, which vary significantly between patients with different baseline characteristics.