Primary knee arthroplasty for osteoarthritis restores patients’ health-related quality of life to normal population levels: a propensity score matched study

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INTRODUCTION:

Knee osteoarthritis is a leading cause of disability and is estimated to have a global prevalence of 22.9% (654.1 million) in people aged over 40 years. Primary knee arthroplasty (KA) for end-stage osteoarthritis (OA) is a common procedure which successfully relieves pain and enhances function in the majority of patients. The impact that a treatment has on health-related quality of life (HRQoL) is an increasingly important aspect when determining its value to patients and to the health care system. The majority of studies investigating HRQoL following KA are primarily interested in the 'within-patient' change. However, it is less clear as to how HRQoL differs between KA patients and their peers in the General Population. Consequently, there is limited context for the associated improvement seen in HRQoL following primary KA. The aim of this study is to investigate whether primary knee arthroplasty restores health-related quality of life to levels expected in the general population.

METHODS:

This retrospective case-control study compared HRQoL data from two sources: patients undergoing primary knee arthroplasty from the Edinburgh Orthopaedic Research Database (2013-2019); and the Health Survey for England (HSE) (2010-2012). The Health Survey for England (HSE) is a national survey performed every year to monitor trends in the health of adults and children. The survey is used to estimate the number of people affected with specific health conditions, observe prevalence of associated risk factors, and monitor health related behaviours. Patient level data from the HSE was used to represent the General Population.

Propensity score matching was used to balance covariates and facilitate group comparisons. A propensity score was estimated using logistic regression based upon the covariates sex, age, and body mass index (BMI). Two matched cohorts with 3029 patients each were obtained for the adjusted analyses (median age 70.3 interquartile range (IQR) 64-77; Female sex 3233 (53.4%); median BMI 29.7 IQR 26.5-33.7). HRQoL was measured using the three-level version of the EuroQol 5-Dimensions (EQ-5D-3L) and summarised using the Index and EQ-VAS scores. The primary outcome of interest was the difference in HRQoL (as measured by the EQ-5D-3L Index Score) between the KA cohort and the control group.
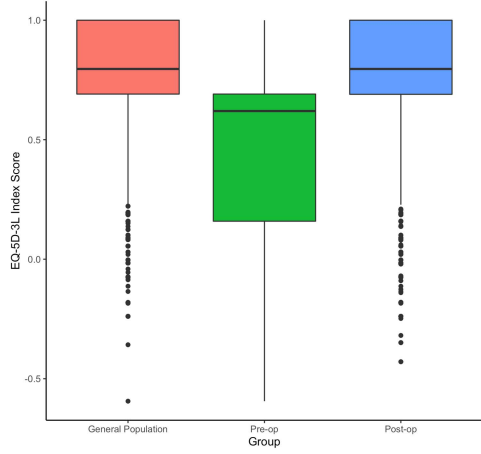
RESULTS:

Following balancing of covariates, patients awaiting KA had significantly lower EQ-5D-3L Index scores than the General Population (median 0.620 (IQR 0.16-0.69) vs median 0.796 (IQR 0.69-1.00), p<0.001). The General Population reported significantly lower levels of problems in every domain measured by the EQ-5D-3L.

By one-year post-operation, the median EQ-5D-3L Index score improved significantly in the KA cohort (mean change 0.32 (Standard deviation 0.33), p<0.001), and demonstrated no significant differences when compared to the General Population (0.796 (IQR 0.69-1.00) vs 0.796 (0.69-1.00), p=1.0) (Figure 1). Sub-group comparisons demonstrated that older age-groups had statistically better Index scores than matched peers in the General Population (Figure 2). Compared to the General Population cohort, the post-operative EQ-VAS was significantly higher in the KA cohort (p<0.001).

DISCUSSION AND CONCLUSION:

This study provides important context for both the significant impact of knee osteoarthritis and the positive outcomes of primary knee arthroplasty. Patients with end-stage knee osteoarthritis awaiting KA have significantly poorer HRQoL than their peers in the general population. However, within one year of surgery, primary KA restores HRQoL to levels comparable with the age, sex, and BMI-matched general population.