Description of Surgical Treatment Methods for Periprosthetic Joint Infection following Total Hip Arthroplasty for Osteoarthritis: A Population Based Cohort Study

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INTRODUCTION:
Periprosthetic joint infection (PPJI) is a serious and devastating complication following total hip arthroplasty (THA), and the optimal management of PPJI remains under debate. We sought to examine surgical treatment patterns and outcomes for PPJI following THA for osteoarthritis from 2012 to 2019 in Ontario, Canada.
METHODS:
We used administrative databases to identify all patients who underwent THA for osteoarthritis from 2012 to 2019 in Ontario, Canada using procedural and diagnosis codes. We used the Canadian Joint Replacement Registry to identify patients who underwent revision surgery for PPJI, and categorized them based on type of revision surgery: a) Head and liner exchange (HL); b) 1 stage revision (1S); and c) 2 stage revision (2S). We further identified any repeat revision surgeries up to two years. We used Chi-square and Fisher exact tests to compare the unadjusted differences in patient demographics and outcomes between groups, and multivariable logistic regression to identify variables independently associated with revision surgery.
RESULTS:
We identified 67,267 patients who underwent THA between 2012 and 2019. Of these, 312 (0.5%) underwent revision surgery for PPJI, 126 (40.4%) in the HL group, 70 (22.4%) in the 1S group, and 116 (37.1%) in the 2S group. The proportion of patients in the 1S group increased from 22% in 2012 to 2014 to 35.5% in 2018 to 2019, the proportion of patients in the 2S group decreased from 40.7% in 2012 to 2014 to 20.8% in 2018 to 2020, and the proportion of patients in the HL group increased from 37.4% in 2012 to 2014 to 43.8% in 2018 to 2019.

Variables independently associated with undergoing any type of revision surgery for PPJI included a higher CCI (Odds ratio 1.75, 1.12 to 2.72), a higher deprivation index (1.57, 1.05-2.37), and a longer wait time for their initial THA (1.01, 1.00-1.02).

Patients in the HL group were more likely to be older, have a higher Charlson Comorbidity Index (CC), live further away from a hospital, and live in an area experiencing more material deprivation.

Of the 312 patients who underwent revision for PPJI, 61 (19.6%) underwent a repeat revision within 2 years. The proportion of second revisions was non-significantly higher in the 2S group (26, 22.4%) compared to the 1S (14, 20.0%), and HL (21, 16.7%) groups. The majority of repeat revisions were performed due to infection in all groups (HL: 76.2%, 1S: 57.1%; 2S: 84.6%), followed by aseptic loosening (HL: 9.5%; 1S: 21.4%; 2S: 15.4%).
DISCUSSION AND CONCLUSION:
While the proportion of patients undergoing 1 stage revisions for PPJI has increased in Ontario, Canada from 2012 to 2019, the risk of repeat revision surgeries remains high across all surgical management options for PPJI. These data suggest that patients with a higher CCI, with a higher deprivation index, or longer initial wait time (from referral to surgery) for initial THA may be at an increased risk of PPJI following THA for osteoarthritis. Prospective clinical studies are required to further examine the outcomes of revision surgery for PPJI.