Treatment Approaches for Managing Infection Following Total Knee Arthroplasty: A Population Based Cohort Study

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INTRODUCTION:
While total knee arthroplasty (TKA) is generally a successful procedure for patients experiencing end-stage knee osteoarthritis, prosthetic infection (PI) following TKA remains a substantial concern for both patients and the healthcare system. Treatment options include irrigation and debridement with tibial insert exchange, 1-, or 2-stage revision TKA, and can vary by region. We sought to examine approaches to managing PI following TKA in Ontario, Canada from 2012 to 2019.

METHODS:
We identified all patients who underwent TKA for osteoarthritis from 2012 to 2019 using administrative databases in Ontario, Canada. Using a combination of procedural and diagnosis codes, as well as the Canadian Joint Replacement Registry, we identified patients who underwent surgical treatment for PI following the initial TKA. We grouped patients based on type of revision: i) irrigation and debridement with tibial insert (TI) exchange only ii) 1 stage (1S) revision and iii) 2 stage (2S) revision and identified repeat revision surgeries within 2 years. We used Chi-Square and Fisher Exact tests to examine unadjusted differences in patient characteristics and outcomes between groups, and multivariable logistic regression to identify predictors of revision and repeat revision surgery.

RESULTS:
Between 2012 and 2019, 98,384 patients received TKA for osteoarthritis in Ontario, Canada, 660 (0.7%) of whom underwent a revision for PI. Revisions were primarily 2S revisions (n=269, 40.8%), followed by TI exchange (n=255, 38.6%), and 1S revisions (n=136, 20.6%). We observed a decrease in 2S revisions from 43.6% in 2012-2014 to 25.0% in 2018-2020, while both TI exchange and 1S revisions increased in use from 2012-2014 (TI: 40.0%; 1S: 17.4%) to 2018-2019 (TI: 46.8%; 1S: 28.2%).

Risk factors for undergoing any revision for PI included age 18-49 (vs. 50-59, odds ratio [OR] 1.57, 1.31-1.88), a Charlson Comorbidity Index ≥2 (vs. 0-1, OR 2.03, 1.56-2.63)), and male sex (OR 1.57 [1.34-1.84]).

A total of 124 (18%) of those who experienced a revision for PI underwent a repeat revision within 2 years. The proportion of repeat revisions was significantly higher in the 1S group (n=38, 27.9%) vs. the TI (n=49, 19.2%), and 2S (n=37, 13.7%) groups. These repeat revisions were completed primarily for infection in each group (TI: 70.3%; 1S: 50.0%; 2S: 77.3%), followed by instability (TI: 13.5%; 1S: 18.4%; 2S: 15.9%), and pain (TI: 2.7%; 1S: 18.4%; 2S: 2.3%).

DISCUSSION AND CONCLUSION:
These data show a relatively low risk of revision for PI following TKA for osteoarthritis in Ontario, Canada. However, patients who do undergo surgical treatment for PI show an 18% risk of repeat revision, which is typically completed for persistent infection. Further prospective clinical work is required to improve outcomes of patients who experience PI following TKA for osteoarthritis.