

Periprosthetic Joint Infection Case Volume is a Risk Factor for Mortality And Adverse Outcomes Following Revision Arthroplasty for Periprosthetic Joint Infection

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INTRODUCTION: The relationship between surgeon case volume and postoperative morbidity following revision arthroplasty for periprosthetic joint infection (PJI) has yet to be defined. As such, we sought to compare 90-day postoperative mortality and adverse outcomes between patients undergoing stage one antibiotic spacer placement for PJI of the hip or knee by low volume compared to high volume surgeons.

METHODS:

The Premier Healthcare Database was queried from 2015 to 2021 for adult patients undergoing stage one antibiotic spacer placement for PJI. Using International Classification of Disease, Tenth Revision and Current Procedural Terminology codes, as well as hospital charges for antibiotics, patients undergoing stage one exchange arthroplasty for PJI were identified. Restricted cubic splines were used to characterize the relationship between annual surgeon case volumes and mortality risk; these were used to identify a threshold volume where the risk of postoperative mortality significantly increases. Patients were divided by those operated on by high versus low volume surgeons defined by this threshold. The primary outcomes were odds of 90-day mortality and readmissions. Multivariable logistic regressions were conducted to address possible confounding demographic, comorbidity, and hospital characteristics. A secondary illustrative analysis on mortality rates was conducted for surgeons performing 8-15 and >15 stage one exchange arthroplasties.

RESULTS: In a cohort of 40,346 PJIs, the odds of postoperative mortality was significantly increased in patients who were operated on by surgeons performing <8 first stage spacers annually. Mortality within 90 days of surgery was higher in the low volume cohort (1.58% vs. 0.50%, $P<0.001$), even when accounting for potential confounding factors (adjusted odds ratio (aOR)=2.00; 95% CI=1.41-2.85, $P<0.001$). Readmission rates were higher in the low volume cohort (35.78% vs. 32.55%, $P<0.001$), however not statistically significant after multivariable analysis (aOR=1.01; 95% CI=0.95-1.07, $P=0.685$). The 8-15 cohort also had significantly lower mortality rates than the low volume cohort (0.45% vs. 1.58%, $P<0.001$; aOR=2.21; 95% CI=1.43-3.39, $P<0.001$), however with similar rates to the >15 cohort (0.45% vs. 0.60%, $P=0.391$; aOR=0.56; 95% CI=0.34-1.12, $P=0.457$).

DISCUSSION AND CONCLUSION: Patients treated by a surgeon performing <8 stage one spacers annually had twice the risk of mortality compared to higher volume PJI surgeons. Surgeons and policy-makers should consider incentive structures that facilitate PJI management by higher volume PJI surgeons at tertiary referral centers.

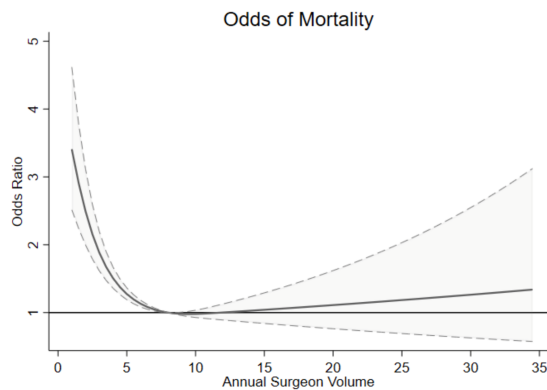


Figure 1. Restricted cubic spline depicting the odds of 90-day mortality after stage one antibiotic spacer placement for periprosthetic joint infection across annual surgeon volume. 95% confidence intervals are depicted in gray.