Operating Room Size Does Not Affect Periprosthetic Joint Infection Risk for Primary Hip and Knee Arthroplasty

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INTRODUCTION: Periprosthetic joint infection (PJI) is a devastating postoperative complication after total hip (THA) or knee (TKA) arthroplasty. Previous studies have suggested that operating room (OR) size may be an important risk factor, which would have critical implications from an administrative and policy standpoint. Thus, we sought to determine whether OR size was associated with the development of PJI at a single, high-volume institution.

METHODS: We retrospectively identified 25,746 primary THAs (N=12,728, 49.4%) and TKAs (N=13,018, 50.6%) from a single center over a five-year period. ORs were stratified into three groups based on size: 400-499 square feet (ft^2) was defined as small, 500-599 ft^2 was medium, and 600-700 ft^2 was large. Laminar flow was present in all rooms. The primary outcome was the development of PJI within 90 days of surgery. The rate of PJI by OR size was compared via univariate analysis using a Chi-Square test. Multivariable logistic regression was performed to investigate the association between OR size and PJI while controlling for confounding variables.

RESULTS: Of the 25,746 procedures included in the study, 13,389 (52%) were performed in small ORs, 11,467 (45%) in medium ORs, and 890 (3%) in large ORs. There were 12,964 TKAs (51%) and 12,675 THAs (49%) analyzed. The incidence of PJI after procedures performed in small ORs was 50/13,389 (0.37%), compared to 52/11,467 (0.45%) in medium ORs and 5/890 (0.56%) in large ORs (p=0.489). On multivariable logistic regression, OR size was not associated with the development of PJI (odds ratio for small vs. large ORs=0.64 [95% CI 0.3–1.6]; odds ratio for medium vs. large ORs=0.81 [95% CI 0.3–2.1). There was also no association between OR size and PJI when analyzing TKA and THA separately (p>0.05 for both).

DISCUSSION AND CONCLUSION: Operating room size was not associated with the development of PJI after TKA or THA at single, high-volume institution. Given the devastating consequences of this complication, future studies should seek to identify other modifiable risk factors to mitigate its incidence.

Table I. Results of the multivariable logistic regression evaluating factors associated with the development of PJI within 90 days of surgery.

Variable	Odds Ratio	95% CI	P-Value
Hip vs Knee	0.96	0.63 – 1.45	0.828
Age	0.99	0.98 – 1.01	0.555
BMI	1.01	0.98 – 1.05	0.409
ASA 3-4	1.55	0.96 – 2.49	0.071
Medium vs Large OR	0.81	0.32 – 2.06	0.664
Small vs Large OR	0.64	0.25 – 1.62	0.343
Order of Case by Surgeon 1 vs 5	1.35	0.44 – 4.14	0.604
Order of Case by Surgeon 2 vs 5	1.37	0.53 – 3.53	0.513
Order of Case by Surgeon 3 vs 5	1.01	0.47 – 2.15	0.991
Order of Case by Surgeon 4 vs 5	1.77	0.84 – 3.74	0.135
Order of Case by Room 1 vs 4	0.54	0.18 – 1.65	0.278
Order of Case by Room 2 vs 4	0.66	0.28 – 1.53	0.328
Order of Case by Room 3 vs 4	0.78	0.38 – 1.58	0.484
Ambulatory Surgery	0.69	0.28 – 1.72	0.425
Robotic Assistance	0.88	0.46 – 1.68	0.704
Computer Navigation	0.73	0.47 – 1.14	0.163

CI = Confidence Interval
BMI = Body Mass Index
ASA = American Society of Anesthesiologists Class