

## Are patients who are Candidates for Extended Oral Antibiotic Prophylaxis at Higher Risk for PJI after Aseptic Revision TJA?

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**INTRODUCTION:** Prosthetic joint infection (PJI) is a devastating and costly complication of total joint arthroplasty (TJA). Use of extended oral antibiotic prophylaxis (EOAP) has become increasingly popular in the United States following a highly publicized study from a single center demonstrating a significant protective effect against PJI in primary TJA patients. While there are potential benefits for EOAP, the practice directly contradicts antibiotic stewardship efforts, therefore targeted administration of EOAP to high-risk patients only is necessary. The criteria for EOAP included 32 preoperative comorbidities assigned to 6 groups, which designated patients as high risk. To date, these comorbidities have not been studied in revision arthroplasty patients, a cohort of patients with an even higher incidence of PJI. We aimed to determine if these comorbidities that derive EOAP-eligibility increased risk of PJI and readmission following aseptic revision total hip arthroplasty (rTHA) and total knee arthroplasty (rTKA).

**METHODS:** 2,256 aseptic revision TJAs, including 1135 rTHAs (50%) and 1121 (50%) rTKAs were conducted at a single high-volume institution between January 1, 2016 to April 1, 2022 were reviewed. 32 comorbidities conferring EOAP-eligibility including autoimmune diseases, active smoking, body mass index (BMI)>35, diabetes mellitus, chronic kidney disease (CKD), and ‘other’ categories were recorded. Reoperation for PJI at 90-days and 1-year was recorded. Chi-squared or Fischer’s exact tests were calculated to determine the association between presence/absence of IBC and PJI. Multivariable logistic regressions were conducted to determine if specific IBC conferred an increased PJI risk.

**RESULTS:** Half (N=564) of rTHA patients had at least one comorbidity that made them EOAP-eligible. EOAP-eligible patients were more likely to be female, have an increased ASA score, and higher BMI. However, EOAP-eligible rTHA patients did not have a higher risk of PJI or readmission. In multivariate analysis controlling for demographics and other comorbidities, only active smoking, BMI>35, and CKD were significant predictors of PJI after rTHA at 90-days, with BMI>35 and CKD significant at 1-year, (p<0.05; Table 1). Among rTKA patients, 59% (N=659) were EOAP-eligible and this status increased PJI risk at 1 year by 2-fold (p=0.024). Multivariate analysis found that only BMI>35 and diabetes mellitus were predictive of 90-day PJI after rTKA, and diabetes at 1-year (p<0.05). Having >1 EOAP-related comorbidity increased rTHA and rTJA PJI risk (p<0.05; Table 1).

**DISCUSSION:** Although over half of EOAP rTJA patients had comorbidities that made them eligible for EOAP, only select EOAP-related comorbidities were associated with increased PJI risk. In rTHA patients, the rate of PJI in EOAP-eligible patients was as no greater than in patients with no EOAP comorbidities. However, specific comorbidities of active smoking, BMI>35, and chronic kidney disease were associated with increased PJI risk after rTHA. While EOAP-eligible rTKA patients has a higher rate of PJI than non-eligible patients, when considering subsets of comorbidities, only diabetes and mellitus and BMI>35 remained significantly predictive of PJI. Due to the retrospective nature of the study, there are inherent limitations including selection bias for patients undergoing aseptic revision TJA and surgeon preference for perioperative protocols.

**SIGNIFICANCE:** In conclusion, the results from our large retrospective analysis suggest that EOAP administration may be appropriate for a narrower range of patients undergoing rTJA than previous studies in primary TJA might suggest. To better align with CDC recommendations for antibiotic use, prospective studies should target EOAP to rTJA patients with a more limited range of comorbidities.

Table 1: Multivariate analysis for association between specific comorbidities and occurrence of prosthetic joint infection (PJI).

Odds of reoperation for PJI	Revision Total Hip Arthroplasty			Revision Total Knee Arthroplasty		
	Odds Ratio	95% CI	p-value	Odds Ratio	95% CI	p-value
<b>Odds at 90 days</b>						
BMI > 35	<b>3.1</b>	<b>[1.2-8.3]</b>	<b>0.024</b>	<b>2.4</b>	<b>[1.0-5.6]</b>	<b>0.046</b>
Diabetes mellitus	1.2	[0.3-4.2]	0.808	<b>3.1</b>	<b>[1.3-7.6]</b>	<b>0.013</b>
Chronic kidney disease	<b>4.0</b>	<b>[1.3-12.7]</b>	<b>0.017</b>	1.4	[0.3-6.3]	0.685
Active smoker	<b>3.7</b>	<b>[1.0-13.4]</b>	<b>0.049</b>	1.9	[0.4-8.6]	0.390
Autoimmune disease	0.9	[0.3-2.4]	0.825	1.3	[0.5-3.1]	0.575
Other	1.2	[0.3-5.6]	0.802	0.7	[0.1-5.1]	0.683
<b>Odds at 1 year</b>						
BMI > 35	<b>2.8</b>	<b>[1.1-6.8]</b>	<b>0.025</b>	1.9	[0.9-4.0]	0.087
Diabetes mellitus	1.3	[0.4-3.8]	0.683	<b>2.5</b>	<b>[1.2-5.6]</b>	<b>0.020</b>
Chronic kidney disease	<b>4.0</b>	<b>[1.4-11.1]</b>	<b>0.008</b>	2.4	[0.8-7.5]	0.132
Active smoker	2.7	[0.8-9.6]	0.126	3.0	[1.0-9.0]	0.053
Autoimmune disease	0.9	[0.4-2.2]	0.853	1.3	[0.6-2.7]	0.545
Other	1.5	[0.4-5.4]	0.520	0.4	[0.1-3.2]	0.396

BMI = body mass index, PJI = prosthetic joint infection

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