

Chronic Kidney Disease Severity and Renal Transplant Status and the Risk of Periprosthetic Joint Infection Following Total Hip and Total Knee Arthroplasty

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INTRODUCTION: Patients with chronic kidney disease (CKD) are at increased risk of periprosthetic joint infection (PJI) following total joint arthroplasty (TJA). However, there is debate about the risk of PJI among patients who are status post renal transplant (RT). This study assessed the risk of periprosthetic joint infection (PJI) among patients with CKD and RT recipients undergoing TJA.

METHODS: The Premier Healthcare Database was used to identify elective TJA patients from 2016 to 2023 with a history of CKD or RT. Preoperative creatinine values were utilized to classify patients by CKD stage. Multivariable regression was used to account for potential confounding factors. Variables found to be mediated by chronic kidney disease, including hypertension, diabetes, iron deficiency anemia, peripheral vascular disease, fluid imbalance, chronic heart failure, and history of ischemic cardiac and neurological processes were excluded from adjustment to avoid controlling for disease effects.

RESULTS: In total, 86,260 patients were identified, of which 32,371 (37.5%) had CKD 1, 39,470 (45.8%) CKD 2, 11,617 (13.5%) CKD 3, 559 (0.6%) CKD 4, 194 (0.2%) CKD 5, and 2,049 (2.4%) with history of RT. The risk of PJI was elevated in the CKD 4, 5, and the RT cohorts with rates of 1.25%, 2.06%, and 1.07% respectively ($p < 0.001$). After accounting for confounding factors, an increased risk for PJI was observed among CKD 4 (aOR: 2.53, 95% CI: 1.17-5.46, $p = 0.018$) and CKD 5 (aOR 2.87, 95% CI: 1.04-7.93, $p = 0.042$) patients compared to RT patients (aOR: 1.56, 95%-CI: 0.99-2.46, $p = 0.056$).

DISCUSSION AND CONCLUSION: Patients with severe chronic kidney disease are at increased risk of PJI following TJA. However, patients who have received a kidney transplant may be at decreased risk compared to patients with severe CKD. These findings may help surgeons counsel patients about the optimal timing of TJA with respect to renal transplant.

	Periprosthetic Joint Infection			Multivariable Analysis			
	Number	Percent	P Value	aOR	95% CI		p value
CKD Stage 1 (n=32,371)	192	0.59%	<0.001	-	-	-	-
CKD Stage 2 (n=39,470)	206	0.52%		1.01	0.82	1.24	0.932
CKD Stage 3 (n=11,617)	82	0.71%		1.46	1.10	1.93	0.008
CKD Stage 4 (n=559)	7	1.25%		2.53	1.17	5.46	0.018
CKD Stage 5 (n=194)	4	2.06%		2.87	1.04	7.93	0.042
Renal Transplant (n=2,049)	22	1.07%		1.56	0.99	2.46	0.053

Table 1: Risk for periprosthetic joint infection (PJI) following total joint arthroplasty (TJA) for patients with chronic kidney disease and a history of renal transplant.