

Inflammatory Bowel Disease and Periprosthetic Joint Infection Following Total Joint Arthroplasty: Crohn's Disease and Ulcerative Colitis Associated with Varying Risk

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INTRODUCTION:

It is unclear if patients with inflammatory bowel disease (IBD) are at increased risk of periprosthetic joint infection (PJI) after total joint arthroplasty (TJA) as the current literature is inconclusive. This study sought to clarify the relationship between IBD and PJI risk following TJA.

METHODS: The Premier Healthcare Database was used to identify patients who underwent primary, elective TJA between 2016 and 2023 using International Classification of Disease, Tenth Revision and Current Procedural Terminology codes. Patients with a history of Crohn's disease (CD) or ulcerative colitis (UC) were identified. Propensity scoring was used to create 7:1 matched control cohorts for the UC, CD, and aggregate IBD cohorts based on age and sex. Standardized mean differences (SMDs) were evaluated and comorbidities were iteratively added to the matching algorithms until SMDs were balanced (<10%). Odds of 90-day PJI were assessed with multivariable regression.

RESULTS: In total, 10,029 patients with a history of IBD were identified, of which 5,474 had CD and 4,555 had UC. These cohorts were matched to 38,230 and 31,865 controls, respectively. The combined IBD cohort had a similar incidence of PJI as the control cohort (0.71% vs. 0.61%, p=0.245). However, PJI incidence was significantly higher in the CD cohort compared to matched controls (0.86% vs. 0.62%, p=0.043). In contrast, the UC cohort had a similar rate of PJI compared to controls (0.53% vs. 0.64%, p=0.365). After accounting for confounding factors, Crohn's disease was associated with an increased risk of PJI (adjusted odds ratio [aOR]: 1.38; 95% confidence interval 1.01-1.89; p=0.046) whereas no differences were observed in the UC or combined IBD groups.

DISCUSSION AND CONCLUSION: While patients with Crohn's disease were at increased risk of PJI, patients with ulcerative colitis were not. This finding may explain discrepancies in the literature on IBD as a risk factor for PJI.

90-Day Postoperative Outcomes	(+ IBD (n = 10,029))		(- IBD (n = 70,203))		Univariate Regression			Multivariable Regression		
	N	%	N	%	OR	95%-CI	P-value	aOR	95%-CI	P-value
	Periprosthetic Joint Infection	71	0.71%	428	0.61%	1.16	0.90 - 1.49	0.245	1.20	0.93 - 1.55
Acute Renal Failure	286	2.85%	1,564	2.23%	1.29	1.13 - 1.46	<0.001	1.27	1.12 - 1.45	<0.001
Pneumonia	68	0.68%	399	0.57%	1.19	0.92 - 1.54	0.180	1.19	0.92 - 1.54	0.185
Acute Respiratory Failure	132	1.31%	763	1.09%	1.21	1.01 - 1.46	0.042	1.22	1.01 - 1.47	0.036
Urinary Tract Infection	173	1.72%	1,142	1.63%	1.06	0.90 - 1.25	0.477	1.09	0.92 - 1.28	0.322
Any Postoperative Infection	59	0.59%	318	0.45%	1.30	0.98 - 1.72	0.066	1.32	1.01 - 1.74	0.054
Sepsis	63	0.63%	334	0.48%	1.32	1.01 - 1.73	0.043	1.32	1.01 - 1.73	0.044
Wound Dehiscence	68	0.68%	427	0.61%	1.11	0.86 - 1.44	0.409	1.13	0.88 - 1.47	0.338
Seroma	9	0.09%	47	0.07%	1.34	0.66 - 2.73	0.422	1.32	0.64 - 2.69	0.451
Hospital Readmission	386	3.84%	2,166	3.09%	1.26	1.12 - 1.40	<0.001	1.26	1.13 - 1.41	<0.001
Mortality	9	0.09%	69	0.10%	0.91	0.46 - 1.83	0.795	0.92	0.46 - 1.85	0.818

90-Day Postoperative Outcomes	(+ CD (n = 5,474))		(- CD (n = 38,230))		Univariate Regression			Multivariable Regression		
	N	%	N	%	OR	95%-CI	P-value	aOR	95%-CI	P-value
	Periprosthetic Joint Infection	47	0.86%	238	0.62%	1.38	1.01 - 1.89	0.043	1.38	1.01 - 1.89
Acute Renal Failure	163	2.98%	860	2.25%	1.33	1.13 - 1.58	0.001	1.32	1.11 - 1.57	0.002
Pneumonia	44	0.80%	218	0.57%	1.41	1.02 - 1.96	0.037	1.38	0.99 - 1.91	0.054
Acute Respiratory Failure	73	1.33%	445	1.16%	1.15	0.89 - 1.47	0.279	1.11	0.86 - 1.43	0.408
Urinary Tract Infection	100	1.83%	596	1.56%	1.17	0.95 - 1.45	0.139	1.17	0.95 - 1.46	0.142
Any Postoperative Infection	38	0.69%	178	0.47%	1.49	1.05 - 2.12	0.025	1.48	1.04 - 2.10	0.031
Sepsis	37	0.68%	172	0.45%	1.51	1.05 - 2.15	0.024	1.48	1.01 - 2.11	0.033
Wound Dehiscence	36	0.66%	254	0.66%	0.99	0.70 - 1.40	0.954	0.99	0.69 - 1.40	0.943
Seroma	7	0.13%	28	0.07%	1.75	0.76 - 4.00	0.187	1.78	0.78 - 4.09	0.173
Hospital Readmission	209	3.82%	1,192	3.12%	1.23	1.06 - 1.43	0.006	1.22	1.01 - 1.41	0.011
Mortality	6	0.11%	36	0.09%	1.16	0.69 - 2.76	0.730	1.09	0.63 - 2.63	0.849

90-Day Postoperative Outcomes	(+ UC (n = 4,555))		(- UC (n = 31,865))		Univariate Regression			Multivariable Regression		
	N	%	N	%	OR	95%-CI	P-value	aOR	95%-CI	P-value
	Periprosthetic Joint Infection	24	0.53%	204	0.64%	0.82	0.54 - 1.26	0.365	0.84	0.55 - 1.29
Acute Renal Failure	122	2.68%	797	2.50%	1.07	0.88 - 1.30	0.476	1.07	0.88 - 1.30	0.481
Pneumonia	24	0.53%	173	0.54%	0.97	0.63 - 1.49	0.890	0.95	0.62 - 1.47	0.833
Acute Respiratory Failure	59	1.30%	339	1.06%	1.22	0.92 - 1.61	0.161	1.23	0.93 - 1.62	0.155
Urinary Tract Infection	73	1.60%	535	1.68%	0.95	0.75 - 1.22	0.707	0.97	0.76 - 1.24	0.798
Any Postoperative Infection	21	0.46%	159	0.50%	0.92	0.59 - 1.46	0.733	0.95	0.60 - 1.50	0.832
Sepsis	26	0.57%	149	0.47%	1.22	0.80 - 1.86	0.347	1.24	0.81 - 1.89	0.315
Wound Dehiscence	32	0.70%	220	0.69%	1.02	0.70 - 1.48	0.927	1.05	0.72 - 1.52	0.806
Seroma	2	0.04%	17	0.05%	0.82	0.19 - 3.56	0.794	0.89	0.20 - 3.87	0.875
Hospital Readmission	175	3.84%	1,002	3.14%	1.23	1.04 - 1.45	0.013	1.22	1.04 - 1.44	0.017
Mortality	3	0.07%	21	0.07%	1.00	0.30 - 3.35	0.999	0.97	0.29 - 3.26	0.958