Patients with Ostomies Undergoing Total Knee Arthroplasty are Not at Increased Risk of Revision or Periprosthetic Joint Infection

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INTRODUCTION: Limited research exists on the effect of colostomy or ileostomy on the risk of periprosthetic joint infection (PJI) after total knee arthroplasty (TKA). Our study aimed to utilize a statewide database to assess the outcomes of TKA patients with ostomies and if there was an increased the risk of PJI or revisions.

METHODS:

The Statewide Planning and Research Cooperative System was queried for primary TKA patients from 2010 to 2020. Patient demographic information, history of ostomy, 90-day emergency department (ED) visits and readmissions, all-cause revisions, and revisions for PJI were collected. Cox proportional hazard models and multivariable logistic regression were performed to evaluate the main effect of history of ostomy performed prior to TKA on the risk of revision while controlling for patient demographics and operative indication. Kaplan-Meier plots were utilized to asses revision-free and PJI-free survival probability.

RESULTS:

A total of 216,037 primary TKAs with minimum 2-year follow up were included, of which 619 had history of an ostomy prior to TKA. Patients with ostomies had higher rates of 90-day ED visits (11.2 vs. 14.2%; *p* = 0.017) and 90-day readmissions (7.8 vs. 13.6%; *p*<0.001). There was no significant difference for all-cause revisions (*p*=0.26) and revisions due to PJI (*p*=0.50). Cox proportional hazards model demonstrated no difference for all-cause revisions (*p*=0.86) and revisions due to PJI (*p*=0.095). Multivariable logistic regression demonstrated no difference in odds of revision due to PJI (*p*=0.54). Both revision-free and PJI-free survival were equivalent between cohorts.

DISCUSSION AND CONCLUSION:

Patients with ostomies prior to primary TKA have higher rates of 90-day readmissions and ED visits, but do not have increased risks of all-cause revisions and revisions due to PJI. Further studies should seek to delineate causes of acute hospital encounters.

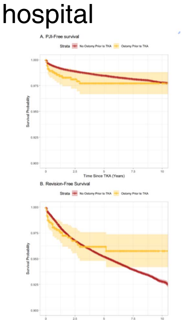

Figure 1: KM curves

Figure: Kaplan-Meier plots demonstrating (A) probability of PJI-free primary TKA survival and (B) probability of all-cause revision-free primary TKA survival. Based on log-rank test comparing the survival curves between patients with a history of colostomy or ileostomy prior to TKA and those without a history of prior ostomy, there is no significant difference in time to event. Note: y-axis is limited to 90-100% survival.

	No ostomy prior to TKA (N = 215,418)	Ostomy prior to TKA (N = 619)	*P-value*
Age (years ± SD)	66.1 ± 10.0	68.3 ± 9.2	**<0.001**
Sex (%)			0.071
Female	139,714 (64.9%)	380 (61.4%)	
Male	75,704 (35.1%)	239 (38.6%)	
Race			**<0.001**
White	162,441 (75.4%)	542 (87.6%)	
Black	19,955 (9.3%)	30 (4.8%)	
Hispanic	16,185 (7.5%)	30 (4.8%)	
Asian	2,809 (1.3%)	1 (0.2%)	
Native American	664 (0.3%)	2 (0.3%)	
Other or Unknown	13,364 (6.2%)	14 (2.3%)	
Elixhauser score (± SD)	0.6 ± 4.3	1.7 ± 5.4	**<0.001**
Insurance (%)			**<0.001**
Private	94,042 (43.7%)	195 (31.5%)	
Medicare	104,189 (48.4%)	381 (61.6%)	
Medicaid	5,655 (2.6%)	19 (3.1%)	
Worker's Compensation	9,365 (4.3%)	19 (3.1%)	
Other	2,167 (1.0%)	5 (0.8%)	

Table 1: Patient demographics and follow-up duration
TKA: Total knee arthroplasty; SD: Standard deviation

	No ostomy prior to TKA (N = 215,418)	Ostomy prior to TKA (N = 619)	*P-value*
Length of stay (days ± SD)	3.3 ± 1.8	3.6 ± 3.1	**0.017**
Discharge disposition			
Home	112,782 (52.4%)	306 (49.4%)	0.191
Skilled Nursing Facility	70,451 (32.7%)	232 (37.5%)	
Inpatient Rehabilitation	30,805 (14.3%)	76 (12.3%)	
Other	1,380 (0.6%)	5 (0.8%)	
90-day ED visit (%)	24,077 (11.2%)	88 (14.2%)	**0.017**
90-day Readmission (%)	16,699 (7.8%)	84 (13.6%)	**<0.001**
All-cause revision	10,068 (4.7%)	23 (3.7%)	0.259
Revision for PJI	3,127 (1.5%)	11 (1.8%)	0.499
Time to first revision (years ± SD)	2.4 ± 2.1	1.2 ± 1.3	**<0.001**

Table 2: Patient postoperative outcomes after total knee arthroplasty.
TKA: Total knee arthroplasty; SD: Standard deviation

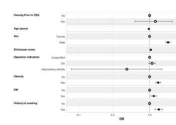

Figure 2: Model coefficients for odds of PJI requiring revision.

Table 4: Cox PH

	Time to PJI			Time to All-Cause Revision		
Characteristic	**HR**[1]	**95% CI**[1]	**p-value**	**HR**[1]	**95% CI**[1]	**p-value**
Ostomy Prior to TKA						
No Ostomy Prior to TKA	—	—		—	—	
Ostomy Prior to TKA	1.48	0.93, 2.36	0.095	0.97	0.68, 1.38	0.860
Age (years)	0.98	0.98, 0.98	**<0.001**	0.96	0.96, 0.96	**<0.001**
Sex						
Female	—	—		—	—	
Male	1.87	1.76, 1.99	**<0.001**	1.23	1.19, 1.28	**<0.001**
Elixhauser score	1.04	1.04, 1.05	**<0.001**	1.02	1.02, 1.03	**<0.001**
Operative indication						
Unspecified	—	—		—	—	
OA	0.79	0.73, 0.85	**<0.001**	0.91	0.87, 0.96	**<0.001**
Inflammatory arthritis	0.66	0.27, 1.58	0.346	0.70	0.43, 1.15	0.161
Obesity						
No	—	—		—	—	
Yes	1.40	1.31, 1.50	**<0.001**	1.08	1.04, 1.13	**<0.001**
DM						
No	—	—		—	—	
Yes	1.10	1.02, 1.19	**0.017**	0.97	0.93, 1.02	0.249
History of smoking						
No	—	—		—	—	
Yes	1.41	1.27, 1.57	**<0.001**	1.18	1.11, 1.26	**<0.001**

[1] HR = Hazard Ratio, CI = Confidence Interval

Table: Cox proportional hazards models evaluating the effect of ostomy prior to TKA on PJI (left) and all-cause revision (right). When controlling for the covariates listed, there is no significant effect of ostomy prior to TKA.

Characteristic	**OR**[1]	**95% CI**[1]	**p-value**
Ostomy Prior to TKA			
No	—	—	
Yes	1.21	0.62, 2.09	0.536
Age (years)	0.98	0.97, 0.98	**<0.001**
Sex			
Female	—	—	
Male	1.82	1.70, 1.96	**<0.001**
Elixhauser score	1.04	1.03, 1.05	**<0.001**
Operative indication			
Unspecified	—	—	
OA	1.09	0.98, 1.20	0.118
Inflammatory arthritis	0.48	0.08, 1.49	0.298
Obesity			
No	—	—	
Yes	1.32	1.22, 1.43	**<0.001**
DM			
No	—	—	
Yes	1.15	1.05, 1.25	**0.002**
History of smoking			
No	—	—	
Yes	1.35	1.19, 1.52	**<0.001**

[1] OR = Odds Ratio, CI = Confidence Interval

Table: Logistic regression model demonstrating the odds of revision for PJI for patients undergoing TKA with at least 2 years of follow-up. When controlling for the effects of age, gender, Elixhauser score, operative indication, obesity, DM, and smoking history, the main effect of ostomy prior to TKA is not associated with an increased risk of PJI.