Are Active Cancer Patients at Increased Risk of Revision Surgery after Primary Total Joint Arthroplasty? A Propensity-Matched Study

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[1]Adult Reconstruction

INTRODUCTION: While the number of absolute and relative contraindications to total joint arthroplasty (TJA) continues to decrease over time, active cancer patients have traditionally been challenging surgical candidates due to complex medical needs and increased potential for complications. As such, the literature on arthroplasty outcomes in active cancer patients is limited. We sought to compare perioperative and two-year clinical outcomes of patients with and without active cancer.

METHODS: All patients over 18 years old undergoing primary, unilateral TJA between 2017 and 2023 at a single, urban, academic institution were screened for minimum two-year follow up. Patients undergoing revision/conversion arthroplasty, or hemiarthroplasty were excluded. Active cancer status, type, and stage were determined and manually reviewed for all subjects. To reduce potential confounding, the 68 patients with active cancer were then propensity matched in a 3:1 ratio to the nearest-neighboring 204 of the 9,382 patients without cancer. Propensity scores were made on the basis of age, sex, BMI, smoking, race, and ASA score. Demographic, perioperative, and clinical outcomes were obtained.

RESULTS: There were no significant demographic differences between groups, with the exception of CCI. There were no differences in discharge disposition, operative time, or length of stay. There were no differences in all-cause revisions (7.4 vs 2.5%), but this finding was underpowered. Patients with active cancer were more likely to have a revision for infectious causes (4.4 vs 0%, P=0.003).

DISCUSSION AND CONCLUSION: Patients with active cancer are frequently excluded from studies evaluating total joint arthroplasty outcomes. This tightly-matched retrospective cohort study of active cancer patients versus non-cancer patients with minimum two years follow-up showed no significant differences in perioperative measures, discharge disposition, and all-cause revision, however active cancer patients did have more revisions for infection.

	Active Cancer (n=68)	No Cancer (3:1 Match, n=204)	P-value
Mean Age, [SD]	69.6 [9.1]	70.9 [8.8]	0.31
Sex, n (%)			0.89
Female	38 (55.9)	111 (54.4)	
Male	30 (44.1)	93 (45.6)	
Race, n (%)			0.98
White	49 (72.1)	152 (74.5)	
Black	11 (16.2)	29 (14.2)	
Asian	2 (2.9)	6 (2.9)	
Other/Unavailable	6 (8.8)	17 (8.3)	
Smoking Status, n (%)			0.91
Current	2 (2.9)	5 (2.5)	
Former	35 (51.5)	111 (54.4)	
Never	31 (45.6)	88 (43.1)	
ASA Score, n (%)			0.63
1	0 (0.0)	0 (0.0)	
2	21 (30.9)	76 (37.3)	
3	46 (67.6)	125 (61.3)	
4	1 (1.5)	3 (1.5)	
Mean BMI [SD]	31.4 [6.5]	30.3 [5.9]	0.24
Mean CCI [SD]	7.6 [3.9]	4.3 [2.3]	<0.001
Surgical Operation Type			0.68
Total Hip Arthroplasty	33 (48.5)	93 (45.6)	
Total Knee Arthroplasty	35 (51.5)	111 (54.4)	
Anesthesia Type			0.99
General	8 (11.8)	24 (11.8)	
Regional	60 (88.2)	180 (88.2)	

Table 1. Demographic composition of patients with and without active cancer at time of TJA. SD, Standard Deviation.

Cancer Type, n	Stage 0	Stage I	Stage II	Stage III	Stage IV	Unknown/ Not Available	Totals, n (%)
Brain	0	0	0	0	1	0	1 (1.5)
Breast	2	6	1	1	4	1	15 (22.1)
Colon	0	0	0	0	1	0	1 (1.5)
Endometrial	0	3	0	0	1	0	4 (5.9)
Female GU	0	4	0	1	0	1	6 (8.8)
GI	0	1	1	0	1	1	4 (5.9)
Head/Neck	0	0	0	0	0	1	1 (1.5)
Leukemia	1	0	0	0	0	4	5 (7.4)
Liver	0	0	0	0	0	1	1 (1.5)
Lung	0	0	0	0	2	1	3 (4.4)
Lymphoma	1	0	0	0	1	3	5 (7.4)
Melanoma	0	0	1	0	0	1	2 (2.9)
Multiple Myeloma	0	0	1	0	0	0	1 (1.5)
Prostate	0	2	1	5	2	4	14 (20.6)
Skin	0	1	0	0	0	1	2 (2.9)
Thyroid	0	0	0	1	0	2	3 (4.4)
Totals, n %	4 (5.9)	17 (25.0)	5 (7.4)	9 (13.2)	11 (16.2)	22 (32.4)	68

Table 2. Cancer types stratified by cancer stage. GI, gastrointestinal; GU, genitourinary.

	Active Cancer (n=68)	No Cancer (3:1 Match, n=204)	P-value
Total Revisions, n (%)	5 (7.4)	5 (2.5)	0.15
Arthrofibrosis	1 (1.5)	0 (0.0)	0.08
Aseptic Loosening	0 (0.0)	1 (0.5)	0.56
Chondromalacia	0 (0.0)	1 (0.5)	0.56
Dislocation	0 (0.0)	1 (0.5)	0.56
Fracture	1 (0.5)	1 (0.5)	0.08
Infection	3 (4.4)	0 (0.0)	0.003
Instability	0 (0.0)	1 (0.5)	0.56
Discharge Disposition, n (%)			0.20
Home	65 (95.6)	185 (90.7)	
Skilled Nursing Facility	2 (2.9)	18 (8.8)	
Acute Care Facility	1 (1.5)	1 (0.5)	
Operative Time (minutes), mean [SD]	111 [30]	110 [28]	0.87
Length of Stay (hours), mean [SD]	47 [24]	52 [35]	0.29

Table 3. Clinical outcomes stratified by active cancer status. VTE, Venous Thromboembolism.