Impact of Ankylosing Spondylitis on Complications After Total Knee Arthroplasty

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INTRODUCTION:

Ankylosing Spondylitis (AS) is a chronic inflammatory disease affecting over 300,000 Americans. Although AS commonly affects the axial skeleton and sacroiliac joints, up to 70% of patients have involvement of the knees and other joints. Total knee arthroplasty (TKA) is effective in managing patients with AS, yet it remains unclear whether AS affects complication rates following TKA. The purpose of this study was to characterize the effects of AS on the incidence of revision TKA (rTKA), periprosthetic fractures (PPF), mechanical loosening, and prosthetic joint infection (PJI).

METHODS: Patients who underwent TKA were identified in the PearlDiver Database and were stratified based on whether they had a prior diagnosis of AS or not. The cohorts were matched by age and gender at a 1:10 ratio of those with AS and those without. Univariate analysis was conducted on demographic characteristics, comorbidities, and postoperative complications using Pearson chi-square analysis. If a postoperative outcome was significant on univariate analysis ($p < 0.05$), a multivariable analysis using logistic regression was conducted to adjust for other potential risk factors. In order to determine factors for adjustment, demographics and comorbidities with p-values of <0.2 were included in the multivariable analysis.

RESULTS: In total, 1663 patients who underwent TKA had a prior diagnosis of AS and 16,630 did not. Patient demographic information and comorbidities can be found in Table 1. Univariate analysis demonstrated that at 2 years post-TKA patients with AS had statistically higher incidences of rTKA, PPF, and mechanical loosening (Table 2; $p<0.001$, 0.001, 0.05, respectively), but no difference in the incidence of PJI. Multivariable analysis showed that patients with AS had an increased likelihood of PPF compared to the control group (OR 4.208; $p<0.001$; Table 3).

DISCUSSION AND CONCLUSION: Our study of a national administrative database demonstrated an increased rate PPF in patients with Ankylosing Spondylitis undergoing TKA compared to those without. To our knowledge, this is the largest cohort of patients analyzed for such a study.

Table 1: Demographics of Ankylosing Spondylitis vs. Control TKA

	Control TKA		Ankylosing Spondylitis		
	n	%	n	%	P-value
Total	16630		1663		
Age	63.700		63.685		0.950
Gender					1.000
Male	8110	48.77%	811	48.77%	1.000
Female	8520	51.23%	852	51.23%	1.000
Charlson Comorbidity Index	1.125		1.480		**<0.001**
Congestive Heart Failure	1508	9.07%	181	10.88%	**0.017**
Arrhythmias	4107	24.70%	471	28.32%	**0.001**
Valvular Disease	2174	13.07%	253	15.21%	**0.016**
Pulm Circ Disorders	708	4.26%	94	5.65%	**0.018**
Peripheral Vascular Disease	2109	12.68%	285	17.14%	**<0.001**
Hypertension	8066	48.14%	841	50.57%	**0.062**
Paralysis	207	1.24%	43	2.59%	**<0.001**
Other neurological disorders	704	4.23%	97	5.83%	**0.003**
Chronic Pulmonary Disease	3515	21.14%	429	25.80%	**<0.001**
Hypothyroidism	2723	16.37%	326	19.60%	**<0.001**
Chronic Kidney Disease	1592	9.57%	183	11.00%	**0.066**
Liver Disease	1269	7.63%	169	10.16%	**<0.001**
Peptic Ulcer Disease	173	1.04%	34	2.04%	**<0.001**
Lymphoma	65	0.39%	10	0.60%	0.280
CancerMet	338	2.03%	19	1.14%	**0.016**
CancerNoMet	1240	7.46%	117	7.04%	0.565
Rheumatoid Arthritis and Collagen Vascular Disease	963	5.79%	913	54.90%	**<0.001**
Coagulopathy	1651	9.93%	207	12.45%	**0.001**
Fluid and electrolyte disorders	4981	29.96%	961	57.77%	**<0.001**
Blood loss anemia	457	2.75%	60	3.61%	**0.052**
Deficiency anemia	1451	8.73%	195	11.73%	**<0.001**
Alcohol abuse	89	0.54%	10	0.60%	0.861
Drug abuse	660	3.97%	152	9.14%	**<0.001**
Psychoses	360	2.16%	34	2.04%	0.615
Depression	3623	21.79%	490	29.46%	**<0.001**
Obesity	643	3.87%	339	20.38%	**<0.001**
Smoking	900	5.41%	198	11.91%	**<0.001**
Osteoporosis	836	5.03%	171	10.28%	**<0.001**
Diabetes Mellitus	5615	33.77%	416	75.07%	**<0.001**
Vitamin D Deficiency	2341	14.08%	525	31.57%	**<0.001**
Dementia	86	0.52%	50	3.01%	**<0.001**

Table 2: Univariate Analysis of 2-Year Complication Rates Following TKA

OUTCOME	CONTROL		Ankylosing Spondylitis		P-value
	n	%	n	%	
Revision	260	1.56%	45	2.71%	**<0.001**
Periprosthetic Fracture	34	0.20%	14	0.84%	**<0.001**
Loosening	118	0.71%	21	1.26%	**0.020**
Prosthetic Joint Infection	100	0.60%	8	0.48%	0.658

Table 3: Multivariate Analysis of 2-Year Complication Rates Following TKA

OUTCOME	Odds Ratio	Lower 25%	Upper 25%	P-value
Revision	1.038	0.787	1.368	0.793
Periprosthetic Fracture	4.208	2.348	7.561	**<0.001**
Loosening	1.060	0.717	1.562	0.770