

Effect of Alcohol Use Disorder on Revision Rates and Perioperative Outcomes in Total Shoulder Arthroplasty

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Purpose

Total shoulder arthroplasty (TSA) is widely recognized as a mainstay of surgical management for primary glenohumeral osteoarthritis. Current estimates on the incidence of TSA approximate over 50,000 shoulder replacements performed in the United States each year¹. The existing literature on the impact of alcohol use disorder (AUD) in joint arthroplasty focuses largely on outcomes in hip and knee replacement^{2,3}. **The purpose of this study was to identify the association of AUD with adverse perioperative outcomes following TSA to help fill this gap in the literature.**

Materials and Methods

Data was collected from the **Mariner dataset with PearlDiver software using ICD-9, ICD-10, and CPT codes**. Patients with the diagnoses of Alcohol Abuse or Alcohol Dependence were identified, excluding those in remission. Patients with underlying cirrhosis were excluded from the study. **Primary outcomes for this study included 2-year revision surgery, 90-day readmission, and 90-day emergency department visit.** 90-day surgical and medical complications were also investigated. **Significant univariate outcomes using chi-squared tests were followed up using multivariable logistic regression.**

Results

Data was collected from a total of N=59,261 patients who underwent TSA for osteoarthritis. The AUD cohort contained N=1,522 patients. **Multivariable results showed that patients with AUD were more likely to undergo 2-year all-cause revision (p<0.01, OR 1.49), 2-year aseptic revision (p<0.02, OR 1.47), and 90-day hospital readmission (p<0.02, OR 1.57).** Although numerous medical and surgical complications were increased on univariate analysis, these findings were not confirmed by multivariable regression.

Discussion

Our analysis reveals AUD to be independently associated with increased rates of 2-year aseptic and all-cause revision surgery, as well as 90-day readmission following primary TSA for osteoarthritis. These results expand on the existing literature regarding substance use in the context of arthroplasty. Our findings may assist orthopedic surgeons in counseling patients with AUD during the preoperative course to achieve ideal long-term results.

Table 1. Demographic comparison of patients undergoing TSA for primary osteoarthritis with and without a comorbid diagnosis of Alcohol Use Disorder (AUD)

Group	Number of Patients	
	AUD	Control
Total	59261	
Alcohol Use Disorder	1522	
Control		57739

Demographic Risk Factor	AUD	Control	p-value*
	Mean (years)	Mean (years)	
Age	62.4	67.6	<0.02
Male Gender	65.57%	46.37%	<0.02
Congestive Heart Failures	16.36%	15.02%	
Cardiac Arrhythmia	42.44%	34.42%	<0.02
Valvular Disorder	18.46%	20.19%	
Pulmonary Circulation Disorder	6.18%	6.58%	
Peripheral Vascular Disease	22.60%	21.18%	
Uncomplicated Hypertension	70.37%	66.07%	<0.02
Paralysis	3.15%	2.22%	<0.02
Neurological Disorder	16.49%	7.97%	<0.02
Chronic Pulmonary Disorder	43.89%	32.10%	<0.02
Diabetes Mellitus	27.79%	29.38%	
Hypothyroidism	19.58%	25.18%	<0.02
Chronic Kidney Disease	16.89%	16.64%	
Peptic Ulcer Disease	3.09%	1.61%	<0.02
Lymphoma	0.53%	1.06%	
Metastatic Cancer	2.17%	2.48%	
Solid Tumor Without Metastasis	12.61%	14.32%	
Rheumatoid Arthritis and Collagen Disorders	15.64%	15.98%	
Coagulopathy	15.44%	11.65%	<0.02
Fluid and Electrolyte Disorder	43.23%	27.12%	<0.02
Blood Loss Anemia	4.27%	3.77%	
Deficiency Anemia	16.62%	14.37%	<0.02
Drug Abuse	26.22%	5.32%	<0.02
Psychosis	11.10%	3.12%	<0.02
Depression	52.96%	30.29%	<0.02
Tobacco Smoking and Nicotine Dependence	43.82%	12.07%	<0.02
Obesity (BMI>30)	18.73%	16.48%	

*p-values determined by chi-squared test, demographic risk factors with p>0.02 were omitted in multivariable logistic regression

Table 3. Multivariable logistic regression analysis* of long term (2-year) and 90-Day outcomes

Outcome	Odds Ratio	p-value	GOF test p-value**
2-Year Outcomes			
All-Cause Revision	1.49	0.01	0.77
Septic Revision	1.34	0.51	0.46
Aseptic Revision	1.47	0.01	0.55
90-Day Outcomes			
ED Visit	1.11	0.20	0.00
Readmission	1.57	0.01	0.82
Dislocation	1.26	0.43	0.53
Other Operative Complication	1.53	0.21	0.03
All Surgery Related Complications	1.26	0.23	0.03
Renal Failure	1.08	0.66	0.00
Post-op Anemia	0.99	0.92	0.00
Death	2.50	0.11	0.84
Bleeding Complication	1.07	0.83	0.31
Transient Mental Disorder	2.13	0.03	0.30
Convulsions	1.00	0.99	0.26
All Medical Complications	0.93	0.33	0.00
All Complications	0.96	0.55	0.00

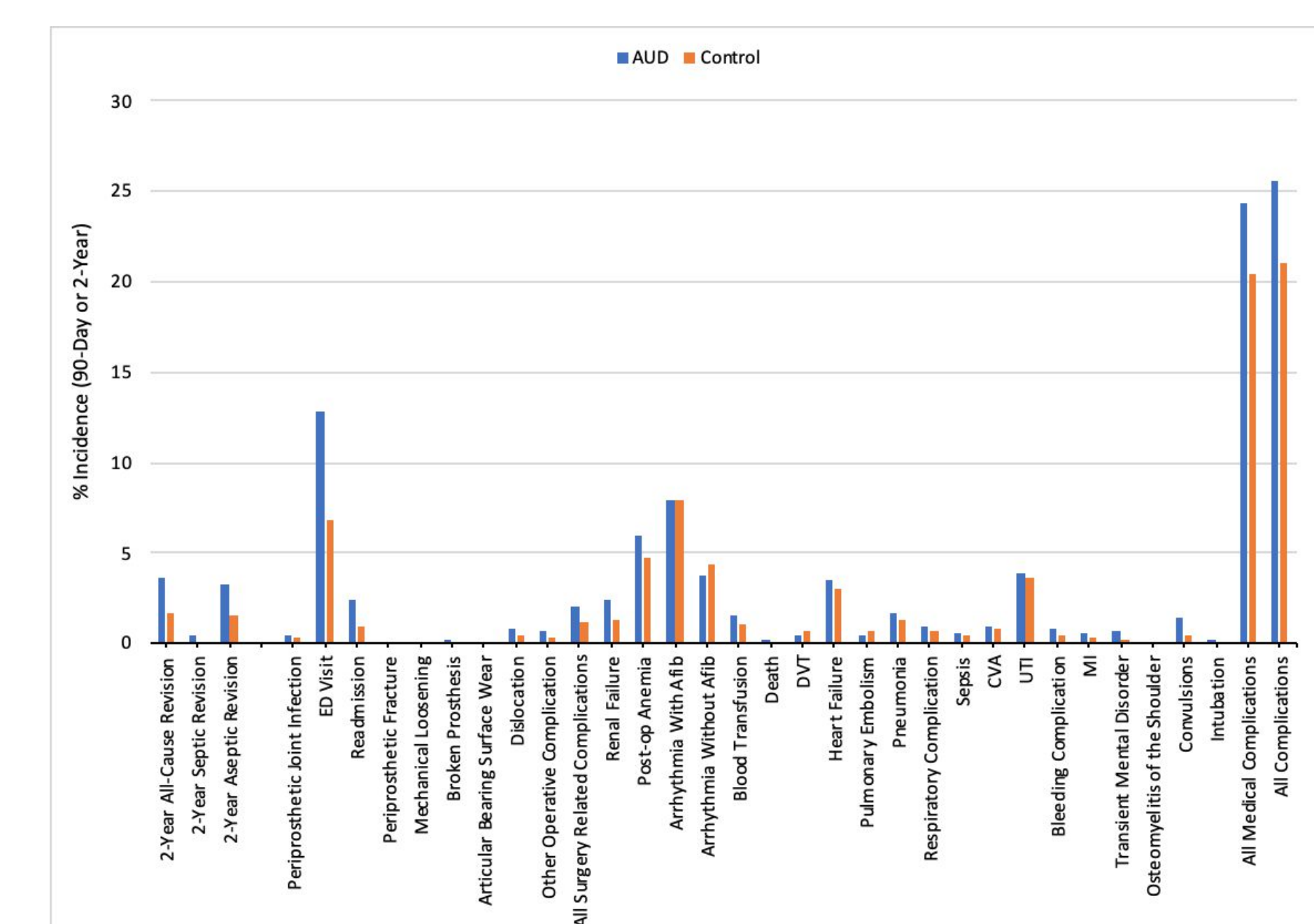
* Performed for significant univariate outcomes with p<0.05, included demographic risk factors with p<0.02 in analysis
** For the Hosmer and Lemeshow goodness of fit test, p-values >0.05 indicate that the model is acceptable, with higher p-values indicating a better fit

Table 2. Univariate analysis of long term (2-year) and 90-Day outcomes

Outcome	AUD	Control	p-value*
	Mean (days)	Mean (days)	
Length of Hospital Stay	1.7	1.8	
Incidence			
2-Year Outcomes			
All-Cause Revision	3.7%	1.7%	<0.001
Septic Revision	0.4%	0.1%	<0.05
Aseptic Revision	3.2%	1.6%	<0.001
90-Day Outcomes			
Periprosthetic Joint Infection	0.5%	0.3%	
ED Visit	12.8%	6.8%	<0.001
Readmission	2.4%	0.9%	<0.001
Periprosthetic Fracture	0.1%	0.1%	
Mechanical Loosening	0.1%	0.1%	
Broken Prosthesis	0.2%	0.1%	
Articular Bearing Surface Wear	0.0%	0.0%	
Dislocation	0.9%	0.4%	<0.05
Other Operative Complication	0.7%	0.3%	<0.05
All Surgery Related Complications	2.0%	1.1%	<0.01
Renal Failure	2.4%	1.3%	<0.001
Post-op Anemia	6.0%	4.8%	<0.05
Arrhythmia with Afib	8.0%	7.9%	
Arrhythmia without Afib	3.8%	4.3%	
Blood Transfusion	1.6%	1.1%	
Death	0.3%	0.1%	<0.01
DVT	0.4%	0.7%	
Heart Failure	3.6%	3.0%	
Pulmonary Embolism	0.5%	0.7%	
Pneumonia	1.6%	1.3%	
Respiratory Complication	1.0%	0.7%	
Sepsis	0.5%	0.5%	
CVA	1.0%	0.8%	
UTI	3.9%	3.6%	
Bleeding Complication	0.8%	0.4%	<0.05
MI	0.6%	0.4%	
Transient Mental Disorder	0.7%	0.3%	<0.001
Osteomyelitis of the Shoulder	0.0%	0.0%	
Convulsions	1.4%	0.5%	<0.001
Intubation	0.2%	0.1%	
All Medical Complications	24.3%	20.4%	<0.001
All Complications	25.6%	21.1%	<0.001

*p-values determined by chi-squared test, insignificantly different outcomes (p>0.05) were omitted in multivariable logistic regression

Figure 1. Univariate analysis of long term (2-year) and 90-Day outcomes



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