A Comparison of Patients Presenting to the Emergency Department Within 90 Days Following Primary Total Joint Arthroplasty: A Retrospective Analysis

Benjamin T. Johnson, BS[1], Rana Ahmad, BS[1], Brett Drake, BS[2], Apurva Choubey, M.D.[2], Mark H. Gonzalez, M.D., P.h.D.[2]
[1]University of Illinois College of Medicine at Chicago, Chicago, IL, [2]University of Illinois Hospital, Department of Orthopaedics, Chicago, IL
Email of Presenting Author: bjohn52@uic.edu

Disclosures: Benjamin T. Johnson (N), Rana Ahmad (N), Brett Drake (N), Apurva Choubey (N), Mark H. Gonzalez (N)

INTRODUCTION: Healthcare spending on emergency department (ED) visits can reach up to 10% of total healthcare expenditures.[1] In patients undergoing total joint arthroplasty (TJA), 10.4% of patients will present to the ED within 90 days of their procedure.[2] While numerous studies have examined the reasons for ED visits following total joint replacements, few have directly compared the three major joint replacements to each other. Therefore, the purpose of this study is to investigate differences between patients presenting to the ED <90 days following primary total hip arthroplasty (THA), total knee arthroplasty (TKA), and total shoulder arthroplasty (TSA).

METHODS: Patients who were >1-year post-op from a primary THA, TKA, or TSA procedure between December 2020 and August 2022 were retrospectively recruited from an urban, academic tertiary medical center. This yielded a total of 429 patients. Of note, TSA patients included both anatomic and reverse total shoulder arthroplasty. Exclusion criteria included prisoners, individuals <18 years of age, TJA secondary to trauma, post-operative infection, and revision surgery. Medical charts were reviewed for patient demographics, medical comorbidities, procedure information, and subsequent hospital visits. The study cohorts were compared using Fischer's exact test. The Kruskal-Wallis H Test was used to evaluate non-parametric, continuous values. This study was IRB approved by the institution of study.

RESULTS SECTION: A total of 429 patients were identified as having undergone a primary TJA with 112 of those patients presenting to the ED <90 days post-op. Patients undergoing TSA presented to the ED less frequently (14%) than those undergoing THA (31%) and TKA (31%) (p=0.009). Additionally, TSA patients were more likely to have chronic obstructive pulmonary disease (COPD) (p=0.038) and diabetes mellitus (p=0.029) (**Table 1**). There were no significant differences in sex, age, BMI, race/ethnicity, insurance type, socioeconomic status as measured by both national area deprivation index (ADI) and social vulnerability index (SVI), cardiovascular disease, anxiety or depression, and smoking status. TSA patients presenting to the ED required additional or revision surgery in the same joint more frequently than THA and TKA patients (p=0.015). No substantial differences were noted in discharge disposition, reasons for ED visits, patients canceling or postponing their surgery, and <90-day hospital readmission rates (**Table 2**). The most significant reason for ED visit was pain for all three joint replacements.

DISCUSSION: The most common reason for ED presentation following TJA was pain, which is congruent with recent literature.[3] While TSA patients were less likely to present to the ED within 90 days following surgery, our ED visit rates are higher than reported in the literature. This could be due to a number of reasons including our patient population having higher socioeconomic disadvantage (as evidenced by ADI and SVI scores), which has been demonstrated to increase ED visit rates.[4] Limitations of this study include a small sample size of patients undergoing TSA due to this being a single center study. Future studies should include multiple centers to capture a larger and more diverse patient population and stratify patients based on SES to increase the external validity of these findings.

SIGNIFICANCE/CLINICAL RELEVANCE: Pain is the most reported reason for ED visits within 90 days of total joint replacement and efforts should be made to reduce the need for ED services following joint replacement.

REFERENCES: **1:** Lee MH, Schuur JD, Zink BJ. Owning the cost of emergency medicine: beyond 2%. *Ann Emerg Med*. 2013;62(5):498-505.e3. **2:** Maldonado-Rodriguez N, Ekhtiari S, Khan MM, et al. Emergency Department Presentation After Total Hip and Knee Arthroplasty: A Systematic Review. *J Arthroplasty*. 2020;35(10):3038-3045.e1. **3:** Singh V, Anil U, Kurapatti M, Robin JX, Schwarzkopf R, Rozell JC. Emergency department visits following total joint arthroplasty: do revisions present a higher burden?. *Bone Jt Open*. 2022;3(7):543-548.**4:** Lee SY, Lee SR, Choi EK, Han KD, Oh S, Lip GYH. Impact of Socioeconomic Status on Emergency Department Visits in Patients With Atrial Fibrillation: A Nationwide Population-Based Cohort Study. *J Am Heart Assoc*. 2022;11(24):e027192.

IMAGES/TABLES:

Procedure	THA, N = 33[1]	TKA, N = 69[1]	TSA, N = 10[1]	p-value[2]
ED Visits / Total Number of Surgeries	33/137 (31%)	69/219 (31%)	10/73 (14%)	**p = 0.009**
Sex				p = 0.384
Male	15 (45%)	22 (32%)	3 (30%)	
Female	18 (55%)	47 (68%)	7 (70%)	
Age at Surgery	59.9 ± 12.9	65.0 ± 8.7	58.3 ± 13.2	p = 0.132
BMI	31.2 ± 6.0	32.2 ± 5.3	31.2 ± 5.7	p = 0.576
Race/Ethnicity				p = 0.075
White/Caucasian	7 (21%)	6 (8.7%)	3 (30%)	
Black/African American	18 (55%)	38 (55%)	6 (60%)	
Hispanic/Latinx	5 (15%)	23 (33%)	1 (10%)	
Asian	0 (0%)	1 (1.4%)	0 (0%)	
Other	3 (9.1%)	1 (1.4%)	0 (0%)	
Insurance type				p = 0.750
Medicare	15 (45%)	38 (55%)	4 (40%)	
Medicaid	15 (45%)	25 (36%)	6 (60%)	
Private/Commercial	3 (9.1%)	5 (7.2%)	0 (0%)	
Workers Comp	0 (0%)	1 (1.4%)	0 (0%)	
Other	0 (0%)	0 (0%)	0 (0%)	
National ADI	64.6 ± 19.3	64.5 ± 17.3	69.8 ± 21.3	p = 0.341
Social Vulnerability Index (Zip code)	73.0 ± 31.4	79.8 ± 25.4	73.6 ± 30.7	p = 0.433
Cardiovascular Disease	8 (24%)	16 (23%)	4 (40%)	p = 0.504
Chronic Obstructive Pulmonary Disease	5 (15%)	4 (5.8%)	3 (30%)	**p = 0.038**
Diabetes Mellitus	4 (12%)	24 (35%)	4 (40%)	**p = 0.029**
History of Anxiety or Depression	10 (30%)	14 (20%)	5 (50%)	p = 0.110
Smoking Status				p = 0.260
Active	8 (24%)	13 (19%)	1 (10%)	
Former	14 (42%)	19 (28%)	5 (50%)	
Never	11 (33%)	37 (54%)	4 (40%)	

[1] n (%) Mean ± SD
[2] Pearson's Chi-Squared Test; Fisher's Exact Test; Kruskal-Wallis Rank Sum Test

Table 1: Demographic factors of patients who underwent primary TJA and presented to the ED <90 days following the date of operation.

Procedure	THA, N = 33[1]	TKA, N = 69[1]	TSA, N = 10[1]	p-value[2]
Discharge Disposition				0.196
Home with home care	14 (42%)	29 (42%)	3 (30%)	
Home without home care	15 (45%)	29 (42%)	7 (70%)	
Institutional Rehab Facility	2 (6.1%)	0 (0%)	0 (0%)	
Skilled Nursing Facility	2 (6.1%)	11 (16%)	0 (0%)	
Other	0 (0%)	0 (0%)	0 (0%)	
Reason for ED Visit				0.317
Pain	11 (33%)	20 (29%)	4 (40%)	
Wound Issues	7 (21%)	9 (13%)	3 (30%)	
Dislocation	3 (9.1%)	0 (0%)	0 (0%)	
Swelling	3 (9.1%)	15 (22%)	0 (0%)	
Cardiac Issues	1 (3.0%)	4 (5.8%)	0 (0%)	
Pulmonary Issues	2 (6.1%)	5 (7.2%)	1 (10%)	
Gastrointestinal Issues	2 (6.1%)	6 (8.7%)	2 (20%)	
Neurological Issues	0 (0%)	1 (1.4%)	0 (0%)	
Other	13 (12%)	9 (13%)	0 (0%)	
Surgery Cancelled / Postponed	4 (12%)	7 (10%)	1 (10%)	0.897
Readmitted Within 90 Days of Surgery	12 (36%)	22 (32%)	4 (40%)	0.786
Additional / Revision Surgery <1 Year	4 (12%)	8 (12%)	5 (50%)	**0.015**

[1] n (%) Mean ± SD
[2] Pearson's Chi-Squared Test; Fisher's Exact Test; Kruskal-Wallis Rank Sum Test

Table 2: Post-operative information for patients undergoing TJA who presented to the ED <90 days following the date of operation.