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Safety and patient satisfaction of outpatient shoulder arthroplasty

Timothy S. Leroux, MD [a], William A. Zuke, BA [b], Bryan M. Saltzman, MD [b], Beatrice Go, BS [b], Nikhil N. Verma, MD [b], Anthony A. Romeo, MD [b], Jason Hurst, MD [c], Brian Forsythe, MD [b,*]

[a] *University Health Network, Toronto, ON, Canada*
[b] *Midwest Orthopaedics at Rush, Rush University Medical Center, Chicago, IL, USA*
[c] *Joint Implant Surgeons, Inc., New Albany, OH, USA*

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Background: There is increasing interest in outpatient shoulder arthroplasty (SA); however, the clinical evidence behind this practice is sparse. The purpose of this study was to assess the safety of outpatient SA performed in an ambulatory surgery center and to determine patient factors that are associated with increased risk for perioperative complications or dissatisfaction.

Methods: Patient demographics and operative variables were collected retrospectively for patients undergoing outpatient SA at 2 ambulatory surgery centers with a minimum follow-up of 90 days. Patients completed a postsurgery questionnaire about their experience, satisfaction, pain control, and health care use.

Results: Forty-one anatomic total SAs (n = 32) and reverse SAs (n = 9) with a mean follow-up of 60 weeks (16.4 weeks-3 years) were included. The mean age, body mass index, Charlson Comorbidity Index, and American Society of Anesthesiologists class were 60.6 ± 4.8 years, 31.8 ± 6.6, 2.9 ± 1.9, and 2.3 ± 0.6, respectively. Three (7.3%) minor complications occurred within 90 days of the SA, none before first follow-up. Two patients stayed in the ambulatory surgery center 23-hour observation unit. Thirty-five patients (85.4%) completed the questionnaire, of whom 97.0% (n = 32) were satisfied with the outpatient procedure. Two patients had difficulties with postoperative pain control and were taking chronic narcotic medication before surgery.

Conclusion: Outpatient SA in an ambulatory surgery center is safe with high patient satisfaction and low rates of perioperative complications. Although larger cohorts are required to adequately determine which patients will be appropriate candidates for an outpatient SA, our findings do suggest that patients with a history of preoperative narcotic use may have difficulties or dissatisfaction with outpatient SA.

Total shoulder arthroplasty (TSA) is an excellent operation to address pain relief and to provide functional improvement for patients limited by glenohumeral arthritis who have failed to respond to conservative measures.[18] The number of TSAs performed in the United States is growing rapidly,[9,17] and patient demand is increasing substantially in the last 4 decades, with an average increase in volume of TSA of 9.4% per year.[1,9] In an age of cost-conscious health care, this has substantial implications for overall health care expenditures, including a focused attempt by health care providers to minimize costs while maintaining safety and efficacy. In particular, policymakers and hospitals are frequently looking at length of stay (LOS) after surgery as an area of focus for improvement, with recent interest in outpatient TSA.[21] According to an insurance-based database, outpatient TSA results in a $3614 cost reduction compared with matched inpatients.[7]

In the hip and knee arthroplasty literature, numerous studies have evaluated the success of outpatient procedures (LOS of 0 days) and have suggested specific eligibility criteria and perioperative analgesia protocols to permit success.[3,8,13,20,23,28–30] However, ambulatory shoulder arthroplasty (SA) is in its relative infancy, and publications delineating the results of this practice are lacking or involve only a small cohort of patients.[6] The purpose of this study was to retrospectively evaluate the safety and satisfaction of outpatient SA at 2 separate ambulatory surgery centers. Specifically, our intention was to report demographic variables of those patients selected by the senior surgeon to undergo ambulatory surgery; readmissions, complications, and unscheduled postoperative clinical visits within 90 days of the procedure; and results from an administered questionnaire meant to assess readiness for

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* Corresponding author: Brian Forsythe, MD, Midwest Orthopaedics at Rush, 1611 W Harrison St, Suite 300, Chicago, IL 60612, USA.
E-mail address: forsythe.research@rushortho.com (B. Forsythe).

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discharge and satisfaction with the overall experience. Our hypothesis was that outpatient SA would be offered to healthier and younger patients, that it demonstrated safety with a low complication profile, and that patients would generally be satisfied with their experience.

Methods

We conducted a retrospective chart review and telephone questionnaire of patients who underwent an outpatient primary anatomic TSA or reverse TSA (RTSA) at 2 ambulatory surgery centers from August 2013 to July 2016. The ambulatory surgery centers have the capacity for 23-hour observation, are physician owned, and are managed by a national surgery center corporation. Exclusions included revision procedures, hemiarthroplasties, and SA performed for fracture. After exclusion criteria were applied, consecutive patients were included. We obtained consent by telephone, at which time patients were also asked a series of questions about their experience with outpatient SA. We believe a telephone interview is sufficient for the purpose of safety and satisfaction as opposed to direct examination. In addition, to decrease the likelihood of missing early postoperative complications, patients with at least 90 days of follow-up were included. The chart review portion of this study examined all available documents in the medical record, including demographic information, past medical history, past surgical history, medication history, intraoperative anesthesia records, and postanesthesia care unit (PACU) records.

The senior authors selected patients for outpatient procedures on the basis of past medical history and active comorbidities. The following were exclusion criteria for outpatient procedures: renal disease, chronic obstructive pulmonary disease, active thromboembolic disease, active or untreated coronary artery disease, and untreated sleep apnea. A prior coronary or cerebrovascular event, if treated and stable, was not an absolute exclusion criterion. Active and untreated disease, however, was a strict exclusion criterion for outpatient SA. Furthermore, medical specialists cleared all patients for the outpatient procedures. Perioperatively, an anesthetist administered an ultrasound-guided, single-injection interscalene block augmented with epinephrine and dexamethasone to all patients, and general anesthesia was used for all patients intraoperatively. Two senior authors (B.F. and J.H.) performed all outpatient SAs at 2 separate ambulatory surgery centers. All used the deltopectoral interval and followed the implant-specific technique guidelines. One surgeon routinely administered tranexamic acid (TXA) perioperatively (n = 21) by intravenous or topical routes, whereas the other surgeon did not use TXA (n = 20). Patients with a history of a stent, stroke, transient ischemic attack, deep venous thrombosis, pulmonary embolism, or color blindness received topical TXA. In addition, all patients received standardized postoperative pain management (Table I). Before proceeding with an outpatient TSA, confirmation of an available, reliable caregiver in the home was a requisite.

Table I
Postoperative pain medication protocol by senior surgeons

Surgeon 1	Oxycodone/acetaminophen (5/325-mg tablets), 1-2 tablets every 4 hours as needed (60 tablets, with 2 possible refills) Transition to hydrocodone/acetaminophen (5/325 mg) 1-2 tablets every 6 hours as needed (30 tablets)
Surgeon 2	Oxycodone (5-mg tablets), 1-2 tablets every 6 hours as needed (75 tablets); acetaminophen, 650 mg every 6 hours; Dilaudid (2 mg), 1-2 tablets every 4 hours for breakthrough pain (10 tablets) Transition to hydrocodone/acetaminophen (5/325 mg) as needed (75 tablets)

Table II
Patient demographic information

Average combined follow-up	60.3 weeks
Average clinic follow-up	25.5 weeks
Average telephone follow-up	63.5 weeks
Age	60.6 ± 4.8 years
Gender	
Male	46.3 (19)
Female	53.7 (22)
BMI	31.8 ± 6.6
Charlson Comorbidity Index	2.9 ± 1.9
ASA class	2.3 ± 0.6
Comorbidities	
Hypertension	60.0 (25)
Diabetes mellitus	10.0 (4)
Depression	28.6 (12)
Tobacco	
Current use	4.9 (2)
Previous use	24.4 (10)
Preoperative narcotic use	17.1 (7)

BMI, body mass index; *ASA*, American Society of Anesthesiologists.
Data are presented as % (number) or mean ± standard deviation.

Results

A total of 41 outpatient primary anatomic TSA procedures (32) or RTSA procedures (9) were reviewed from August 2013 to July 2016. Of all the SAs performed at the 2 ambulatory surgery centers, only 2 patients (5%) were excluded from this study. One patient was excluded for a hemiarthroplasty revised to a TSA and another for an RTSA for a proximal humerus fracture. Comparison of the patient demographics and surgical data of these anatomic TSAs and RTSAs revealed no significant differences (Appendix). The mean age of the patients was 60.6 ± 4.8 years (range, 46.1-68.5 years); 46.3% (n = 19) were male. The mean body mass index (BMI) was 31.9 ± 6.6; 24 (58.5%) patients had a BMI >30; 14 (34.1%) patients had a BMI >35. The mean Charlson Comorbidity Index was 2.9 ± 1.9, and the mean American Society of Anesthesiologists (ASA) class was 2.3 ± 0.6. The mean follow-up was 60.3 weeks (25.5 weeks in clinic and 63.5 weeks by telephone) (Table II); 35 of the 41 (85.4%) patients were able to complete a phone questionnaire between September 2016 and November 2016.

Indications, surgical time, and recovery time in the PACU before discharge can be found in Table III. There were no intraoperative complications. One surgeon used TXA routinely and the other surgeon did not, but the differences in blood loss at the 2 centers (with TXA, mean of 103 ± 53 mL; without TXA, mean of 84.3 ± 52 mL) were not significant ($P = .21$). Two patients originally destined for

Table III
Surgical details per case

Indication	
Glenohumeral arthritis	82.9 (34)
Rotator cuff arthropathy	14.6 (6)
Avascular necrosis	2.4 (1)
Procedure	
TSA	78.0 (32)
RTSA	23.8 (9)
Implant	
Biomet Comprehensive	51.2 (21)
Tornier	36.6 (15)
Arthrex Univers II	12.1 (5)
Surgery time	101.1 ± 24.7 minutes
PACU time	
No observation patients	144.5 ± 49.3 minutes
All patients	212.5 ± 253.2 minutes
Estimated blood loss	97.6 ± 54.4 mL

TSA, total shoulder arthroplasty; *RTSA*, reverse total shoulder arthroplasty; *PACU*, postanesthesia care unit.
Data are presented as % (number) or mean ± standard deviation.

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