



Predictors of length of stay after elective total shoulder arthroplasty in the United States



John C. Dunn, MD*, Joseph Lanzi, MD, Nicholas Kusnezov, MD, Julia Bader, PhD, Brian R. Waterman, MD, Philip J. Belmont Jr, MD

Department of Orthopedic Surgery and Rehabilitation, William Beaumont Army Medical Center, El Paso, TX, USA

Background: Total shoulder arthroplasty (TSA) is an increasingly used treatment of glenohumeral arthritis and proximal humerus fractures. However, patient-specific characteristics affecting length of hospital stay postoperatively have not been elucidated.

Methods: All patients undergoing primary unilateral TSA between 2005 and 2011 were isolated from the National Surgical Quality Improvement Program database. Patient demographics, medical comorbidities, and selected surgical variables were extracted, and length of stay was established as the primary end point of interest. Risk factors were expressed as odds ratios (ORs) with 95% confidence intervals by bivariate and multivariable analysis.

Results: A total of 2004 patients were identified; the average age was 68.8 years, and 57% were women. Mean length of stay after TSA was 2.2 days (standard deviation, 1.7), and 91% of cases received hospital discharge in <3 days. Multivariable logistic regression analysis identified renal insufficiency (OR, 11.35; $P = .0002$), increased age (OR, 2.13; $P = .011$), longer operative time (OR, 1.94; $P = .0041$), and American Society of Anesthesiologists class ≥ 3 (OR, 1.86; $P = .0016$) as the most significant risk factors for length of stay. Gender also influenced length of stay; women were more likely to stay ≥ 4 days (OR, 0.44; $P < .0001$).

Conclusions: Perioperative risk stratification and preoperative counseling are paramount for patients undergoing TSA, particularly for those individuals with cardiac and renal disease or of advancing age. These variables may effectively predict prolonged hospital stay after TSA.

Level of evidence: Epidemiology Study, Database Analysis.

Published by Elsevier Inc. on behalf of Journal of Shoulder and Elbow Surgery Board of Trustees.

Keywords: Total shoulder arthroplasty; length of stay; morbidity; risk factors

Shoulder arthroplasty was first conceived in 1893 by French surgeon Jules-Émile Péan as a rubber, platinum, and wood prosthesis for a patient with a tuberculoid shoulder.²⁸

Since its modern description by Neer for the treatment of comminuted proximal humeral fractures,^{31,32} the indications for shoulder arthroplasty have expanded

Some authors are employees of the U.S. Federal Government and the United States Army. The opinions or assertions contained herein are the private views of the authors and are not to be construed as official or reflecting the views of William Beaumont Army Medical Center, the Department of Defense, or the United States government.

The American College of Surgeons National Surgical Quality Improvement Program and its participating hospitals are the source of the data used

herein; they have not verified and are not responsible for the statistical validity of the data analysis or the conclusions derived by the authors. IRB approval for this study was not necessary.

*Reprint requests: John C. Dunn, MD, Department of Orthopedic Surgery and Rehabilitation, William Beaumont Army Medical Center, 5005 North Piedras St, El Paso, TX 79920-5001, USA.

E-mail address: dunnjohnc@gmail.com (J.C. Dunn).

dramatically, and total shoulder arthroplasty (TSA) has evolved as a reliable treatment option for painful glenohumeral arthritis and other degenerative conditions.^{6,42} Subsequent studies have demonstrated the efficacy of TSA in terms of both improved range of motion and pain relief; however, the complication rate remains relatively high, ranging from 4.8% to 12%, including significant medical complications, secondary instability, periprosthetic fracture, and infection.^{4,5,11} Jain et al²⁴ found that the rates of both mortality and postoperative complications were correlated with surgeon and hospital volume. In addition, the authors found that low-volume surgeons had an increased length of hospital stay.

However, no study has previously correlated length of hospital stay after TSA with specific patient factors. Prolonged hospital stay may have important financial repercussions in health care spending and resource utilization,³⁶ and this has been associated with an increase in major postoperative morbidity and mortality in arthroplasty,²⁷ trauma,¹⁵ and spine surgery.¹⁸ The current study sought to identify specific patient and surgical risk factors for increased length of hospital stay after TSA with use of a national patient database. We hypothesize that older age and cardiopulmonary comorbidities will be associated with an increased length of stay after TSA.

Materials and methods

After Institutional Review Board exemption, the National Surgical Quality Improvement Program (NSQIP) database was obtained from the American College of Surgeons. In prior large-scale cross-sectional investigations evaluating a variety of orthopedic surgical procedures,^{2,3,34,35} the NSQIP has been validated as a reliable source of perioperative surveillance data derived from nearly 250 participating hospitals within the United States. As a part of a national quality improvement initiative, patients are prospectively enrolled and observed for 30 days after index surgery, during which a variety of specific objective outcomes are collected to further assess risk-adjusted quality of care based on these clinical end points.

The current analysis isolated all patients in the NSQIP undergoing *Current Procedural Terminology* code 23472 for TSA between 2006 and 2011. Only patients with primary unilateral TSA were considered, and any individuals with hemiarthroplasty, resurfacing arthroplasty, bilateral TSA, or revision TSA were excluded. Demographic and other patient-based parameters were collected, including age, gender, body mass index (BMI), American Society of Anesthesiologists (ASA) classification, and individual medical comorbidities. Furthermore, surgical variables, such as mode of anesthesia and total operative time, were identified. For the purposes of the study, the primary outcome of interest was length of hospital stay after elective TSA. Both bivariate χ^2 analysis and multivariate logistic regression analysis were used to evaluate variables contributing to increased duration of hospital stay. Specific patient-based and surgical risk factors included the following: presence of specific medical comorbidities, BMI (<29.9, 30.0-39.9, and ≥ 40 kg/m²), gender, ASA class

Table I Demographics and length of stay

Characteristic	Value	Patients for whom characteristic was determined (N)
Age, y, mean \pm SD	68.8 \pm 11.1	2004
Sex, N (%)	—	1998
Male, N (%)	859 (43.0)	—
Female, N (%)	1139 (57.0)	—
Body mass index, kg/m ² , mean \pm SD	30.3 \pm 6.4	1987
Operative time, min, mean \pm SD	122.9 \pm 51.2	2004
Length of stay	—	2004
≥ 4 days, N (%)	181 (9.0)	—
≤ 3 days, N (%)	1823 (91.0)	—

(1 or 2 vs. ≥ 3), age (<60, 60-69, 70-79, and ≥ 80 years old), and operative time. Operative time analysis was delineated by comparing cases that were exceeded more than 1 standard deviation above the average time with those that did not.

For bivariate analysis, any factors with a $P < .2$ were carried forward into multivariate logistic regression to further control for other identified parameters. For both bivariate and multivariable analysis, specific factor risk was defined with odds ratios (ORs) with 95% confidence intervals (CIs). Statistical significance was achieved if a P value was below .05 and 95% CI exclusive of 1.0.

Results

Between the years of 2006 and 2011, 2004 patients underwent primary unilateral TSA in the NSQIP database. The average age of patients was 68.8 (standard deviation [SD], 11.1) years, and 57% were women. The average BMI was 30.3 (SD, 6.4), and the mean operative time was 122.9 (SD, 52.1) minutes. Mean length of stay after TSA was 2.2 days, with a hospital stay of 3 days or less in 91% of patients. Conversely, only 9% of patients stayed 4 days or more after TSA (Table I).

Bivariate analysis isolated numerous significant predictors for length of stay (Table II). Renal insufficiency (OR, 13.71 [95% CI, 3.04, 61.72]; $P = .0007$), cardiac disease (OR, 8.22 [95% CI, 2.19, 30.88]; $P = .0018$), and ASA classification ≥ 3 (OR, 2.34 [95% CI, 1.70, 3.24]; $P < .0001$) were the most significant factors for increased length of stay. Multivariable logistic regression analysis identified significant independent factors for length of stay (Table III). Renal insufficiency (OR, 11.35 [95% CI, 1.68, 76.49]; $P = .0002$), increased age (OR, 2.13 [95% CI, 1.11, 4.07]; $P = .011$), and longer operative time (OR, 1.94 [95% CI, 1.23, 3.04]; $P = .0041$) were significant risk factors for length of stay.

Discussion

As the annual number of TSA procedures steadily climbs,^{1,7,11,29} a substantive analysis of length of hospital

Download English Version:

<https://daneshyari.com/en/article/4073060>

Download Persian Version:

<https://daneshyari.com/article/4073060>

[Daneshyari.com](https://daneshyari.com)