

Outpatient Shoulder Arthroplasty in the COVID-19 Era: 90-day Complications and Risk Factors

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Disclosures

- **Albert Lin has the following disclosures:**
 - Stryker/Tornier: Paid Consultant
 - Arthrex: Paid Consultant
 - American Academy of Orthopedic Surgeons: Committee or board member
 - American Shoulder and Elbow Surgeon: Committee or board member
 - American Orthopedic Society for Sports Medicine: Committee or board member
 - ISAKOS: Committee or board member
 - Knee Surgery, Sports Traumatology, Arthroscopy: Editorial or governing board
 - Annals in Joint: Editorial or governing board
 - Arthroscopy: Editorial or governing board
 - JISAKOS: Editorial or governing board
 - American Journal of Sports Medicine: Reviewer
 - Journal of American Academy of Orthopedic Surgeons: Reviewer
 - Knee Surgery, Sports Traumatology, Arthroscopy: Reviewer
 - Journal of Shoulder and Elbow Surgery: Reviewer
 - Journal of Bone and Joint Surgery: Reviewer
- **None of these disclosures are related to the content of this talk**

Background

- Shoulder arthroplasty has gained popularity over recent decades, given expanding indications and improvement in outcomes¹
- Current understanding of outpatient shoulder arthroplasty is that it is generally safe and efficacious for “appropriately selected patients”²
- With the COVID-19 pandemic placing an increased burden on healthcare systems, shoulder arthroplasties are more commonly being performed as outpatient procedures³
- Very few studies, however, have assessed outcomes of outpatient shoulder arthroplasty in the COVID-19 era with less stringent patient selection criteria

Study Objective

Aim:

- To characterize the 90-day episode-of-care complications of outpatient shoulder arthroplasty without using a prior algorithm for patient selection and to assess for their risk factors.

Hypothesis:

- Outpatient shoulder arthroplasty may be a safe procedure for all patients, regardless of patient demographics and comorbidities.

Methods

- **Retrospective cohort study** of all patients who underwent planned outpatient anatomic or reverse total shoulder arthroplasty by one fellowship-trained orthopaedic shoulder surgeon between March 2020 and January 2022
- **3-month minimum follow-up**
- **All patients were scheduled for outpatient surgery** regardless of medical comorbidities due to the COVID-19 pandemic
- Indications for shoulder arthroplasty in this study included patients with glenohumeral osteoarthritis, rotator cuff arthropathy, and humeral fracture

Methods

- **Preoperative data collection**
 - **Demographics** - age, body mass index (BMI), sex, handedness, and occupation
 - **Comorbidities** - tobacco/alcohol use, diabetes, history of MI, history of DVT/PE, COPD
 - **Charlson Comorbidity Index** and **ASA Class**
- **Outcomes**
 - Intraoperative complications
 - 90-day episode-of-care complications - unplanned hospital stay on the first night postoperatively, unplanned ED or clinic visits, unplanned hospital readmissions, need for revision, mortality, request for additional pain meds, infection, DVT/PE
 - 3-month PROs
- **Multivariate logistic regression to assess risk factors for poor outcomes**

Study Cohort

127 patients

- 92 rTSA
- 35 aTSA

Cohort Variable	Outpatient Arthroplasty (n=127)
Procedure	92 rTSA (72.4%) 35 aTSA (27.6%)
Indication	63 glenohumeral OA (49.6%) 54 RC arthropathy (42.5%) 10 humerus fracture (7.9%)
Age	68.7 ± 9.1 years
BMI	30.0 ± 6.0
Sex (Male)	59 (46.5%)
Diabetes	23 (18.1%)
Tobacco Use	21 (16.5%)
History of MI	10 (7.9%)
History of COPD	10 (7.9%)
History of DVT/PE	10 (7.9%)
ASA Physical Status	2 – Mild systemic illness: 78 (61.4%) 3 – Severe systemic illness: 49 (38.6%)
CCI	1-2 – Mild: 44 patients (34.6%) 3-4 – Moderate: 47 patients (37.0%) ≥ 5 – Severe: 36 patients (28.3%)

Results

- 15 patients required an unplanned overnight stay (6 for severe pain, 4 for postoperative hypoxia, 3 for fever, and 2 for severe nausea)
- Factors predictive of unplanned overnight stay included age over 70 years, tobacco use, and ASA status of 3

Variable (n=127)	Odds Ratio for Unplanned Overnight Stay	95% CI	p-value
Age \geq 70 years	36.80	2.20 – 615.49	0.012
BMI	1.09	0.97– 1.21	0.153
Tobacco Use	12.90	1.23 – 135.31	0.033
Diabetes	1.92	0.32 – 15.00	0.427
COPD	5.21	0.70 – 55.23	0.178
History of MI	3.76	0.25 – 67.26	0.323
History of DVT/PE	3.13	0.28 – 34.85	0.354
ASA Physical Status (3 as opposed to 2)	13.84	1.22 – 156.57	0.034
CCI \geq 5 (as opposed to CCI 1-2)	3.22	0.76 – 55.19	0.245
CCI 3-4 (as opposed to CCI 1-2)	4.15	0.33 – 76.13	0.374

Results

- 7 hospital admissions related to the surgery (2 of these were for PE, 1 for sepsis, 1 for transient global amnesia, 1 for postoperative pneumonia, 1 for a GI bleed in the setting of postoperative NSAID use, and 1 for irrigation and debridement of a surgical site infection)
 - No factors were predictive of hospital readmission
- 4 patients required a revision surgery (2 due to dislocations after a fall, 1 due to fracture after a fall, 1 surgical site infection)
 - No factors were predictive of need for revision
- 29 patients requested additional narcotic pain medication (22.8%).
- Total incidence of surgical site infection was 1 (0.8%), DVT was 3 (2.4%), and PE was 2 (1.6%).

Results

- 17 unplanned visits to either the emergency department or to the clinic (4 falls onto operative extremity, 3 for DVT, 2 for PE, 2 for postoperative altered mental status, 2 for arm swelling in which DVT was ruled out, 1 for urinary retention, 1 for surgical site infection, 1 for postoperative pneumonia, and 1 for trouble ambulating postoperatively)
- Only factor predictive of unplanned ED/clinic visit was age over 70 years old

Variable (n=127)	Odds Ratio for 90-day Unplanned ED/Clinic Visit	95% CI	p-value
Age \geq 70 years	7.90	1.26 – 45.45	0.027
BMI	1.04	0.95– 1.13	0.448
Tobacco Use	1.18	0.21 – 6.8	0.856
Diabetes	3.08	0.47 – 20.22	0.240
COPD	1.18	0.11 – 13.26	0.891
History of MI	2.33	0.23 – 11.43	0.418
History of DVT/PE	1.85	0.29 – 11.82	0.517
ASA Physical Status (3 as opposed to 2)	1.74	0.39 – 7.68	0.467
CCI \geq 5 (as opposed to CCI 1-2)	2.07	0.43 – 9.93	0.362
CCI 3-4 (as opposed to CCI 1-2)	1.52	0.18 – 13.21	0.705

Results

Outcome	Preoperative (n=127)	3-month (n=127)	% Achieving MCID	p-value
VAS	8.2 ± 6.2	1.7 ± 1.9	92	<0.001
SSV (%)	37 ± 22	76 ± 18	70	<0.001
ASES	35 ± 15 (n=81)	72 ± 15 (n=81)	91	<0.001
ROM FF (deg)	105 ± 38	129 ± 30	N/A	<0.001
ROM ER (deg)	26 ± 15	34 ± 15	N/A	<0.001

Discussion

- Very few studies have assessed clinical outcomes of outpatient shoulder arthroplasty without a preoperative patient selection criterion based on patient comorbidities
- The results of this study indicate that outpatient shoulder arthroplasty is a safe procedure with excellent 90-day outcomes and low rates of readmission regardless of comorbidities.
- We found that no specific preoperative comorbidities are predictive of unplanned ED/clinic visit, hospital readmission, and revisions within the first 90 days postoperatively.
- However, patients who are older, use tobacco, and have a preoperative ASA physical status of 3 as opposed to 2 may be more likely to require overnight hospital stay postoperatively.

Conclusion

- Outpatient shoulder arthroplasty is a safe procedure with excellent outcomes and low rates of readmissions and can be considered as the default plan for all patient undergoing shoulder arthroplasty
- Patients who are above 70 years of age, use tobacco, and have ASA score of 3, however, should be counseled regarding the higher risk of unplanned overnight hospitalization.

References

1. Bixby EC, Boddapati V, Anderson MJJ, Mueller JD, Jobin CM, Levine WN. Trends in total shoulder arthroplasty from 2005 to 2018: lower complications rates and shorter lengths of stay despite patients with more comorbidities. *JSES Int.* 2020;4(3):657-661. doi:10.1016/J.JSEINT.2020.04.024
2. Allahabadi S, Cheung EC, Hodax JD, Feeley BT, Ma CB, Lansdown DA. Outpatient Shoulder Arthroplasty—A Systematic Review. <https://doi.org/10.1177/24715492211028025>. 2021;5:247154922110280. doi:10.1177/24715492211028025
3. Mehta N, Bohl DD, Cohn MR, et al. Trends in outpatient versus inpatient total shoulder arthroplasty over time. *JSES Int.* 2021;6(1):7-14. doi:10.1016/J.JSEINT.2021.09.016

Thank You

