

# Risk of Thromboembolic Events in Patients with Hemophilia Following Total Shoulder Arthroplasty

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## INTRODUCTION:

Total shoulder arthroplasty (TSA) is a common orthopaedic procedure in which damaged areas of the shoulder joint are replaced with prosthetics. A rare, but life-threatening complication of major surgical procedures, such as TSA, is a postoperative venous thromboembolism (VTE). Research evaluating the effect of hemophilic conditions on postoperative TSA complication rate is limited. This study aims to determine the risk of post-operative complications, including VTE, in patients with hemophilic conditions following TSA.

## METHODS:

Using CPT and ICD-10 codes, we queried the Global Collaborative Network on the TriNetX database for patients undergoing TSA between May 2005 and June 2025. The study involved deidentified data, and therefore Institutional Review Board approval was not required. 129,779 patients were initially included in our study. Patients were stratified into 2 cohorts depending on whether they had a previous diagnosis of a hemophilic condition. 1:1 propensity score matching was performed to control for age at index, sex, race, type 2 DM, HTN, dyslipidemia, obesity, CKD, tobacco use, history of cancer, HbA1c, and BMI. 90-day post-operative outcomes were reported. Risk difference, risk ratio, odds ratio, and Kaplan-Meier survival analysis were used for analysis between patients without hemophilia and patients with hemophilia following TSA. p-value<0.05 was considered statistically significant.

## RESULTS:

129,779 patients were initially included in our study, with 2,105 in the hemophilia cohort compared to 127,674 controls. The two cohorts had statistical differences in multiple characteristics and comorbidities, including age, sex, and all included comorbidities. After propensity score matching, each cohort consisted of 2,103 patients. All differing comorbidities were normalized between the two groups except BMI. The risk of lower extremity deep vein thrombosis (DVT) (p<0.0001), pulmonary embolism (PE) (p<0.0001), and VTE (DVT+PE) (p<0.0001) 90 days postoperatively was significantly higher in the hemophilia cohort compared to the cohort without hemophilia. Similarly, the risk for revision (p=0.029), readmission (p=0.042), and opioid prescription (p=0.002) was also higher in the hemophilia cohort. In addition, the risk for pneumonia (p<0.0001), acute kidney injury (AKI) (p<0.0001), and urinary tract infection (UTI) (p<0.0001) was increased in patients with hemophilia. There was no difference between the two cohorts in the 90-day risk of stroke (p=0.630), death (p=0.316), periprosthetic joint infection (p=0.094), and periprosthetic fracture (p=0.673).

## DISCUSSION:

Our findings demonstrate that patients with hemophilic conditions face a significantly higher risk of complications within 90 days following TSA, including substantially elevated rates of thromboembolic events such as DVT, PE, and VTE. This contrasts with prior literature reporting low VTE risk in lower-extremity arthroplasty among hemophilia patients, where bleeding complications have historically been the primary concern. In addition, hemophilia patients undergoing TSA experienced higher rates of revision surgery, readmission, opioid prescription, and medical complications such as pneumonia, acute kidney injury, and urinary tract infection, suggesting a more complex postoperative course requiring closer surveillance and management. Notably, no differences were observed between cohorts for stroke, death, periprosthetic joint infection, or fracture, highlighting that not all complications are increased in this population. Limitations include reliance on retrospective database data and short-term follow-up. These results emphasize the need for tailored perioperative protocols to mitigate complication risk in hemophilia patients undergoing TSA.

## SIGNIFICANCE/CLINICAL RELEVANCE:

Patients with hemophilia undergoing total shoulder arthroplasty face a significantly higher risk of early postoperative complications—including thromboembolic events, infection, and readmission—underscoring the need for specialized care, close monitoring, and potential tailored perioperative management for this population.

## TABLES:

Outcomes	Hemophilia (%)	Control (%)	p-value
PJI	1.52%	0.95%	0.094
Revision	1.81%	1.38%	<b>0.029</b>
Readmission	1.47%	0.81%	<b>0.042</b>
Periprosthetic fracture	1.28%	1.14%	0.673
DVT	5.14%	1.47%	<b>&lt;0.0001</b>
PE	3.61%	1.19%	<b>&lt;0.0001</b>
VTE	6.32%	1.81%	<b>&lt;0.0001</b>
PNA	4.61%	2.43%	<b>&lt;0.0001</b>
AKI	5.09%	2.81%	<b>&lt;0.0001</b>
Stroke	1.76%	1.57%	0.63
UTI	5.71%	3.28%	<b>&lt;0.0001</b>
Outcome	Hemophilia (mean +/- SD)	Control (mean +/- SD)	p-value
Opioid	3.43 +/- 5.78	2.38 +/- 3.63	<b>&lt;0.0001</b>

**Table 1.** Summary of complication rates in the two cohorts.