Postoperative Complications in Patients with Sickle Cell Disease Following Total Shoulder Arthroplasty

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INTRODUCTION: Sickle cell disease (SCD) encompasses a spectrum of genetic hematologic disorders characterized by sickling of erythrocytes. Patients may experience musculoskeletal manifestations of SCD, such as proximal humerus avascular necrosis, for which total shoulder arthroplasty (TSA) may be considered. Prior literature suggests patients with sickle cell diseases are more likely to suffer certain complications following orthopedic procedures. However, this has not be investigated for those undergoing TSA.

METHODS: Adult TSA patients (age >18 years) were identified in the 2010-2023 PearlDiver M170 database. Patients with SCD (including sickle cell anemia (Hgb S-S), sickle cell thalassemia, and sickle cell-Hgb C disorder) were identified and matched 1:4 to patients without sickle cell diseases based on age, sex, and Elixhauser comorbidity index (ECI).

Ninety-day postoperative complications, emergency department (ED) visits, and readmissions were identified in both patient cohorts by International Classification of Diseases (ICD)-9/10 and Current Procedural Terminology (CPT) codes. Complications were compared by univariable and multivariable analyses (the latter controlling for age sex and ECI). A Kaplan-Meier survival curve was generated to compare 5-year revision rates by log rank test.

RESULTS: Among TSA patients in the database, SCD was identified for 278 and compared to 1,076 matched controls. Of patients with SCD, 68.0% of patients were female, and of control patients, 68.2% were female.
SCD was associated with greater odds of any aggregate adverse events (OR=9.41), serious adverse events (OR=5.96), and minor adverse events (OR=10.30) ($p<0.001$ for all), as well as nearly all individual complications studied (Figure 1). Ninety-day ED visits were also significantly more common in the sickle cell cohort (OR=5.67, $p<0.001$). However, 90-day readmissions and 5-year survival to revision did not differ significantly among those with versus without SCD (Figure 2).

DISCUSSION: Patients with SCD were at significantly elevated odds of many complications relative to those without sickle cell diseases following total shoulder arthroplasty. Surgeons should consider this elevated risk when conducting preoperative counseling. Reassuringly, the elevated odds of complication during the acute postoperative period did not correlate with increased rates of revision over the course of 5 years, though this finding could partially represent a hesitancy to re-operate on patients at such high risk of postoperative complications.

SIGNIFICANCE/CLINICAL RELEVANCE: Patients with sickle cell disease are at high risk of postoperative complication following TSA, and careful consideration of treatment options, thorough preoperative counseling, and perioperative optimization are necessary when considering these patients for TSA.

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IMAGES AND TABLES:

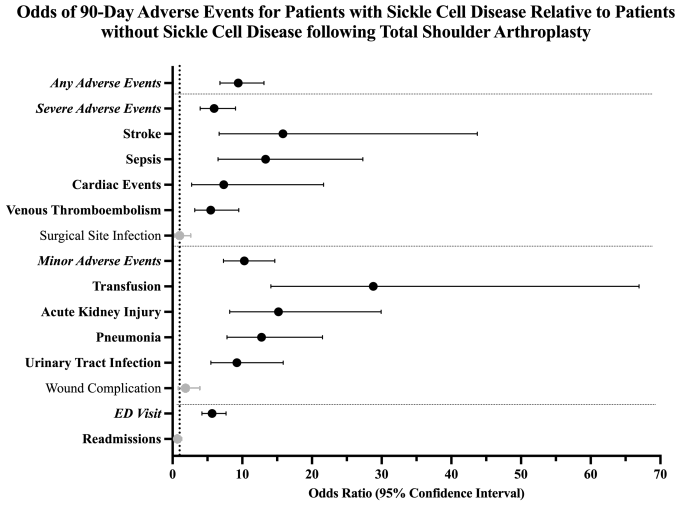

Figure 1. Forest plot depicting the odds of 90-day adverse events for patients with sickle cell disease relative to those without sickle cell disease following total shoulder arthroplasty. Black bars indicate statistical significance ($p<0.05$).

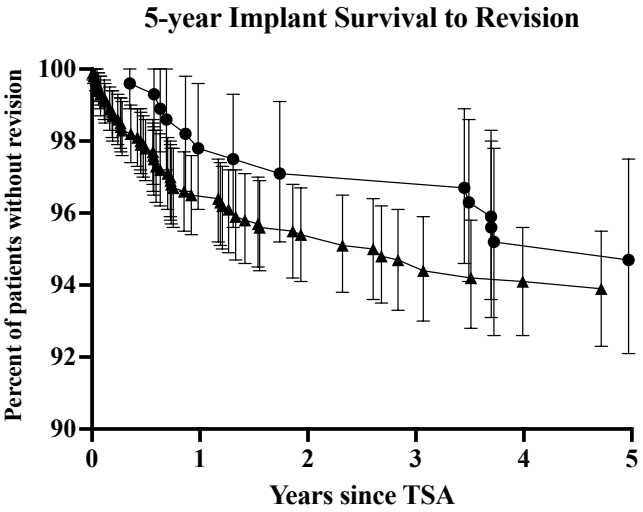

Figure 2. Kaplan-Meier analysis of implant survival to TSA revision for patients with sickle cell disease relative to those without sickle cell disease following total shoulder arthroplasty. No significant difference detected ($p=0.50$).