Outcomes following total shoulder arthroplasty in patients with systemic lupus erythematosus

Andrew Salib[1], Joshua Sanchez[1], Lenique Huggins[2], Julian Smith-Voudouris[1], Meera Dhodapkar[1], Fotios Koumpouras, MD[3], Jonathan Grauer, MD[1]

[1]Yale School of Medicine Department of Orthopaedics and Rehabilitation, New Haven, CT, USA
[2]Yale School of Medicine Department of Dermatology, New Haven, CT, USA
[3]Yale School of Medicine Department of Rheumatology, New Haven, CT, USA

Financial disclosures/conflicts of interests: Andrew Salib (N), Joshua Sanchez (N), Lenique Huggins (N), Julian Smith-Voudouris (N), Meera Dhodapkar (Richard K. Gershon, M.D. Fund at Yale University School of Medicine, Associate Editor Visual Abstracts North American Spine Society Journal), Fotios Koumpouras (N), Jonathan Grauer (Editor-in-Chief of North American Spine Society Journal).

INTRODUCTION: Total shoulder arthroplasty (TSA – anatomic or reverse) is a common procedure with a variety of indications. As such, candidate patients may present with comorbid conditions such as systemic inflammatory disorders. One of the most prominent inflammatory disorders is systemic lupus erythematosus (SLE), which is a multisystem autoimmune disorder characterized by aberrant B and T cell response to self-antigens. Patients with SLE have been shown to experience impaired healing processes. However, postoperative risks for SLE patients undergoing TSA are not well characterized. The aim of the present study was to examine the relationship of SLE with the risk of 90-day postoperative complications and 5-year implant survival following TSA within a large, administrative database.

METHODS: Adult patients with and without SLE who underwent TSA from October 2010 to April 2022 were identified in the PearlDiver M161 database. Exclusion criteria included patients age < 18 years, a history of infection, neoplasm, or trauma within 90 days of surgery, or patients not active in the database for at least 90 days following their procedure. Patients without and with SLE were 4:1 matched on age, sex and Elixhauser comorbidity index.

Univariable analyses and multivariable logistic regression (controlling for age, sex, ECI) were then performed on the matched populations to compare postoperative 90-day adverse events and five-year implant survival.

RESULTS: Overall, 73,732 TSA patients who met inclusion criteria were identified, of which 1,031 (1.4%) had a history of SLE. After matching, 3,638 patients without SLE and 922 patients with SLE were selected.

On multivariable analysis of the matched groups, patients with SLE were at increased odds of 90-day (in decreasing ORs): cerebrovascular incident (OR 6.95), prosthetic loosening (OR 5.27), pneumonia (OR 4.80), venous thromboembolism (OR 4.31), acute kidney injury (OR 4.01), nerve injury (OR 3.72), cardiac event (OR 3.23), prosthetic dislocation (OR 2.84), bleeding-related events (OR 2.81), sepsis (OR 2.68), and respiratory failure (OR 2.27) (**Figure** 1, $p < 0.0023$ for all).

Also, SLE patients were at an increased odds of aggregated events including all adverse events (OR 3.39), severe adverse events (OR 4.27), minor adverse events (OR 3.46), and orthopaedic-related events (OR 2.58) (**Figure 1**, $p < 0.0023$ for all). However, there was no difference in 5-year implant survival between study groups.

DISCUSSION: The current study examined postoperative outcomes between matched cohorts of patients with versus without SLE and found them to be at increased odds of a number of individual and aggregated adverse events following TSA. However, it was reassuring that no difference in 5-year implant survival was found between study groups.

SIGNIFICANCE/CLINICAL RELEVANCE: This data has important implications for optimizing and counseling lupus patients who are considered for TSA. Surgeons should be aware that while SLE increases risk of adverse events, five year differences in implant survival were not significantly different.

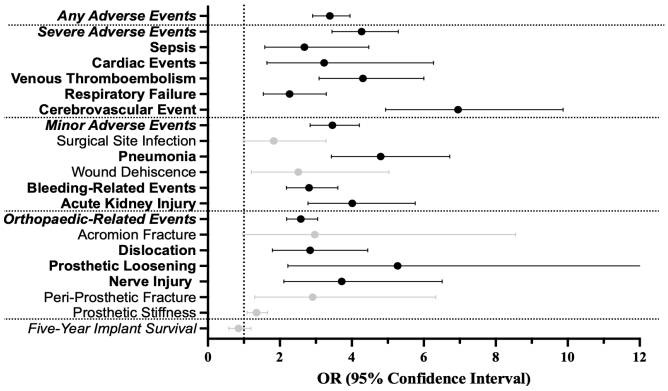

Figure 1. Multivariable analysis of 90-day outcomes of adult patients with systemic lupus relative to those without who underwent total shoulder arthroplasty, black points and bars represent statistically significant odds ratios (OR) and 95% CI, grey points and bars represent statistically insignificant OR and 95%