

Ethnic Differences in Glenoid Version and Local Bone Density in Patients Undergoing Primary Anatomic Total Shoulder Arthroplasty for Glenohumeral Arthritis

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INTRODUCTION:

Previous studies have documented racial disparities in utilization rates, comorbidities, and outcomes for total shoulder arthroplasty (TSA). Black patients undergo fewer total shoulder arthroplasties with longer hospital stays and increased rates of skilled nursing facility (SNF) discharges compared to white patients. It is also known that pre-operative radiographic variables can significantly affect outcomes after shoulder arthroplasty. Therefore, the purpose of this study was to assess anatomic differences between white and black patients with regards to glenoid version, inclination, glenoid vault bone density, and proximal humeral bone density, and examine outcomes such as length of stay, SNF discharge rates, and readmissions.

METHODS:

A retrospective review was performed on primary TSAs performed between July 2013 and August 2021 at a single institution. Selected sociodemographic factors, comorbidities, and glenoid anatomy metrics, such as degrees of version, inclination, and bone densities, were used to compare comorbidity burden and anatomic differences between white and black patients. Preoperative CT scans were used to assess glenoid anatomy including version, inclination, presence of biconcave glenoid wear, proximal humeral bone density in Hounsfield units (HUs), and glenoid bone density in HUs. Chi Square and T-test analysis were used to compare the prevalence or severity for categorical and continuous variables, respectively, between white and black patients receiving primary TSA.

RESULTS:

533 Caucasian patients and 75 Black patients were included. The black patient cohort had a significantly higher BMI ($p = 0.001$), prevalence of renal failure ($p = 0.005$), and psychoses ($p = 0.011$), higher current smoking status ($p < 0.001$), and lower mean household income ($p = 0.008$). The black patient cohort had significantly less retroversion, a lower proportion of B2 glenoids ($p = 0.018$) and had higher glenoid and proximal humeral bone density than the white patient cohort ($p = 0.003$; $p = 0.004$). There was no significant difference between length of stay ($p = 0.773$), operative time (0.063), 90-day readmission ($p = 0.803$), or 90-day ED visits ($p = 0.564$) between the two patient cohorts.

DISCUSSION AND CONCLUSION:

Differences in comorbidities and sociodemographic factors exist between white and black patients undergoing total shoulder arthroplasty, with renal failure, psychoses, current smoking status, higher BMI, and lower mean household income being more prevalent in black patients. However, black patients undergoing TSA did not show a greater risk of prolonged length of stay, discharge to skill nursing facility, or 90-day ED visits or readmissions. Upon analyzing glenoid anatomy, black patients also had less glenoid retroversion with increased glenoid and humeral metaphysis bone density, which may have implications for glenoid and humeral component fixation strategies.