Shoulder Arthroplasty Patients are Underscreened for Osteoporosis

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INTRODUCTION: Osteoporosis and osteoporosis related fragility fractures present a large public-health issue in the United States, with studies reporting a one-year mortality rate of 30% for patients who sustain a fragility hip fracture. Osteoporosis screening and subsequent treatment has been shown to be efficacious in decreasing the rates of fragility fractures and periprosthetic fractures (PPF). However, current screening and treatment rates are low. This study aims to determine 1) the prevalence of total shoulder arthroplasty (TSA) patients who meet criteria for osteoporosis screening, 2) the prevalence of those screened, and 3) the 5-year cumulative incidence of fragility fracture (FF) and periprosthetic fractures (PPF).

METHODS: A national insurance database was utilized to identify all patients over the age of 50 who underwent TSA. Guidelines from the American Association of Clinical Endocrinologists were used to stratify patients into "high-risk" and "low-risk" of osteoporosis cohorts using International Classification of Disease (ICD) codes for various risk factors. Patients were considered "high-risk" if they were a woman of at least 65 years of age, a man of at least 70 years of age, and at least 50-years of age with known non-age-related risk factors for osteoporosis. These risk factors included smoking status, alcohol abuse/dependence, being underweight (BMI < 18.5), having a prior fragility fracture, utilizing chronic corticosteroids (defined as patients having a systemic corticosteroid prescription for at least 3 months), and metabolic conditions affecting sex hormones (i.e., hypogonadism) and inherited conditional affecting bone mineral density (i.e.., osteogenesis imperfecta). The prevalence of osteoporosis screening using dual-energy x-ray absorptiometry (DXA) scan was analyzed and the 5-year cumulative incidence of FF and PPF was calculated between the "low-risk" and "high-risk" groups using Kaplan-Meier analysis.

RESULTS: In total, 66,140 (65.5%) who underwent TSA were considered "high-risk" for osteoporosis. Of the "high-risk" patients, 11.7% patients received routine osteoporosis screening preoperatively. Of the risk factor groups, chronic steroid users were the most likely screened (30.9%), followed by females aged 65 years and older (19.7%) and those underweight (14.1%). The 5-year cumulative incidence rates for fragility fractures for those at "high-risk" and "low-risk" for osteoporosis following TSA were 1.7% and 0.8%, respectively (Figure 1). The 5-year cumulative incidence rates for PPF for those at "high-risk" and "low-risk" for osteoporosis following TSA were 0.3% and 0.2%, respectively (Figure 2). Patients at "high-risk" for osteoporosis had significantly higher risk of fragility fractures (HR: 2.42; 95% CI: 2.1-2.8; p<0.001; Table 3) and PPF (HR: 1.4; 95% CI: 1.0-1.9; p=0.037; Table 3) within 5-years of TSA when compared to those at "low-risk" (Table 1).

DISCUSSION AND CONCLUSION: There is a high prevalence of osteoporosis among patients undergoing total shoulder arthroplasty, but a low rate of routine osteoporosis screening in this cohort. More than half of shoulder arthroplasty patients are at "high-risk" for osteoporosis with less than 15% of these patients receiving endocrinology guideline recommended screening. Patients with osteoporosis who are categorized as "high-risk" have an increased rate of fragility fractures and periprosthetic fractures. Therefore, there is an opportunity to increase appropriate osteoporosis screening and management in this cohort which may affect future risk of fragility fracture and periprosthetic fracture.

Figure 1. 5-Year Cumulative Incidence of Fragility Fracture following Total Shoulder Arthroplasty
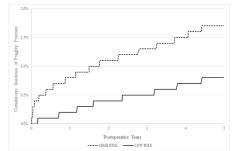

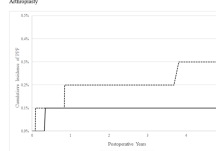Figure 2. 5-Year Cumulative Incidence of Periprosthetic Fracture following Total Shoulder Arthroplasty

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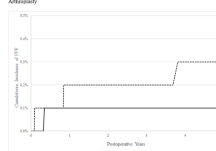
Table 1. Cox Proportional Hazard Ratio Analysis of Risk of Periprosthetic Fracture and Fragility Fracture within 5-years of Total Shoulder Arthroplasty

	HR	95% CI	P-VALUE
FF	2.42	2.06-2.84	<0.001
PPF	1.4	1.02-1.92	0.037

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