Differences in Primary Total Shoulder Arthroplasty Volume, Reimbursement, Practice Styles, and Patient Populations Based on Surgeon Gender: A Temporal Analysis

Camryn Sumwalt Payne[1], Eugenia Lin, Vikram Singh Gill, Alexandra Cancio-Bello, Jack Haglin[2], John M Tokish
[1]Mayo Clinic Alix School of Medicine, [2]Mayo Clinic

INTRODUCTION: Orthopedic surgery has previously been shown to have a shortage of female physicians and a gender pay gap. However, this has not been thoroughly evaluated in the setting of shoulder surgery. The primary purpose of this study was to evaluate differences in total shoulder arthroplasty (TSA) volume, reimbursement, surgeon billing practices, and patient populations between male and female surgeons from 2013 to 2021.

METHODS: The Medicare Physician and Other Practitioners database, a publicly available dataset that includes 100% of services billed to Medicare Part B was utilized. The database was queried for all billing episodes of Current Procedural Terminology (CPT) code 23472, which encompasses both anatomic and reverse primary TSA. Procedural volume, average inflation-adjusted reimbursement per TSA, physician billing information, and the patient demographics of each surgeon who performed TSAs were collected. Welch's t-test and Kruskal-Wallis were utilized to compare male and female surgeons each year between 2013 and 2021.

RESULTS: Between 2013 and 2021, the proportion of TSA surgeons that are female increased from 1.9% to 3.3%. The number of TSAs performed by female surgeons nationally increased from 1.8% to 2.9% (+1.1%). This increase was greatest in the Northeast (2.0% to 6.1%), while a decrease was seen in the Midwest (1.9% to 1.6%). In 2021, there was no significant difference between male and female surgeons in the average inflation-adjusted reimbursement per TSA ($1,144.00 vs $1,143.00, p=0.79) and the average number of TSAs performed per surgeon (26.6 vs 23.1, p=0.10). Female TSA surgeons, on average, had less Medicare beneficiaries (348 vs 462, p<0.001), performed fewer annual services (1,817 vs 3,630, p<0.001), and performed fewer unique services (60 vs 76, p<0.001) compared to male surgeons. A higher proportion of female surgeon's patient populations were non-White (24% vs 22%, p=0.02), female (61% vs 59%, p=0.001), and dual enrolled Medicare-Medicaid patients (13 vs 10, p<0.001). However, there was no difference in the average patient complexity between male and female TSA surgeons based on hierarchical condition category (HCC) score (1.08 vs 1.07, p=0.22).

DISCUSSION AND CONCLUSION: Female representation within TSA surgery is increasing nationally, with the greatest representation in the Northeast and West and the lowest representation in the South and Midwest. Although female TSA surgeons perform a similar number of TSAs, receive comparable reimbursement per TSA, and have a similarly complex patient population as their male counterparts, they perform significantly fewer total and unique billable services annually. Additionally, female TSA surgeons tend to see more non-White, women, and dual Medicare-Medicaid enrolled patients.

Figure 1: Average National Inflation-Adjusted Reimbursement by Gender for TSA

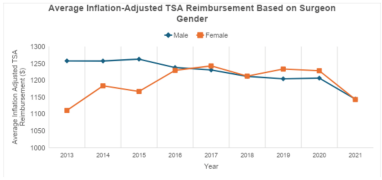

Table 1: Differences in TSA Within the Medicare Population Based on Surgeon Gender

	2013			2021		
	Male	Female	p-value	Male	Female	p-value
Surgeons	936	18	n/a	1,733 (+85.1%)	60 (+233.3%)	n/a
TSA's Performed	22,887	417	n/a	46,126 (+101.5%)	1,385 (+232.1%)	n/a
Reimbursement	$1,257.56	$1,110.52	0.18	$1,144.00 (-9.0%)	$1,143.00 (+2.9%)	0.79
TSA per Surgeon	24.45	23.17	0.73	26.62 (+8.9%)	23.08 (-0.4%)	0.10
Average Beneficiaries per Surgeon	490.97	267.33	**<0.001**	461.67 (-6.0%)	348.07 (+30.2%)	**<0.001**
Total Annual Services Per Surgeon	3,293.98	1,191.50	**<0.001**	3,630.21 (+10.2%)	1,817.13 (+52.5%)	**<0.001**
Average Services Per Beneficiary	6.71	4.46	**<0.001**	7.86 (+17.2%)	5.22 (+17.1%)	**<0.001**
Unique Services Billed	92.43	62.33	**0.002**	75.85 (-17.9%)	60.43 (-3.0%)	**<0.001**
Beneficiary Average Age	72.43	71.23	**0.02**	73.31 (+1.2%)	72.91 (+2.4%)	**0.01**
Beneficiary Average HCC	1.13	1.19	0.89	1.08 (-4.7%)	1.07 (-9.4%)	0.22
Beneficiary Average % White	89.15	83.66	0.12	88.23 (-1.0%)	86.33 (+3.2%)	**0.02**
Beneficiary Average % Female	60.56	61.87	0.97	58.84 (-2.8%)	61.07 (-1.3%)	**0.001**
Beneficiary Average % Dual Medicare and Medicaid	13.87	19.62	0.07	9.91 (-28.6%)	13.04 (-33.6%)	**<0.001**

Figure 4: 2021 Geographic Differences in Inflation-Adjusted Medicare Reimbursement for TSA Based on Surgeon Gender