Insufficient Work Relative Value Units Fails to Adequately Compensate Septic Revision Total Shoulder Arthroplasty

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INTRODUCTION: Revision total shoulder arthroplasty (TSA) for prosthetic joint infection (PJI) is more time and resource intensive compared to aseptic revisions. The assigned Work Relative Value Units (wRVUs) may not accurately reflect the added workload of PJI revision cases. This study aims to assess whether the compensation given to physicians performing revision TSA procedures is adequate, particularly in cases of PJI revision compared to aseptic revision.

METHODS: The National Surgical Quality Improvement Program (NSQIP) database was queried from 2006 to 2021 to identify aseptic and septic revision TSA cases. wRVU, operation time, wRVU per minute, and dollars per minute were compared between the cohorts. Univariate and multivariate analyses were conducted to determine differences in work effort and assess wRVU accuracy for one-component and two-component septic revision shoulder arthroplasty. The RVU-to-dollar conversion factor was provided by the U.S. Centers for Medicare & Medicaid Services (CMS), and RVU dollar valuations were calculated.

RESULTS SECTION: We identified 2214 and 190 patients who underwent aseptic and septic revision TSA respectively. The mean duration of aseptic revision TSA was 126.83, while the mean for septic revision TSA was 135.43 minutes (p=0.025). Consequently, the wRVUs per minute were calculated as 0.26 for the aseptic revision cohort and 0.23 for the septic revision cohort (p=0.002). Aseptic revision TSA cases were valued higher with a dollar per minute of $503.64, whereas septic revision TSA cases had a dollar per minute value of $452.93 (p=0.002).

DISCUSSION: The current state of physician reimbursement for septic revision TSA does not align with the increased complexity and worse postoperative outcomes associated with these procedures. This incongruity may discourage healthcare providers from performing these operations, which could result in delayed or inadequate treatment for patients with PJI's. As a result, the study suggests a need for a more precise system of RVU assignment in septic revision TSA cases to ensure that physicians are compensated fairly for their work.

SIGNIFICANCE: This study underscores the discordance between the procedural complexity and adverse outcomes of PJI revision in TSA and the current physician reimbursement. More equitable compensation could promote more timely and comprehensive treatment for patients with PJI, ultimately improving the quality of care provided.

Table 1. RVU and operation time comparison between aseptic and septic revision total shoulder arthroplasty cohorts

	Total n = 2404	Aseptic n = 2214	Septic n = 190	p-value
Work RVU	26.39 ± 1.07 (25.00, 27.21)	26.39 ± 1.07 (25.00, 27.21)	26.47 ± 1.05 (25.00, 27.21)	0.314
Operation Time	126.14 ± 61.46 (21.00, 695.00)	126.12 ± 61.72 (21.00, 695.00)	135.43 ± 57.68 (30.00, 418.00)	**0.025**
RVU per Minute	0.26 ± 0.12 (0.04, 1.30)	0.26 ± 0.13 (0.04, 1.30)	0.23 ± 0.11 (0.07, 0.83)	**0.002**
USD per Hour	$499.63 ± $242.39 ($76.13, $2519.53)	$503.64 ± $244.74 ($76.13, $2519.53)	$452.93 ± $208.07 ($126.58, $1620.42)	

Data are presented as Mean ± Standard Deviation (Range). RVU, relative value unit; USD, United States Dollar. All p values were determined by one-way analysis of variance. Dollars per hour were calculated using the Centers for Medicare and Medicaid Services 2021 RVU conversion factor.

Table 2. Estimates of USD per hour between aseptic versus septic revision total shoulder arthroplasty with sequentially added covariates

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Intercept	503.64*** (5.14)	530.50*** (17.41)	405.25*** (36.44)	404.20*** (36.49)	394.82*** (44.12)	330.71*** (60.74)	331.88*** (55.82)
Septic	-50.71** (18.30)	-50.11** (18.30)	-48.77** (18.25)	-48.22** (18.27)	-47.98** (18.29)	-50.39** (18.32)	-50.93** (18.27)
Two Component	—	-16.51 (10.22)	-16.98 (10.19)	-16.97 (10.19)	-16.99 (10.20)	-15.97 (10.21)	-15.98 (10.20)
Age	—	—	1.87*** (0.48)	1.84*** (0.48)	1.85*** (0.48)	1.61** (0.50)	1.64*** (0.49)
Female Sex	—	—	—	5.46 (9.93)	5.37 (9.93)	5.59 (9.93)	—
BMI	—	—	—	—	0.27 (0.072)	-0.01 (0.75)	—
ASA II	—	—	—	—	—	80.85 (46.65)	80.18 (46.58)
ASA III	—	—	—	—	—	92.19* (46.78)	91.61* (46.52)
ASA IV	—	—	—	—	—	103.58* (52.54)	103.04* (52.39)
Adjusted R^2	0.00277	0.00344	0.00933	0.00905	0.00869	0.009479	0.10180
p-value	0.00563	0.00589	0.00001	0.00003	0.00009	0.00015	0.00003

Data are presented as Coefficient (Standard Error). Statistical significance is displayed as *p<0.05, **p<0.01, ***p<0.001. Two component revision covariate is compared to a baseline of one component revision. ASA covariates were compared to a baseline of ASA I. BMI, body mass index; ASA, American Society of Anesthesiologists; USD, United States Dollar.