

The Seasonal Variability of Surgical Site Infection Following Shoulder Arthroplasty

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INTRODUCTION: While previous studies have demonstrated the impact of seasonal factors on surgical site infections, it is unclear whether similar patterns exist in those undergoing shoulder arthroplasty. The purpose of this study was to determine the months and seasons of the calendar year that exhibit significant variations in postoperative infection rates following shoulder arthroplasty.

METHODS: The National Readmission Database (NRD) was utilized from 2016 to 2018 to identify patients readmitted within 30 days of their shoulder arthroplasty procedure for a primary diagnosis of a surgical site infection (SSI). Infection rates were calculated and compared on a monthly and seasonal basis. The likelihood of developing SSI based on discharge month, payer status, hospital size, and patient comorbidities were assessed.

RESULTS: 18,715 hemiarthroplasty (HA), 123,643 anatomic shoulder arthroplasty (aTSA), and 194,000 reverse shoulder arthroplasty (rTSA) cases were identified using weighted data. 79 (0.42%) HA, 155 (0.13%) aTSA, and 522 (0.27%) rTSA patients were readmitted at 30-days for SSI. The cumulative highest rate of readmission at 30-days due to SSI were for those discharged in July and August. Cumulatively, patients discharged in July, August, or September had 2.301 (1.65 to 3.218, $p < 0.001$), 1.581 (1.110 to 2.252, $p = 0.011$), and 1.559 (1.109 to 2.227, $p = 0.015$) times more likely, respectively, to be readmitted within 30-days for SSI. Patients discharged in the Summer had a 1.357 (1.089 to 1.692, $p = 0.007$) times higher risk of being readmitted within 30-days for SSI.

DISCUSSION AND CONCLUSION: The cumulative incidence of SSI after shoulder arthroplasty was highest in July through September and lowest in January, mirroring our seasonal observation of a peak in the summer months and trough in winter. These findings highlight the potential for scheduling elective shoulder arthroplasties for high-risk patients during periods of reduced infection risk.

Table I Breakdown of 30-day SSI based on Arthroplasty Type

		All Cases, N (%)			
		HA	aTSA	rTSA	Total
30-day SSI	No	18636 (99.6)	123487 (99.9)	193478 (99.7)	335601 (99.8)
	Yes	79 (0.4)	155 (0.1)	522 (0.3)	756 (0.2)

Table II Comparison of 30-day SSI based on Month of Discharge for Index Surgical Procedure

Month	HA	Odds Ratio (95% CI)	P Value	aTSA	Odds Ratio (95% CI)	P Value
January	6 (7.9)	Reference		10 (6.6)	Reference	
February	2 (2.6)	0.307 (0.051 to 1.848)	0.197	21 (13.8)	2.173 (1.023 to 4.615)	0.043
March	3 (3.9)	0.647 (0.168 to 2.492)	0.527	8 (5.3)	0.822 (0.326 to 2.07)	0.677
April	5 (6.6)	1.074 (0.323 to 3.575)	0.908	6 (3.9)	0.67 (0.247 to 1.818)	0.432
May	3 (3.9)	0.744 (0.187 to 2.962)	0.675	18 (11.8)	2.072 (0.959 to 4.48)	0.064
June	4 (6.6)	0.996 (0.285 to 3.48)	0.994	10 (6.6)	1.111 (0.461 to 2.679)	0.814
July	16 (21.1)	4.207 (1.62 to 10.93)	0.003	13 (8.6)	1.73 (0.757 to 3.956)	0.194
August	9 (11.8)	2.133 (0.747 to 6.094)	0.157	20 (13.2)	2.44 (1.141 to 5.218)	0.021
September	17 (22.4)	3.984 (1.546 to 10.265)	0.004	18 (11.8)	2.186 (1.009 to 4.733)	0.047
October	9 (11.8)	1.98 (0.696 to 5.63)	0.200	7 (4.6)	0.751 (0.289 to 1.951)	0.557
November	2 (2.6)	0.42 (0.081 to 2.181)	0.302	21 (13.8)	2.071 (0.973 to 4.408)	0.059
December	3			4		
Month	rTSA	Odds Ratio (95% CI)	P Value	Total	Odds Ratio (95% CI)	P Value
January	36 (7.1)	Reference		51 (7.0)	Reference	
February	48 (9.4)	1.273 (0.827 to 1.958)	0.272	71 (9.6)	1.359 (0.950 to 1.943)	0.093
March	47 (9.2)	1.154 (0.749 to 1.778)	0.516	58 (7.9)	1.066 (0.734 to 1.547)	0.738
April	63 (12.4)	1.639 (1.09 to 2.465)	0.018	74 (10.0)	1.437 (1.009 to 2.048)	0.045
May	43 (8.4)	1.132 (0.727 to 1.762)	0.583	64 (8.7)	1.287 (0.893 to 1.856)	0.176
June	36 (7.1)	0.962 (0.606 to 1.527)	0.871	50 (6.8)	1.008 (0.683 to 1.486)	0.969
July	70 (13.7)	2.127 (1.425 to 3.174)	<0.001	99 (13.4)	2.301 (1.645 to 3.218)	<0.001
August	46 (9.0)	1.268 (0.821 to 1.958)	0.285	75 (10.2)	1.581 (1.110 to 2.252)	0.011
September	37 (7.3)	1.071 (0.678 to 1.693)	0.768	72 (9.8)	1.559 (1.109 to 2.227)	0.015
October	43 (8.4)	1.114 (0.715 to 1.734)	0.634	59 (8.0)	1.129 (0.778 to 1.639)	0.524
November	41 (8.0)	1.043 (0.667 to 1.631)	0.854	64 (8.7)	1.186 (0.822 to 1.712)	0.362
December	11			18		