Shoulder Arthroplasty Trends in Patients with Rheumatoid Arthritis Receiving DMARD Therapy

Sribava Sharma, Andrew Stephen Miller, Tyler John Bahoravitch, Kevin K Mathew, Abdulaziz Farouk A. Ahmed[1], Saisanjana Vattigunta, Matthew Joseph Best[2], Umasuthan Srikumaran
[1]Johns Hopkin School of Medicine, [2]Johns Hopkins University

INTRODUCTION:

Disease modifying antirheumatic drugs (DMARDs) are used to treat Rheumatoid Arthritis (RA) and may lead to remission and decreased rates of joint arthroplasty. The rates of total shoulder arthroplasty (TSA) in RA patients since the implementation of DMARDs therapy is unknown. Furthermore, the utilization rates of TSA among various age cohorts as well as by procedure type (anatomic (ATSA) and reverse (RTSA) total shoulder arthroplasty) are not well defined in this patient population. The primary aim of this study was to assess TSA trends from 2011-2019 for in RA patients with and without filled DMARD prescriptions.

METHODS:

A retrospective trends analysis utilizing a national claims database was performed investigating the trends of TSA in RA patients with and without DMARD prescription claims from 2011-2019. Patients were identified using International Classification of Diseases (ICD) codes and database-specific drug codes were used to identify DMARD prescriptions. Patients were divided into two cohorts: RA patients who underwent a TSA either with or without DMARD prescription claims. Patients were also stratified by age groups (<59, 60-69, and >70 years) and procedure type (ATSA and RTSA) for analysis. Linear regression and compound annual growth rate (CAGR) were performed to compare trends of surgical utilization. Significant changes between trends were determined using an interaction term between the trend and calendar year within the regression. Statistical analysis was two-tailed and were performed with Stata version 17.0 (StataCorp, TX).

RESULTS:

From 2011-2019, incidence of TSA in RA patients without filled DMARD prescriptions increased significantly more than RA patients with filled prescriptions (CAGR = 9.43% vs -0.54%; linear regression P<0.001; quadratic P<0.001) (**Figure 1**). Among the age groups, incidence of TSA in RA patients with and without filled DMARD prescriptions significantly increased among all age groups (P<0.001). The rate of change of TSA incidence in RA patients was significantly higher increased in patients without filled DMARD prescription for all age groups compared to RA patients with filled prescriptions (P<0.001) (**Table 1**). By procedure type, the incidence of RTSA were significantly increasing while incidences of ATSA were significantly decreasing in both groups (P<0.001).

DISCUSSION AND CONCLUSION:

The incidence of TSA has increased significantly more in RA patients who have not filled DMARD prescriptions when compared to RA patients with filled prescriptions. Across all age groups, TSA was performed increasingly more in patients without filled prescriptions than in patients with filled prescriptions. Additionally, our findings show a greater increase in TSA surgeries among patients younger than 59 without filled prescriptions suggesting that DMARD therapy may play a beneficial role in preventing or delaying the need for TSA in RA patients.

Figure 1. Incidence of rheumatoid arthritis patients with and without disease-modifying antirheumatic drugs (DMARDs) receiving total shoulder arthroplasty from 2011-2019.

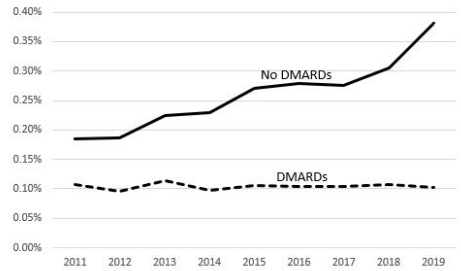

Table 1. Incidence of rheumatoid arthritis diagnosis patients with and without disease-modifying antirheumatic drugs (DMARDs) receiving total shoulder arthroplasty from 2011-2019 stratified by age. P-values bolded if <0.05.

	DMARDs					*No DMARDs*					
Age	2011 N (%)	2019 N (%)	Delta	CAGR	Linear Regression P-value	2011 N (%)	2019 N (%)	Delta	CAGR	Linear Regression P-value	P-value*
<59	15 (0.16%)	48 (0.18%)	0.02%	2.08%	**0.001**	34 (0.06%)	154 (0.13%)	0.07%	8.98%	**<0.001**	**<0.001**
60-69	38 (0.49%)	115 (0.65%)	0.16%	3.61%	**<0.001**	68 (0.17%)	427 (0.47%)	0.30%	14.07%	**<0.001**	**<0.001**
>70	46 (0.52%)	149 (0.90%)	0.38%	6.97%	**<0.001**	90 (0.18%)	578 (0.64%)	0.46%	16.95%	**<0.001**	**<0.001**

CAGR – compound annual growth rate

** Quadratic P-value determined using an interaction term between the two cohorts and time period (2011-2019) within the regression to investigate differences between the two trends.*