

Real-World Treatment Patterns and Healthcare Costs Among Patients with Adhesive Capsulitis in the United States

Jenny Tse¹, Tania Banerji¹, Elizabeth J. Wang¹, Aimee Near¹, Jill Davis², David Hurley²

1 IQVIA, Durham, NC, USA; 2 Endo Pharmaceuticals, Malvern, PA

BACKGROUND

- Adhesive capsulitis (AC), or “frozen shoulder,” is a disabling condition characterized by shoulder joint stiffness and pain resulting in loss of range of motion that affects 2-5% of the general United States (US) population. AC typically lasts 15-24 months after initial onset, but symptoms may persist for years^{1,2}
- There is a lack of consensus regarding optimal management of AC. Approaches range from rehabilitation programs and pharmacological treatment to more invasive surgical alternatives, which are considered for patients who have little improvement after 6-12 weeks of more conservative treatment^{1,3}
- To that end, there is currently limited data on real-world treatment patterns and the economic burden of AC, especially in the US

OBJECTIVE

- This study described surgery utilization and healthcare costs in patients newly diagnosed with AC

METHODS

Data source

- This retrospective study used the IQVIA PharMetrics® Plus database during the study period from Jan 1, 2015 to Mar 15, 2020

Patient selection

- Adults (≥18 years) with ≥1 ICD-10 diagnosis code for AC (ICD-10-CM M75.0X) were identified in the selection window from Jan 1, 2016 to Mar 15, 2018 (**Figure 1**)
 - The earliest diagnosis code for AC was the index date
 - Patients with diagnoses of acute calcific tendonitis/bursitis, shoulder arthrosis, shoulder bursitis, cervicalgia, cervical disc disorder, or rotator cuff tear during follow-up were excluded

Study measures

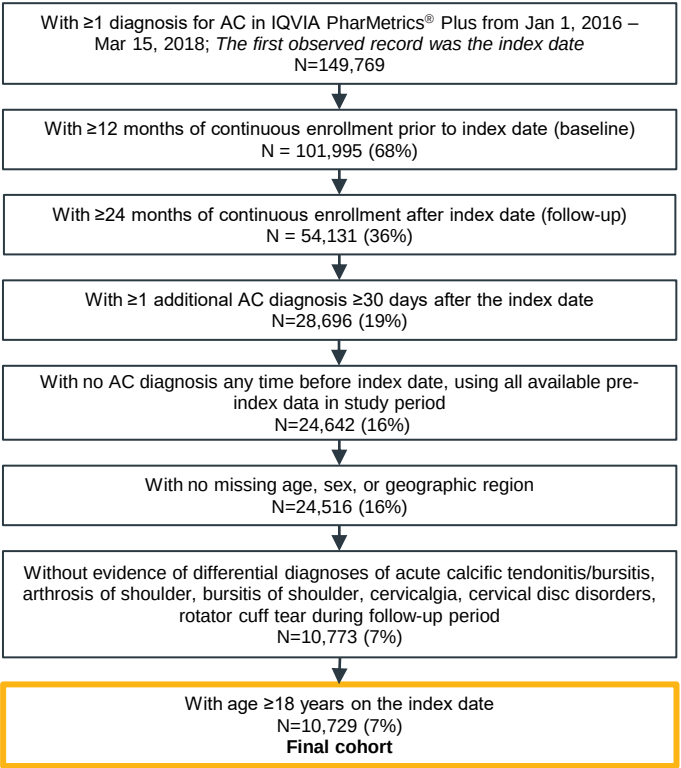
- Demographic and baseline clinical characteristics were described from the 12-month baseline period before index
- Treatment patterns were reported over 24-month follow-up
- Healthcare costs were reported from the 12-month follow-up period for all patients and the subgroup of patients with evidence of surgery
 - Costs were described over 12 months because most patients (87.8%) had their last claim with an AC diagnosis code within 12 months after the index date
 - Given that 41.4% of surgeries occurred close to the index date, sensitivity analyses were conducted using a composite definition for “start of AC”: the earliest of shoulder pain diagnosis, shoulder stiffness diagnosis, AC diagnosis, magnetic resonance imaging (MRI) of the shoulder, physical therapy (PT), or occupational therapy (OT)

RESULTS

Study population

- In total, 10,729 patients met study selection criteria (**Figure 1**)
- The study cohort had a mean ± standard deviation (SD) age of 54.2 ± 9.2 years, was predominately female (65.1%), and had a low comorbidity burden, with mean CCI score of 0.7 ± 1.3
- 50.2% of patients had comorbidities that have been reported as risk factors for AC, such as hypertension, diabetes, and thyroid disease⁴ (**Table 1**)

Figure 1. Patient attrition



Follow-up treatment patterns

- 859 patients (8.0%) had evidence of ≥1 AC-related surgery over 24-month follow-up; of these patients, 70.9% had shoulder manipulation under anesthesia, 33.6% had arthroscopic capsular release, and 0.3% had capsular contracture release
- Most surgeries occurred within the first 12 months of follow-up, including 98.0% of patients with shoulder manipulation under anesthesia, 97.2% of patients with arthroscopic capsular release, and all patients with capsular contracture release
 - 41.4% of patients with surgery (N=356) had surgery within the first month after the index date

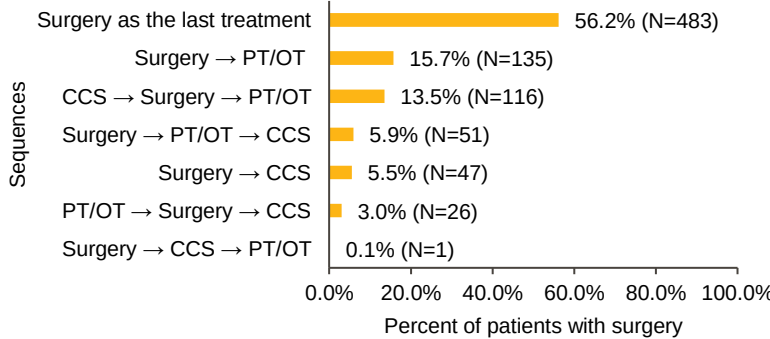
Table 1. Demographic and baseline patient characteristics

Measures		Overall AC cohort N=10,729
Age at index (years)	Mean (SD)	54.2 (9.2)
	Median (Q1, Q3)	54 (49, 59)
Sex, n (%)	Male	3,743 (34.9%)
	Female	6,986 (65.1%)
Geographic region, n (%)	South	3,745 (34.9%)
	Midwest	2,836 (26.4%)
	Northeast	2,283 (21.3%)
	West	1,865 (17.4%)
	Commercial	6,711 (62.6%)
Payer type, n (%)	Self-insured	3,394 (31.6%)
	Medicare	288 (2.7%)
	Medicaid	66 (0.6%)
Index year, n (%)	2016	4,746 (44.2%)
	2017	4,904 (45.7%)
	2018	1,079 (10.1%)
Quan-Charlson comorbidity index (CCI)	Mean (SD)	0.7 (1.3)
	Median (Q1, Q3)	0 (0, 1)
	Any comorbidity	5,385 (50.2%)
Comorbidity risk factors for AC ¹ , n (%)	Hypertension	3,173 (29.6%)
	Diabetes without complications	1,931 (18.0%)
	Hypothyroidism	1,521 (14.2%)
	Obesity (based on diagnosis codes)	1,347 (12.6%)
	Diabetes with complications	572 (5.3%)
	Atherosclerosis	533 (5.0%)
	Breast cancer	288 (2.7%)
	Rheumatoid arthritis	172 (1.6%)
	Hyperthyroidism	98 (0.9%)

Abbreviations: Q1, quartile 1; Q3, quartile 3; SD, standard deviation
1. The following risk factors were present in <1% of the study cohort and are not shown: systemic lupus erythematosus, scleroderma, Parkinson's disease, Peyronie's disease, tuberculosis

- 43.8% (N=376) of patients with surgery had subsequent PT/OT and/or corticosteroid injection (**Figure 2**)
 - Where surgery was followed by PT/OT, the mean time to start of PT/OT ranged from 0.2 to 0.9 months after the surgery
 - When surgery was followed by corticosteroid injection, the mean time to corticosteroid injection ranged from 5.9 to 7.4 months after surgery

Figure 2. Treatment sequencing following surgery, among patients with ≥1 AC-related surgery over 24-month follow-up (N=859)

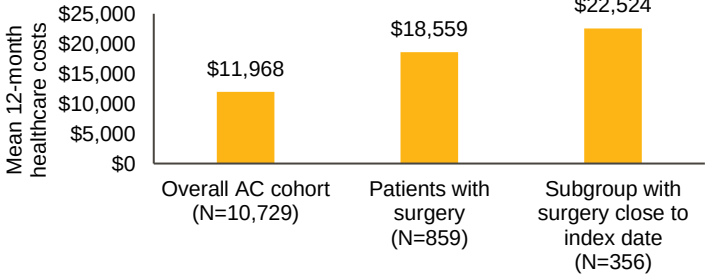


Abbreviations: CCS, corticosteroid injection; OT, occupational therapy; PT, physical therapy

Total healthcare costs

- Mean ± SD 12-month total all-cause healthcare costs per patient were \$11,968 ± \$24,358 for the entire AC cohort (**Figure 3**)
 - \$8,912 (74.5%) were medical costs and \$3,056 (25.5%) were outpatient pharmacy costs
- 12-month all-cause healthcare costs were on average \$6,591 (55.1%) higher in patients who had surgery (N=859) compared to AC patients overall
- Furthermore, 12-month costs in patients with surgery close to the index date (N=356) starting from the earliest indicator of AC were on average \$10,556 (88.2%) higher compared to AC patients overall
 - The mean time from the first indicator of AC to surgery was 5.0 ± 3.7 months; the earliest indicator was typically diagnosis of shoulder pain or stiffness (72.8% of subgroup)

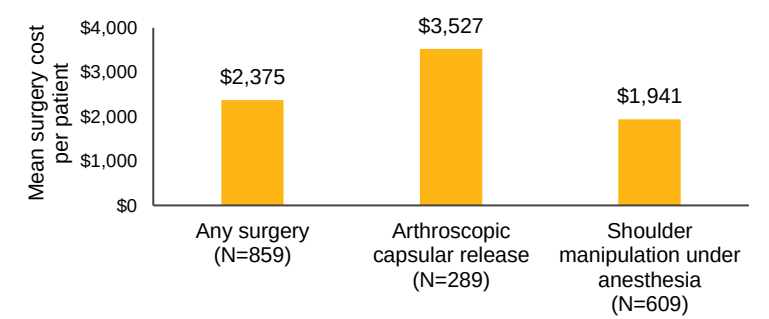
Figure 3. All-cause healthcare costs over 12-month follow-up



Cost of surgery

- Among the 859 patients with surgeries, the mean total surgical cost per patient was \$2,375 ± \$6,206 (**Figure 4**)
- Most patients had only 1 surgery; 30 patients had ≥2 shoulder manipulations and 11 patients had ≥2 arthroscopic capsular releases

Figure 4. Total surgery costs per patient, among patients with ≥1 AC-related surgery over 24-month follow-up (N=859)



Costs for capsular contracture release not shown due to few patients (N=3) with this surgery type

Limitations

- This study has several limitations inherent to retrospective studies using administrative claims databases, including potential misclassification and underreporting of diagnoses, data entry error, and lack of clinical data to characterize AC
- As shown in the sensitivity analyses of healthcare costs, the clinical and economic burden of AC may be underestimated when using the earliest AC diagnosis code as the index date due to the time needed to confirm the diagnosis after the start of symptoms

CONCLUSIONS

- In this real-world cohort of patients with AC, surgery is frequently followed by additional treatments to manage symptoms from 0.2 to 7.4 months after surgery, which suggests unresolved AC
- Patients with surgery had a higher economic burden, with up to 88.2% higher total healthcare costs relative to AC patients overall

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DISCLOSURES

JT, TB, EJW, and AN are employees of IQVIA, which received funding from Endo Pharmaceuticals to conduct these analyses; JD and DH are employees of Endo Pharmaceuticals