

# Comparison of Costs and Healthcare Utilizations in the Year Prior to Reverse Shoulder Arthroplasty Among Patients Who Had and Did Not Have Depression

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## INTRODUCTION:

Although surgical intervention is considered a definitive treatment for glenohumeral osteoarthritis, most healthcare providers exhaust non-surgical options before resorting to a reverse shoulder arthroplasty (RSA) for patients with glenohumeral osteoarthritis with rotator cuff pathology. Given the nationwide transition from fee-for-service to value-based healthcare models, which prioritize enhancing care quality while minimizing unnecessary utilizations of healthcare, there is a need to examine healthcare utilization patterns and expenses. Thus, the objectives of this study were to analyze the distribution of healthcare utilization costs in the year preceding reverse shoulder arthroplasty for glenohumeral osteoarthritis among patients with and without diagnosed depression.

**METHODS:** A retrospective analysis of a nationwide database was conducted spanning from January 1, 2010, to December 31, 2020. Patients diagnosed with glenohumeral osteoarthritis were identified and classified based on whether they underwent primary reverse shoulder arthroplasty using ICD-9/10 procedure codes and Current Procedural Terminology (CPT) codes. Patients who underwent surgery for proximal humerus fractures were excluded from the analysis. Patients undergoing primary reverse shoulder arthroplasty were divided into those diagnosed with depression and those without such a diagnosis preoperatively for comparison. Preoperative expenditures between patients who had and did not have depression were compared in the year prior to RSA for the following categories on a per claim basis: office visits, hyaluronic acid (HA) injections, steroid injections, opioid prescriptions, physical therapy, shoulder radiographs, magnetic resonance imaging (MRI) scans, and computed tomography (CT) scans. Costs were actual reimbursements to the service provider made by the insurance company. A sub-analysis compared Medicare Beneficiaries to Commercial Insurance plans to control for value differences in reimbursements. All reimbursements were adjusted for inflation to 2020 U.S. Dollars (USD). To mitigate potential confounding, patients with depression were matched in a 1:5 ratio to those without depression based on sex, age, COPD (chronic obstructive pulmonary disease), anxiety, diabetes mellitus, hyperlipidemia, hypertension, obesity, and tobacco use. Statistical significance was defined as p-values less than 0.05.

## RESULTS:

The study consisted of 24,326 patients who had depression (n = 4,084) and did not have (n = 20,242) depression undergoing RSA for glenohumeral osteoarthritis. Mean total 1-year preoperative costs (in USD) did not significantly differ between patients who had a history of depression (\$3612/patient) and those without depression (\$3219/patient) (p=0.733). When controlling for patients insured through Medicare, the 1-year preoperative total health expenditures were: depression insured through Medicare (\$2,839/patient) versus non-depression insured through Medicare (\$2,588/patient) (p=0.753). When controlling for patients insured commercially, the 1-year preoperative total health expenditures were: depression insured through commercial insurance (\$4,643/patient) versus non-depression insured through commercial insurance (\$3,982/patient) (p=0.657). The majority of expenses in the year leading up to RSA for both groups were attributed to steroid injections (Depression: \$913, 25%; Controls: \$750, 23%), followed by CT scans (Depression: \$772, 21%; Controls: \$690, 21%), and MRI scans (Depression: \$596, 17%; Controls: \$599, 19%). Other healthcare utilization measures were also compared and showed no significant differences. Controlling for insurance carrier, albeit slightly higher for CT scans, PT visits, and steroid injections, these did not reach statistical significance in Medicare beneficiaries (p>0.0786). Similarly, for privately insured patients, reimbursements were higher for CT scans, PT visits, steroid injections, and HA injections although these did not reach statistical significance (p=0.428). When comparing Medicare insured versus commercially insured patients, HA injections, Steroid injections, CT scans, and MRIs all were significantly higher for commercially insured patients who had and did not have depression. Patients with depression experienced notably higher cumulative costs during the 90-day surveillance period postoperatively (\$19,363.10 vs. \$17,927.55, p<0.0001).

## DISCUSSION AND CONCLUSION:

Approximately \$3,000 per patient was spent in healthcare resource use in the year prior to undergoing RSA. Strategically employing nonoperative treatments for patients who may not benefit can effectively reduce costs.

