

Pain Relief Survivorship: A Comparison of Anatomic and Reverse Total Shoulder Arthroplasty for Primary Osteoarthritis

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INTRODUCTION: With the growing popularity of reverse total shoulder arthroplasty (rTSA), multiple studies have evaluated the role of rTSA in the setting of primary glenohumeral osteoarthritis (GHOA). Collectively, these studies have shown better rotational motion with the arm at side in favor of anatomic (aTSA) over rTSA. However, these same studies have failed to demonstrate superiority of either prosthesis when assessing patient-reported outcome measures. Pain relief plays a major deterministic role in postoperative patient satisfaction; however, whether aTSA or rTSA provides the most durable pain relief has not been studied. Over time, aTSA has been shown to develop progressive glenoid loosening and remains at risk for secondary rotator cuff dysfunction both of which may contribute to a recurrence of pain postoperatively. The purpose of this study was to evaluate the durability of pain relief after aTSA compared to rTSA in patients undergoing surgery for primary GHOA.

METHODS: A retrospective review of a commercially maintained multicenter shoulder arthroplasty database was performed on patients enrolled between 2007 and 2020. All primary aTSA and rTSA performed for rotator cuff intact GHOA were included. Patients with other diagnoses were excluded. Pain after surgery was assessed at multiple timepoints including 3 months, 6 months, and yearly after surgery. Recurrence of pain (scale of 0-10) was defined as a patient with pain exceeding the patient acceptable symptom state (PASS), which was calculated using an anchor-based method using 2-year follow-up data from this cohort (daily pain = 1, pain at worst = 3). A Kaplan-Meier survivorship analysis was performed for pain assessments of average daily pain and overall “worst” pain. Shoulders were considered to have “failed” if pain exceeded the calculated PASS. Additionally, multivariable cox regression was performed to determine whether the type of prosthesis (aTSA vs. rTSA) was associated with pain recurrence independent of preoperative pain, age, body mass index, sex, comorbidities, history of shoulder injections and analgesic use, and history of surgery of the involved shoulder.

RESULTS: A total of 3,600 shoulders (2,213 aTSA, 1,387 rTSA) were evaluated with a mean follow up of 35.2±33.4 months. Females were more commonly treated with rTSA (60% vs. 48%, p<0.001). On Kaplan-Meier analysis, patients undergoing rTSA had a greater recurrence of daily pain compared to aTSA (p=0.037; **Figure 1**), but not “worst” pain. (p=0.335; **Figure 2**). Similarly, on multivariable cox regression, rTSA was independently associated with recurrence of daily pain (HR 1.34 [95%CI=1.04-1.72], p=0.023), but not “worst” pain (1.15 [0.91-1.47], p=0.248).

DISCUSSION AND CONCLUSION: Prior studies have demonstrated similar functional outcomes between aTSA and rTSA at early and mid-term follow-up for GHOA. While aTSA is more commonly negatively affected by glenoid component loosening and secondary rotator cuff dysfunction, lasting pain relief meeting the PASS was slightly more common in patients treated with aTSA.

