

Reverse Shoulder Arthroplasty for Acute Fractures Surpasses Reverse Shoulder Arthroplasty for the Sequelae of Proximal Humeral Fractures

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INTRODUCTION:

Surgical interventions commonly chosen for the management of displaced proximal humeral fractures include open reduction and internal fixation (ORIF), hemiarthroplasty, and reverse total shoulder arthroplasty (RSA). Several studies showed that high rates of fixation failure with ORIF and high rates of tuberosity nonunion with hemiarthroplasty. If primary surgery failed, hemiarthroplasty or RSA would be one of the options for treatment. Clinical outcome of hemi shoulder arthroplasty showed that inconsistent results for function, power, and range of motion and failed internal fixation of a fracture of the proximal humeral fractures produces many challenges with limited surgical options. Although functional outcome after hemiarthroplasty for proximal humeral fractures largely depends on the anatomic healing of the tuberosity, the patients who suffered from these injuries often have poor bone quality and/or comminuted tuberosity, which can compromise tuberosity healing. Recently, there are several studies for the use of RSA for acute displaced proximal humeral fractures in elderly patients. A recent study showed improved mid-term outcomes in regard to forward elevation when RSA is compared to hemiarthroplasty for proximal humeral fractures. Furthermore, there are also several studies of RSA for fracture sequelae of proximal humeral fracture, recognizing that the expected outcomes are not as reliable as RSA for cuff tear arthropathy especially for revision cases after ORIF (Salvage RSA). The aim of this study was to evaluate the clinical outcomes of RSA for fracture sequelae. Additionally, a comparison was made between the clinical outcomes of RSA for acute fractures and fracture sequelae.

METHODS:

This study was retrospective case-control study of patients with fracture sequelae of proximal humeral fractures. This study included 53 patients with RSA for acute proximal humeral fracture and 51 patients with RSA for fracture sequelae. Average age was 78.8 years and, 13 patients were men, and 40 patients were female. Average age was 74.8 years, 13 patients were men, and 38 patients were female. According to the fracture sequelae classification of Boileau et al., 9 cases of type1, 18 cases of type2, 11 cases of type3, and 11 cases of type4, and 2 cases for revision after hemiarthroplasty. Primary outcome measures included University California Los Angeles (UCLA) score and constant score, and shoulder range of motion such as active anterior elevation, external rotation, and internal rotation. All outcomes were compared between pre and postoperatively using paired t-test and compared postoperative outcome between RSA for acute fracture and for fracture sequelae using non-paired t-test with statistical significance set at a p value of <.05.

RESULTS:

RSA for acute fracture had an average follow-up period of 32.2 months, whereas RSA for fracture sequelae group had a follow-up period of 30.6 months. In cases where there was significant glenoid bone loss caused by chronic shoulder dislocation, bone grafting RSA was performed in seven cases in RSA for fracture sequelae. Furthermore, the modified L'episcopo procedure was conducted in four cases of RSA for fracture sequelae when it was determined that reduction of the greater tuberosity was not feasible. The clinical outcomes before surgery of RSA for fracture sequelae, the mean UCLA score was 7.8, the mean Constant score was 22.5, and the mean anterior elevation was 32.7°. External rotation measured 3.3°, and internal rotation was assessed as L5. These scores exhibited a statistically significant improvement at the final follow up, with the mean UCLA score increasing to 23.8, the mean Constant score improving to 64.3, and the mean anterior elevation reaching 107.7°. External rotation increased to 13.5°, and internal rotation was L3. Comparing the clinical outcomes between RSA for the acute fracture and fracture sequela, RSA for acute fracture displayed a mean UCLA score of 30.7, a mean Constant score of 82.5, and a mean anterior elevation of 124.5°. External rotation measured 33.9°, and internal rotation was L3. Conversely, RSA for fracture sequelae had a mean UCLA score of 23.8, a mean Constant score of 64.3, and a mean anterior elevation of 107.7°. External rotation measured 13.5°, and internal rotation was L3. All the scores and range of motion measurements showed a statistically significant improvement in the acute fracture RSA group compared to RSA for the fracture sequelae except for internal rotation.

DISCUSSION AND CONCLUSION:

While locking plate fixation remains the established standard for displaced proximal humeral fractures, it is not without risks for failed open reduction and internal fixation (ORIF), including avascular necrosis and malunion of the greater tuberosity, and so on. Recently, RSA has gained popularity as a primary procedure for proximal humeral fractures. Although RSA for acute proximal humeral fractures has shown favorable early outcomes, the clinical results of RSA for fracture sequelae are not consistently promising. Our findings demonstrate that RSA for acute fracture yields significantly superior clinical scores and range of motion (ROM) compared to RSA for fracture sequelae. While RSA for acute fracture achieves good clinical outcomes, RSA for fracture sequelae demonstrates poor clinical outcomes. Based on our results, it

is advisable to exercise caution when considering RSA for fracture sequelae, particularly with regard to tuberosity preservation, and so on. Further comparative series are necessary to determine a treatment algorithm for patients with fracture sequelae of proximal humeral fractures.