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Management of Glenoid Bone Loss in Reverse Shoulder Arthroplasty

Ashish Gupta, MBBS, MSC, FRACS, AUSTRALIA
Christoph Thussbas, MD, GERMANY
Michael Koch, MD, GERMANY
Ludwig Seebauer, MD, GERMANY

Klinikum Bogenhausen
Munich, GERMANY

Summary:
Clinical Results and Treatment algorithm for management of severe glenoid bone loss with reverse shoulder arthroplasty with a min 2.4 year followup

Abstract:
Abstract

Management of significant glenoid bone loss in patients undergoing a Reverse Shoulder Arthroplasty (RSA) poses a significant treatment challenge. The long-term outcome of single stage RSA with glenoid bone grafting is unknown. This study assesses the indications, technique and outcome of RSA with glenoid bone grafting.

Materials and Methods
Between 2001 and 2010, 1074 RSA were performed at our institution. Out of this cohort 94 patients had significant glenoid bone loss. These patients underwent a single or two-stage RSA with glenoid bone grafting. Intra operatively each patient was subcategorized on the basis of the size of the glenoid defect and managed in accordance with a standardized treatment protocol. The defects were sub classified as centric or eccentric and graded from 1-4 based upon their size. A retrospective analysis of the pre and post-operative clinical and radiological outcome was carried out. The mean follow up was 2.4 years, (0.52 years – 10.7 years).

Results

Indication for RSA were as follows: 1) 29.3% Cuff tear arthropathy, 2) 27.2% failed prior arthroplasty, 3) 21% chronic dislocation, 4) 17.4% post traumatic cases. During the operation 17 % had a centric defect and 83 % of patients had an eccentric glenoid defect; the bone loss being anterior in the majority (51.1%).
Composite glenoid grafts were required in 10 patients and 9 patients required a revision specific glenoid base plate. 92.5% (87/94) of the patients could be managed as a single stage procedure. There was a significant improvement in the Constant score (p value <0.01) and the subjective shoulder test score (SST) (p value <0.05) in all the patients. No correlation was found between the clinical outcome and indication for surgery, age, location of defect and size of defect.
7 patients had complications. There was 1 case of early implant failure (graft & glenoid component),
Summary

Complex glenoid defects are encountered in less than 10 % of all cases undergoing a RSA (94/ 1074) and the requirement of complex grafts and revision specific base plates is even rarer (0.8% in our cohort). There by the surgeon must possess an easy intraoperative decision making tool to guide them in an often complex surgical procedure. Pre operative assessment of extent and amount of bone defect with 3D-CT-reconstruction is critical for successful operative technique. However in a revision setting often the bone loss exceeds the surgeons expectations. To combat this problem we have classified glenoid defects based upon the intraoperative finding. A treatment protocol is than followed based upon the size and location of each defect. Sufficient primary fixation of the glenoid base plate is a prerequisite for a single stage procedure and is attainable in 92.3% of patients as per our study. The

goal of restoration of the glenoid joint line in a coronal plane is imperative to attain a stable prosthesis with impingement free arc of motion. The vast majority of patients could be managed by autografts however in 9.5% (9/94) of patients revision specific glenoid base plate with a longer peg was required. Improved preoperative planning and better prosthesis subtraction CT algorithms will enable an early identification of this patient cohort and avoid intraoperative surprises.