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KSES 2026

The 33rd Annual
International Congress of the
Korean Shoulder and
Elbow Society

March
27(Fri) ~ 28(Sat), 2026
BEXCO, Busan, Korea

- Abstract No. : F-0032
- Category : Shoulder
- Detail Category : Rotator cuff , arthroplasty

Reverse Shoulder Megaprosthesis: A Modern Advancement in Proximal Humerus Reconstruction for Oncologic Bone Loss.

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Introduction and Background

The proximal humerus is a common site for primary and metastatic bone tumors in the upper extremity. Shoulder arthroplasty in the setting of severe proximal humerus bone loss remains challenging. Previous surgical techniques focused on limb salvage and reconstruction of the defect after tumor resection using Shoulder Megaprosthesis (SM), which often resulted in limited shoulder function. Currently, reconstructive techniques utilizing the Reverse Shoulder Megaprosthesis (RSM) have been developed and provide better function; however, there is a paucity of comparative controlled studies.

Material and Method

A total of 50 patients (22 female, 28 male) who underwent resection of a proximal humerus bone tumor and subsequent reconstruction were reviewed. The reconstructions included 38 Reverse Shoulder Megaprosthesis (RSM) procedures and 12 Shoulder Megaprosthesis (SM) procedures. Notably, 42 cases involved resection of the deltoid muscle insertion during the procedure.

Results

The Reverse Shoulder Megaprosthesis (RSM) group demonstrated significantly improved functional outcomes compared to the Shoulder Megaprosthesis (SM) group, including: Shoulder flexion (80° versus 35°, $p < 0.001$), Shoulder abduction (110° versus 45°, $p < 0.001$), Shoulder extension (45° versus 25°, $p < 0.01$)

Reverse reconstruction also led to a significantly improved Musculoskeletal Tumor Society (MSTS) Score (28 versus 21; $p < 0.001$). Subluxation/dislocation was a rare complication, occurring only in the Shoulder Megaprosthesis (SM) group ($n=2$, 16.7% of the SM group). Furthermore, shoulder function in cases involving deltoid insertion resection was significantly better with RSM compared to SM ($p < 0.001$).

Conclusions

Functional outcomes are significantly improved in patients undergoing reconstruction with a Reverse Shoulder Megaprosthesis (RSM) compared to traditional Shoulder Megaprosthesis (SM). Given the commonly associated significant bone loss and soft tissue deficiency, Reverse Shoulder Megaprosthesis is a viable and effective limb-salvage option for shoulder reconstruction in the setting of proximal humeral bone loss.



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Figure & Table 1.



Figure & Table 2.

