

Revision Surgery Does Not Lead to Increased Rate of Failure in Proximal Humerus Reconstruction with a Metallic Endoprosthesis: A Multi-Center Study

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Background:

The overall failure rate of proximal humerus reconstructions with a metallic endoprosthesis following bone tumor excision, as defined by the need to undergo surgical revision, has been reported to be as high as 33%. The outcomes of these revised reconstructions, however, have not been clearly reported in an anatomically specific cohort series.

Purpose:

The purpose of this study was to assess the surgical outcomes of a metallic endoprosthesis following proximal humerus reconstruction for bone tumor, comparing complications and failure rates of primary procedures versus revision cases.

Patients and Methods:

A retrospective chart review at three major cancer centers was conducted on patients that underwent metallic endoprosthesis reconstruction following proximal humerus bone tumor excision between 1999-2014. Subjects were excluded if the indication for surgery was non-oncologic, the surgery involved resection of the scapula, or a total humerus replacement was utilized. Revision surgery was defined as the removal of one segmental implant with subsequent reconstruction with a metallic endoprosthesis. Follow up data was collected; short follow-ups were included, in order to capture those that had early failure. Data for demographics, diagnosis, operative metrics, complications and failure mode were collected and analyzed. Failure was defined as need for revision surgery, and mode of failure was classified according to the Henderson Classification scheme. A chi-square test of independence determined statistical significance for the nominal data.

Results:

One hundred nine (109) patients with proximal humerus reconstruction met inclusion criteria. Average age was 50.6 years (14-86) and average follow up was 39.3 months (1-250). Ninety-four (94) patients underwent proximal humerus reconstruction with a metallic endoprosthesis as their primary, index procedure. Fifteen (15) patients underwent revision surgery; indication for revision was soft tissue failure in 5 cases, infection in 5 cases, local recurrence in 1 case and "not listed" in 4 cases. There were no significant differences in age or follow up between the two groups. Significant difference did exist for diagnosis, with a higher incidence of osteosarcoma in the revision group (40.0%) versus the primary group (14.9%), $p=.02$. Significant difference also existed between groups for non-failure subluxation, with the revision group having subsequent subluxation in 6 cases (40.0%), while only 14.9% of primary reconstructions had subluxation ($n=14$). There were no differences between the two groups for total failures or any specific mode of failure.

Conclusions:

In this series, the outcomes of revision surgery with a metallic endoprosthesis reconstruction of the proximal humerus are no worse in regards to subsequent failure than a primary proximal humerus reconstruction with a metallic endoprosthesis. However, subluxation that did not lead to revision was statistically more frequent in the revision group than the primary group.

Level of Evidence: Level III, retrospective case control study