

Local Progression Is Most Common Cause for Revision Surgery in Metastatic Bone Disease

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Background: Evaluation and treatment of impending pathologic fracture of long bones is a major task in the management of patients with metastatic bone disease. Goals of surgery are pain relief and early functional restoration in a full weight-bearing fashion by the use of an implant that will outlast patient's life expectancy. However, revision surgery may be necessary for different reasons, with potentially catastrophic consequences on patient's function and quality of life. Despite increased interest in metastatic patients, incidence and cause of revision surgery remain poorly characterized in this population.

Purpose:

Purpose of this study was to assess:

- Incidence of revision surgery in a population of metastatic patients initially managed with surgery for impending or actual pathologic fracture;
- Relative risk based on initial diagnosis;
- Cause(s) and pathogenesis by critical review;
- Correlation between surgical technique and risk of revision surgery.

Materials and Methods: 2383 patients with metastatic cancer to bone were surgically managed at our Institution from 2000 to 2014. We identified and retrospectively reviewed 63 patients whom underwent a total of 78 revision surgery procedures following initial treatment for impending or actual pathologic fracture. Regression analysis, assessed by using Fisher exact test, was based on significant P-value ≤ 0.05 .

Results: Incidence of revision surgery has remained stable for a decade but appears more recently on the rise: 12 of 792 in 2000-2004 (1.5%); 15 of 799 in 2005-2009 (1.9%); 51 of 792 in 2010-2014 (6.4%).

The most common histology was renal cell (15 cases) and breast cancer (11 cases).

The femur was most commonly the site of revision surgery with almost equal number of intramedullary nail and endoprosthesis as initial procedure. Risk of revision rate for histologic diagnosis was as follows: thyroid 4.2%; renal 3.1%; breast 2.5%; lung 1.1%; prostate 0.2%. Thyroid and renal cancer had a statistically significantly higher risk of revision surgery than lung and prostate ($p < 0.05$).

The cause for revision was classified into 4 types. Type 1, local tumor progression (25 cases); Type 2, implant failure associated with local tumor progression (23 cases); Type 3, tumor progression proximal or distal to the initial surgical site within the same bone (8 cases); Type 4, non-oncological cause, such as infection, dislocation or symptomatic hardware (21 cases).

Conclusions: Local progression alone or associated with implant failure was the most common cause for revision surgery in this cohort of metastatic patients. Effective surgical management of metastatic patients should optimize local control and biomechanics of reconstruction, particularly in patients with thyroid and renal cell cancer.