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Giant Cell Tumor of the Sacrum Treated with Conservative Surgery: 35 Years' Experience

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Background: Giant cell tumor (GCT) of the sacrum presents management problems of a rare tumor in a rare location, with little published information to help guide treatment. Given its rarity, prospective therapeutic trials have not been performed, relegating investigators to extrapolate treatment strategies from reports of GCT in other locations. To improve management of sacral GCT, investigators must address critical issues regarding tumor recurrence, neurologic loss, and pelvic instability.

Questions/Purposes:
Our objective was to examine oncologic, neurologic, and structural outcomes of sacral GCT after conservative surgery (intralesional resection/curettage) and local intraoperative adjunctive treatment.

Patients and Methods:
A retrospective review was conducted on 24 patients with sacral GCT who underwent conservative surgery at our institution from 1973-2012. Patients who were treated with denosumab were excluded. Demographic data, tumor characteristics, operative procedures and adjuvant therapy were analyzed, and we examined possible correlations with postoperative complications and oncologic and functional outcomes. Standardized outcome measurement was undertaken using modified versions of scoring methods by Biagini et al. (1997) and Fourney et al. (2005). Categorical and parametric variables were analyzed by Chi-square test or Fisher's exact test, and Student's *t* test. We used the Kaplan-Meier method to estimate the disease-free survival. The log-rank test was used to evaluate differences between survival curves.

Results:
During the mean follow-up period of 87 months (range; 4-288), local recurrence developed in 7 patients (30%) and distant metastases in 3 (13%). Four of 24 patients (17%) who had no preoperative neurological deficit experienced severe bowel and/or bladder dysfunction after treatment, but regained full function in 1 to 4 years. Larger tumor size (>320 mL) was associated with greater postoperative neurologic loss (p= 0.417). Radiotherapy and serial preoperative embolization were associated with prolonged disease-free survival (p= 0.0011 and p= 0.0007, respectively). Based on radiographic and clinical assessment, spinopelvic stability was achieved in 7 of 8 patients who had spinopelvic fusion (88%) at the final follow-up.

Conclusions: Preservation of sacral roots intraoperatively was associated with better pain relief, improvement in ambulatory function, and retention of bowel/bladder function in most patients. Fusion and instrumentation of the sacroiliac joint successfully achieved spinopelvic stability in cases deemed clinically unstable. High local and distant recurrence rates associated with sacral GCT suggest the need for careful local and systemic follow-up in managing these patients. Despite improvement in the management of sacral GCT over 35 years, a need for novel therapies remains.