

Zoledronic acid-loaded bone cement as a local adjuvant therapy for giant cell tumor of the sacrum after intralesional curettage

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Background:

Giant cell tumor (GCT) is a locally aggressive benign bone tumor and may even with distant metastasis. GCT of the sacrum is very rare, with an incidence of approximately 1.7-8.2% of all GCTs. It is usually silent in initial stages and not diagnosed until achieving a large size. Surgical options include intralesional curettage and wide excision. Compared with wide excision, the advantages of intralesional curettage include lower morbidity, reduced neurologic deficit, preservation of pelvic and spinal continuity, speed and ease of the surgical procedure, and reduced potential for blood loss. However, the recurrence rate after intralesional curettage is very high due to difficult location, large size and potential of uncontrollable intraoperative hemorrhage. Zoledronic acid has been reported to have cytotoxic effect on GCTs, and zoledronic acid-loaded cement was demonstrated cytotoxic effect on the cell line of GCT in a dose-dependent manner.

Questions/Purposes:

This study evaluate if zoledronic acid-loaded bone cement would reduce the recurrence rate of sacral GCT after intralesional curettage.

Patients and Methods:

From 2011 to 2012, we retrospectively reviewed four patients who were diagnosed as sacral GCT and received intralesional curettage with placement of zoledronic acid-loaded bone cement for adjuvant local control. Our protocol involved mixing zoledronic acid 4 mg and vancomycin 1000 mg in PMMA 40 g by hand under sterile condition without a vacuum. The zoledronic acid-loaded cement was then shaped into balls of approximately 1-2 cm³ by hand and placed into the bony defects of the sacrum, where the tumor had been removed by intralesional curettage. After the surgery, all four patients received 20-fraction radiotherapy of 45 Gy. The clinical records including tumor location, tumor size, complication, follow-up status, and functional outcome were analyzed.

Results:

All four patients presented with cauda equina syndrome before surgery with mean tumor volume of 472.8 cm³. Lung metastasis was not detected in any patient preoperatively. There were no intraoperative or postoperative complications. With placement of zoledronic acid-loaded cement, no local recurrence was observed during the mean follow-up period of 34 months (range, 31 to 39). New bone regeneration was found on radiograph in all patients. Patients suffering from cauda equina syndrome were all recovered.

Conclusions:

Management of sacral GCTs is a difficult problem for surgeons, owing to not only the large tumor size but also the difficult location for complete tumor excision and the high local recurrence rate. We believe that placement of zoledronic acid-loaded bone cement is an effective adjuvant therapy for sacral giant cell tumor following intralesional curettage.