

Outcomes following reconstruction with pretreating pasteurized bone autograft with zoledronate for limb sparing surgery

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Introduction

Pasteurization autograft is one of biologic reconstructions that need incorporation to host bone and its strength for potentially improving the longevity and reducing risks for revision. Previous articles noted local treatment of bone allograft with low dose of bisphosphonate delay allograft resorption, enhance new bone formation and increase strength and stiffness of allograft. However, there was no study conducted in pasteurized autograft, clinically. Our objectives were to compare outcomes, complications, incorporation time and graft survival between patients who underwent pasteurized autograft reconstruction which grafts were prepared by soaking in zoledronate and those whose grafts were prepared without.

Methods

From January 2011 to December 2015, we retrospectively reviewed 50 consecutive patients who underwent limb-sparing surgery using extracorporeal pasteurized autograft for bone tumors. Forty-three patients with stage II and III by Enneking received courses of chemotherapy, while 5 patients with stage I and 2 patients with stage 3 did not. After wide resection, autografts were cleaned and prepared by soaking in 65° C saline-solution for 30 minute in 29 patients (group A) and similar to group 1 plus soaking in 0.005 mg/ml zoledronate for 3 minutes in 21 patients (group B). The mean age was 26 (range, 7-84) and 18 years old (range, 6-37) and follow-up time was 34 months (range, 5-63) and 18 months (range, 3-34) for patients in group A and group B, respectively. There was no statistical difference between groups regarding location, type of reconstruction, type of fixation and gap between graft and host bone after fixation. Time of union, complications, musculoskeletal tumor society (MSTS) score and graft survival were compared between the two groups.

Results

Nine patients in group A and 5 patients in group B died of disease at 16 (range, 5-36) and 11 months (range, 3-17), respectively. Recurrent tumors were found in 2 patients in group A and 1 in group B; all were soft-tissue recurrence and treated by amputation in 2 patients and wide resection in 1. In groups A and B, radiologic graft incorporation was achieved in 13/19 and 13/13 patients with a mean time of 15.1 (range, 5-36) and 10.6 months (range, 3-22), respectively (P=0.09). The rate of graft incorporation in 1 year was 6/19 (31.5%) in group A and 8/13 (61.5%) in group B (P=0.09). One of 6 patients with non-union in group A needed additional bone grafting surgery. There was no statistical different regarding 3-year graft survival (81.2% ±8.45 and 88.9% ±10.5, P=0.46), infection (4/29 and 1/21), graft fracture (3/29 and 0/21) and the MSTS score (82.6% (range, 62.6-96.7) and 84% (range, 66.7-93.3%), (P=0.55)) between group A and group B, respectively.

Summary

Patients who underwent pasteurized autograft which was prepared by soaking in zoledronate tended to have shorter incorporation time and lower rate of graft fracture compare to those prepared without although these finding were not statistically significant. Complications were not different between these two groups. More number of patients and longer follow-up is needed to show the benefit of the local treatment of bone grafting by bisphosphonate.