

Biological Reconstruction Of Distal Tibia Osteosarcoma With Pasteurized Autograft

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INTRODUCTION:

Biological reconstruction gives better longevity and fewer complications compared to non biological in long term especially in children who had high functional demand and good bone remodeling potential. There are multiple ways to devitalize a tumor bone autograft with different results as reported in literature. We utilize pasteurization which is the most effective way in our center.

MATERIALS & METHODS:

6 years old girl with no medical illness presented with right lower leg pain, swelling and limping for 1 month duration. There was no fever and no loss of weight and appetite. No family history of malignancy. On examination, she had hard warmth bony swelling at right distal tibia with stretched shinny skin and dilated veins seen. There was no regional lymphadenopathy.

Radiograph showed lytic lesion at right distal tibia with periosteal reaction typical of Codman triangle appearance. MRI showed enhancing heterogenous mass in distal tibia without neurovascular bundle involvement. Neoadjuvant chemotherapy was given in a total of 6 courses. Surgery was performed through anterolateral approach. Resection of tumor bone was performed above physis plate and tumor tissue was curetted. The tumor bone was then pasteurized in 60 degree water for 30 minutes and tumor tissue was curetted. The devitalized bone was reinserted into the resection gap with perfect fit and held in place by two Kirchsner wire and narrow DCP.

RESULTS:

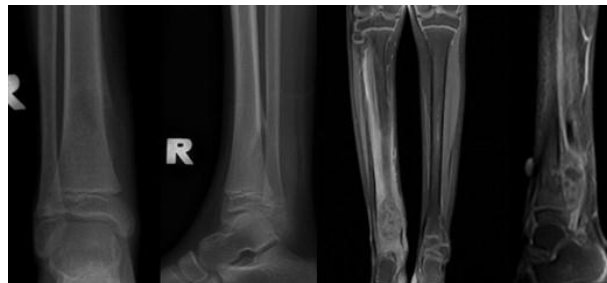


Figure 1: Radiograph(Left) and MRI(right) right lower limb



Figure 2: Pasteurized Autograft(Left) and Reinsertion with plate support(Right)

DISCUSSIONS:

There are multiple ways to devitalize remaining tumor cells in the resected bone including boiling, autoclave, pasteurization, liquid nitrogen and radiation. By heating the bone to 60 degree for 30 minutes, it was shown to adequately devitalize all the tumor cells in the bone. Higher temperature for long duration by autoclaving or boiling will affect the mechanical strength and osteo-inductive properties of the bone. This was explained by Urist et al that higher temperature affects the collagen structure of bone. (1)The stress to failure in compression test was reduced to 55% and 57% and modulus of elasticity was reduced to 66% and 75% for autoclave and boiling respectively. On the opposite, there is no reduction of mechanical properties after pasteurization. (2)

CONCLUSION:

Pasteurization of bone offers better bony remodeling and mechanical strength in comparison to other method.