

Number & Title: 10643 - Reconstruction Using Liquid Nitrogen Treated Tumour Bearing Autograft: Our Experience

Sudhir Kumar Garg**, *Purnima Aggarwal, *Rohit Jindal**
**Department of Orthopaedic Surgery, **Department of Radiodiagnosis*
Government Medical College & Hospital, Chandigarh, India**

Introduction: Reconstruction of bone defect after en-bloc resection in tumours is challenging. There are biological methods to reconstruct the limb such as arthrodesis, allograft or recycled autograft as well as non-biological methods such as endoprosthesis. Both have their own advantages and disadvantages. Segmental allografts are not available to us whereas endoprosthesis are expensive. Recycled autograft though seems perfect option but is feasible only if resected bone has good structural strength. We present our experience of using recycled tumour bearing bone after treating it with liquid nitrogen.

Material & methods: Between Sep. 2010 and Dec. 2014, 7 patients, 4 females and 3 males with age ranging from 8-21 yrs. with malignant tumours underwent this procedure. 6 patients had Ewing's sarcoma and 1 patient had osteosarcoma. Proximal humerus in 1, proximal femur in 1, shaft femur in 1, distal femur in 2 and distal fibula in 2 were the affected segments of bones. At the time of diagnosis, six patients had no evidence of metastatic disease whereas one patient with Ewing's sarcoma had skip lesion. In all seven patients after resection, bone was stripped of soft tissue and periosteum. Intramedullary reaming was done. Bone was immersed in liquid nitrogen for 25 minutes followed by thawing in an antibiotic mixed saline. Internal fixation was done using interlocking plates in 6 and a combination of intramedullary nailing and plate and screws in 1.

Results: At a mean follow-up of 26 months (range 5-56 months), one patient had died of disease (DOD), one died of chemotherapy related complications and 5 are alive with no evidence of disease (NED). Union was achieved in 6 patients. In one patient with diaphyseal tumour of femur, at a follow-up of 5 months distal osteotomy site has united whereas proximal osteotomy site is showing signs of union. There was no local recurrence in any of the re-implanted bone. Mean MSTS score was 84.

Conclusions: There are many advantages of using recycled bone, wherever feasible. It is an anatomically size matched graft, inexpensive and restores bone stock. Re-implanted bone acts as scaffold for creeping substitution and incorporation. Though there are other methods of treating resected tumour bearing bone such as ECRT, autoclaving, pasteurization, but treatment with liquid nitrogen has shown to be superior as it doesn't denaturize the collagen resulting in better mechanical strength.