Femoral Reconstruction Using Autograft treated with liquid nitrogen in Osteosarcoma

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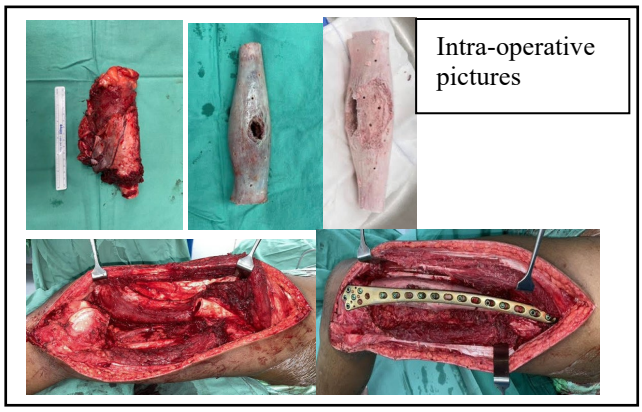
INTRODUCTION:

Osteosarcoma is the commonest primary malignant bone tumour in children.Standard treatment include neo-adjuvant chemotherapy followed by wide-local excision.Bone defect can be reconstructed with endoprosthesis, allograft,recycled autograft or combination of them.Recycle autograft is a biological reconstruction with good biomechanical strength, anatomical fitting, economical & no allogenicity.Autograft sterilization methods include autoclaving, pasteurization,irradiation & cryotherapy.Cryotherapy induces tumour cell death by hypothermia.Comparison studies show that frozen autograft 10-year survival rate is almost 100%.Besides that,cryotherapy retains osteoinductive potential facilitating union at mean 6.2 months and has cryoimmunology advantage enabling local and systemic tumour control.With cryosurgery,5 & 10-year patient survival rates were 86.1% & 80.6% respectively.

REPORT:

15-year old boy presented with 1-month history of left thigh swelling associated with pain affecting mobility and constitutional symptoms.There were no preceding trauma, infection,Tb contact or family history of malignancy.Initial radiographs reveal permeative medullary lesion with osteoid matrix ,cortical destruction and Codman triangle at distal femur diaphysis. MRI showed heterogenous medullary mass(3.5x3.1x7.6cm), metadiaphyseal cortical breach & extra-osseous infiltration. Systemic CT-scan showed no metastasis. Trucut biopsy HPE reported as conventional osteosarcoma.He was then given neo-adjuvant chemotherapy.Subsequent MRI showed no significant change in size & appearance.He then underwent wide-resection,reconstruction using recycled autograft treated with liquid nitrogen. Surgery performed via lateral approach to femur,15cm of femur resected en-bloc with clear tumour margin.Resected bone was skeletonized, curetted and soaked in liquid nitrogen at -196°c for 20 minutes for tissue freezing, followed by prethawing at room temperature for 15-minutes,and thawing in distilled water at room temperature for 15-minutes.Sterilized bone was then reimplanted for skeletal reconstruction,fixed with long distal femur locking plate.His surgical wound healed well and he resumed adjuvant chemotherapy.With determined rehabilitation he regained good knee range of motion and follow-up radiographs showed good progress of bone union.



CONCLUSION:

Limb salvage surgery by means of biological reconstruction is advantageous in bone tumours.Cryosurgery carries numerous advantages, improved clinical outcome and increased survival rate crucial especially in children with malignant bone tumours.

REFERENCES:

Igarashi K,et al;The long-term outcome following the use of frozen autograft treated with liquid nitrogen in the management of bone & soft-tissue sarcomas.Bone Joint J. 2014 Apr;96-B(4):555-61.