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Vascularised Free Fibula Flap For A Rare Case Of Osteofibrousdysplasia Involving Humerus: A Case Report

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I. Introduction:

Free fibular graft is an established method for large humeral defects resulting from trauma, infection, and tumor resection. In this article we would like to present a case of free fibula graft used to cover a proximal humerus defect following excision of osteofibrous dysplasia

II. Case Report:

A 12 year old female came with complaints of pain & swelling in her right arm for 4 months. It was progressive in nature. There was no restriction of mobility of right shoulder joint.

Local Examination: diffuse, hard swelling, margins not well defined. No discharge, fluctuation.

MRI: Mixed lytic sclerotic lesion with periosteal & cortical lysis.

Open biopsy: Fibrous dysplasia.

Patient was taken for segmental humerus resection with free fibula flap reconstruction. 12 cm of proximal humerus was removed.

Fibula was harvested from left leg and placed in defect site. Distal portion docked into native humerus. Proximal portion fixed using screws and PHILOS (Proximal humeral internal locking system) plate. Immediate post op patient was stable. Flap was healthy. Patient was followed up regularly.

On POD-8,Skin paddle necrosis was noted. Wound debridement was done.

Bone was viable hence it was left in position. Post op patient was stable. Suture site was healthy with no discharge. No other complications seen. Patient was discharged after suture removal. Biopsy showed lesion to be **osteofibrous dysplasia**. Patient was regularly followed up. She was maintained in splint with no activity of right upper limb for 12 weeks. She was started on M 4 exercises for 4 months. No weight bearing was allowed. After 4 months she underwent M 5 exercises for 8 months with weight bearing exercises(upto 1 kg). From 18 months post op patient was advised weight loading upto 5 kg weight.

Pre Op X- Ray

Post Proximal Humerus Excision

Flap Elevated

Flap Harvested

Flap Fixed With PHILOS Plate

Flap Anastamosis

Final Suture Line

After Suture Removal At 18 Months

X-Ray At 6 Months

X-Ray At 18 Months Showing Integration Of Fibula Graft

III. Discussion:

Osteofibrous dysplasia (OFD) is a rare developmental condition of childhood, which almost exclusively affects the tibia. The tumor affects children in their first decade and ceases progression with the termination of growth[1].

Osteofibrous dysplasia is mostly asymptomatic and presents with a painless swelling[2]. OFD typically appears as an osteolytic lesion with lobular loculations and a bubbly appearance with well-circumscribed sclerotic edges. It usually involves the anterior diaphyseal cortex of the tibia or fibula with nearby cortical expansion. Intramedullary involvement and anterior bowing deformity are common complications as the lesion progresses[3].

Curettage is considered the most standard treatment method for benign lesions, as well as aggressive lesions. However, the bone cavity created after curettage often needs to be filled with graft, such as acrylic cement or bone grafts, to restore its mechanical stability[4].

The different options of treatment include, observation without surgical intervention, bracing to prevent fracture and minimize deformity, surgical option which includes en bloc resection, extraperiosteal resection and filling the defect with autogenous fibular graft, vascularized fibular graft or iliac crest bone graft. Campanacci *etal* studied 35 patients with this disease and have advocated surgery in patients with extensive disease, but it should be delayed as much as possible[5]. Lee etalstudied 16 patients with osteofibrous dysplasia and have advocated a more aggressive approach for this lesion[6]

Reconstruction of the proximal humerus can be performed with—autografts, allografts, implanted prostheses, or prosthetic-biological composites

Vascularised Autografts not only serve as a scaffold that receives the nearby osteoblasts (**osteoconduction**) but also have a greater tendency to stimulate the osteoprogenitor cells of the nearby tissues to differentiate into osteoblasts and begin new bone formation (**osteoinduction**). This translates to better fusion rates, mechanical strength, and infection resistance.

Vascularised autografts have the best osteointegrative potential among the other reconstructive approaches that are available today and is the treatment of choice especially for young patients with long life expectancy[7]. Various free vascularised bone flaps are available. Among these, free vascularized fibular grafting stands out for its ability to offer immediate mechanical support and potential for growth or hypertrophy based on the patient's growth and activity levels[8]

Free fibula flap is a useful and versatile procedure for defects greater than 6–8 cm. It has been demonstrated that, when appropriate blood perfusion is restored to the flap, the proximal and distal fracture sites have the same healing potential of a bifocal fracture with no bone tissue loss, and with no vascular impairment to the central segment[9]. Due to its constant vascular anatomy, length and diameter the fibula allows for an ideal humeral shaft reconstruction. Donor site morbidity is insignificant if the harvest is properly performed. Once positioned into the recipient site, the fibula is capable of undergoing a **remodelling** process which allows the new functional load to be sustained[10].

In our case, as the initial biopsy was doubtful and patient showed symptoms we proceeded with excision of involved segment of humerus. Vascularised free fibula flap which was used showed good integration in the x-ray taken at 18 months. With regular physiotherapy patient was able to lift weights and do regular daily activities

IV. Conclusion:

Due to this rare presentation of osteofibrous dysplasia, the child was well served with excision to prevent recurrence. A vascularised fibula flap enabled her to continue her normal daily activities. This shows that a free fibula flap is a good reconstructive tool for bone tumours which require aggressive resection

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