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RESEARCH ARTICLE

Case Report - NON – VASCULARIZED FIBULAR GRAFT FOR GIANT ANEURYSMAL BONE CYST

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Abstract

The incidence of Aneurysmal bone cyst (ABC) is rare. About 1% of all primary bone tumors add up to these lesions. These are mostly seen in the upper extremity & rarely are reported in the foot. Here we present a case of Giant ABC of the second metatarsal of the foot, which was managed with non-vascularized fibular graft reconstruction after resection.

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INTRODUCTION

An aneurysmal bone cyst was first described in 1942 by Jaffe & Lichtenstein, & later again in 1950 by Lichtenstein (1). ABC is a benign, expansile, non-neoplastic bone lesion, which is characterized by channels of blood & spaces divided by fibrous septa (2). 95% of the lesions occur in the first 3 decades of life, & almost 75% occur in the first 2 decades (3). Giant ABC can be challenging because of the destructive effect on the bones & the pressure on the nearby structures, especially on weight-bearing bones. ABC of a metatarsal is somewhat uncommon, despite the predisposition of this lesion for long bones (4-13). En bloc resection & fibular strut grafting is a useful surgical technique in the treatment of benign & malignant bone lesions. The aim of this article is to evaluate the clinical & radiological results of the resection & reconstruction of giant ABCs using non-vascularized fibular bone graft.

Case Report –

A 14-year-old female child presented with painful swelling over the dorsum of the right foot since 12 months (Figure 1). She was apparently alright 12 months back when she noticed swelling over the dorsum of right foot. Swelling was sudden in onset gradually progressive. Swelling was single around 5x5x3 cm, diffuse, firm in consistency, non-mobile, adhered to underlying bone. Plain radiographs of the foot showed suggestive of ballooning of radiolucent area with fusiform dilation of the metatarsal diaphysis with a thin outline, which was causing pressure on the surrounding metatarsal bones (Figure 2). MRI was suggestive of an expansile lobulated lesion of bone with several septations in the diaphysis of the involved bone. The lesion was hypointense on T1- & hyperintense on T2-weighted images, & the cortices were disrupted (Figure 3). Surgical plan of management was en

bloc excision of the lesion with an autogenous interpositional non-vascularized fibular graft. A dorsolateral incision was given over the cystic lesion. The incision passed through layers at the level of the cyst, exposing the affected bone, revealing a fusiform swelling, as anticipated from radiological picture (Figure 4). Histopathology indicated the benign nature of the lesion suggestive of aneurysmal bone cyst. The thin-walled tumor was resected en bloc with a micro sagittal saw. The defect was replaced by a segment from the ipsilateral fibula & fixed by Kirschner wire across the osteotomy sites (Figure 5). Postoperatively below the knee slab was applied which was followed by non-weight-bearing cast for 7 weeks, then gradually weight bearing started after another 7 weeks. 8 weeks later, the wire was removed, & gradual range of movement were started.

Discussion -

ABC is classified as a destructive benign bone tumor, which means if untreated or not treated properly may recur or get larger & be called giant ABC. While the pathogenesis is still unknown, the two broad types are either primary (70%) or secondary (30%). From a diagnostic point, ABC is widely confused with other giant cell containing tumors of the bone. Various modalities for treatment of ABC include intralesional injection, arterial embolization, local resection, radionuclide ablation, en-bloc excision & intralesional removal. Adjuvant therapies have also been attempted post resection including the use of liquid nitrogen & phenol (14). Once the cyst is excised, a number of various materials have also been used to fill the void. The cavity can be packed with bone autograft, allograft & even polymethyl methacrylate. Though, with the use of extensive curettage, bone graft with or without adjuvant methods, there is a considerably high rate of complications (15,16) & recurrence. When the extremity lesion is giant, any treatment approach other than complete resection & reconstruction will have a great tendency to increased morbidity of repeated surgeries with possibility of pathological fracture. In giant ABCs, preservation of the bone length is extremely important for suitable functional outcome of the involved limb. In our patients, none of the usual modalities of treatment other than complete resection would have been sufficient to cause everlasting cure.

Non-vascularized autogenous bone grafts are biologically active grafts with relatively low donor site complications that will be replaced completely by living bone & that are capable of remodeling to fulfill the function need (17-21). Its cortical composition provides immediate stability to the surrounding joints (22). Regeneration of the fibula at the donor site occurred within 3 months. For confirming long-term graft integration, fibular cortical grafts should link the bone defect after the resection of diaphyseal bone cyst & it should be securely fixed onto the regular bone with added form of internal fixation. Here we found that success of integration of the strut fibular graft in our case to the rich blood supply of the recipient site & the surrounding well-vascularized soft tissues of the ABC in the metatarsal. This will enhance vascularization of the non-vascularized fibular bone graft. We conclude that ipsilateral strut fibular autograft can be effectively used in reconstruction of defects that were observed after complete removal of giant ABC with outstanding clinical & radiological results at final follow-up.

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Figure Legends -



Figure 1 – Showing Swelling over the dorsum of the right foot.



Figure 2 – AP & Lateral Radiograph of foot showing ballooning of radiolucent area with fusiform dilation of the metatarsal diaphysis with a thin outline, which was causing pressure on the surrounding metatarsal bones.



Figure 3 – Magnetic Resonance Image of Right foot



Figure 4 – Incision & Exposure of the ABC



Figure 5 – Post – operative Radiograph