

Aneurysmal Bone Cyst In Metacarpal of a Child

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What to Learn from this Article?

*ABC in small bone in a small child present unique management scenario
Approach and Management strategies for such a case is discussed here*

Abstract

Introduction: Aneurysmal bone cyst is a rare, rapidly growing, and destructive benign bone tumor that rarely involves the bones of the hand. Various treatment options for aneurysmal bone cyst have been reported in the literature, but controversy exists regarding optimal treatment.

Case Report: A six year old boy presented with a history of pain and local swelling over his third metacarpal of five months' duration. Physical and radiographic examination of the hand was consistent with aneurysmal bone cyst. After biopsy, pathologic examination confirmed the diagnosis of aneurysmal bone cyst. En-block resection of the tumor and autologous fibular strut graft fixation with Kirschner wires was performed. The hand was immobilized in a short arm cast for three weeks; after the patient received three weeks of physiotherapy, the kirschner wires were removed six weeks postoperatively. Excellent clinical and functional results were obtained with no recurrence after two years of follow-up with en-block resection and reconstruction by autologous graft.

Conclusion: Aneurysmal bone cyst in third metacarpal of child of age six is rare entity and decision making for management poses difficulties. Our experience with En-block resection of tumor and autologous fibular sturt grafting was quite satisfactory with excellent clinical result, and we recommend this is as one modality of treatment of ABC in metacarpal of child.

Keywords: Aneurysmal Bone cyst; metacarpal; child; fibular graft.

Author's Photo Gallery



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Introduction

Aneurysmal Bone cyst (ABC) is a rare tumor and accounts for 1-2% of all primary bone tumors. Jaffe and Lichtenstein in 1942 were the first to give distinct identity and describe it separately from hemangiomas of bone and other tumors of giant cells [1]. Aneurysmal Bone cyst usually occurs in first two decades of life and has slight female preponderance. It shows predilection [2, 3] for long bones and vertebral column; less than 5% of all ABC occurs in long bones of hand [4].

Pathogenesis of ABC is obscure. Lichtenstein suggests that persistent local disturbance in hemodynamics (venous thromboses of arteriovenous aneurysm) causes marked increase in venous pressure and leads to development of dilated engorged vascular bed. Various other theories about origin of ABC makes it true neoplasm [6,7].

Various options for treatment of ABC have been reported from time to time, we are sharing our experience with this large ABC in meta carpal of a child of age five [7,8].

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Figure 1: Pre operative xray of patient showing expansile lytic lesion



Figure 2: Post operative xray showing grafting with fibula fixed with k wire

Case Report

A six year-old boy presented with a history of pain and local swelling over his third metacarpal of left hand with five months duration. On physical examination, the lesion was firm and immobile and there was slight tenderness on palpation. Active range of motion of his third metacarpophalangeal joint was slightly restricted, and pain was aggravated with movement. There was no history of trauma. His past medical history revealed nothing significant.

Radiographic examination of the hand showed a marked increase in diameter along the third metacarpal and widening of the medullary canal. The cortex was uniformly thin and the physis was spared [Fig. 1]. The characteristics of the lesion were consistent with aneurysmal bone cyst after biopsy, pathologic examination confirmed the diagnosis of aneurysmal bone cyst. Histologically, ABC was composed of cavernous dilated engorged vascular bed and slit like hemorrhagic spaces surrounded and traversed by fibrous septa containing spindle cells, inflammatory cells and lesser number of osteoclast like multinucleated giant cells that are distributed around hemorrhagic cystic spaces. Typically, osteoid formation with or without osteoblastic rimming was observed. We differentiated this lytic lesion with unicameral bone cyst with histological picture of lesion which was consistent with ABC, However probable

multilocular lytic lesion in x-ray also in favor of ABC. En – block resection of the tumor was performed through a dorsal longitudinal incision over the third metacarpal. Autologous fibular strut graft was harvested from left leg. The graft was cut into its definitive shape and inserted into the created bony defect. K- wire was used for graft fixation (1.5m K-wire) [Fig. 2]. The hand was immobilized in a short arm cast for three weeks, after that patient received three weeks of physiotherapy consisting of progressive active range of motion exercises. Kirschner wires were removed six weeks postoperatively.

At final follow-up two years postoperatively, the patient had gained full range of hand motion with no pain. The patient was satisfied with the functional and cosmetic results. Radiographic examination demonstrated osseous integration of the graft with no signs of recurrence [Fig. 3,4].

Discussion

The main goals in the treatment of aneurysmal bone cyst of the hand are eradication of the lesion, prevention of recurrence, and preservation of hand function. Literatures described many modality of treatment method including grafting with fibular strut.

Currently, curettage and bone grafting is the most common operative procedure used. However, recurrence rate is high after this procedure. Basarir [10] et al



Figure 3: Three month post operative radiograph showing incorporation of fibular bone



Figure 4: Good functional recovery with full grip strength and no pain or instability

reported that two of three cases that were initially treated with curettage and grafting, recurred. Similarly, in a case series by Frassica [11] et al, curettage and bone grafting in seven cases was associated with four recurrences.

Due to the high risk of recurrence after curettage and grafting alone various forms of adjunctive therapy have been used to decrease the rate of local recurrence. In some cases cryosurgery [12,13,14] and sclerotherapy were used as an adjuvant intralesional treatment for aneurysmal bone cyst arising in the hand. These treatments are difficult to use in the small bones of the hand and may damage surrounding intact tissue and cause serious complications such as neuropraxia, postoperative fracture, burn, infection. Low- dose irradiation has also been reported to be an effective method of treatment however it is not used routinely because of potential for malignant transformation and wound necrosis, which may happen more easily in distal lesions. Although a 3.7% local recurrence rate was reported with cryosurgery, there is a potential risk of amputation of small bones.

En-block resection and reconstruction with strut grafting is another operative treatment option. Given the aggressive nature of aneurysmal bone cysts with the tendency to develop recurrence, en-block resection seems to be the therapy of choice. No recurrence have been reported after en-block resection in the relevant literature [8,9,10,15,]. Despite it being a curative method of treatment, its use is limited, particularly in cases where the lesion is close to articular surfaces. Long operation time the need for microsurgical skills, and donor site complications are major problems associated with these techniques. Otherwise, reconstruction can only be achieved with arthrodesis, which may impair hand function.

In our case, excellent clinical and functional results were obtained with en-block resection and reconstruction with fibular strut graft with no recurrence after two year follow-up.

Conclusion

An en block resection of cystic lesion of metacarpal with bone grafting with fibular block is a good choice for treatment for Aneurysmal bone cyst of hand bone with good result in our patient. It give structural construct with full return of functional activity.

Clinical Message

Although ABC in metacarpal of child is rare situation, but it is well treatable with excellent clinical end result. For large Aneurysmal bone cyst in metacarpal of child, En block resection and autologous fibular strut graft is good option of treatment.

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