MANAGEMENT OF ANEURYSMAL BONE CYST WITH BONE GRAFT AND TRICALCIUM PHOSPHATE WITH 6 YEARS OF FOLLOW UP: A CASE REPORT

Orthopaedics

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ABSTRACT

Aneurysmal Bone Cyst (ABC) is a Benign tumor, Also known as Giant Cell Repetative Granuloma, They are locally destructive hemorrhagic benign cystic lesion. According to the definition of the WHO Aneurysmal Bone Cyst is expanding osteolytic lesion consisting of blood-filled spaces of variable size and that are separated by connective tissue septae containing trabecula of bone or osteoid tissue and osteoclast giant cells. We report a case of a giant aneurysmal bone cyst in the Middle one-third of Right humerus of a 16-year-old boy, which was treated with Allograft, Autograft and ender's nail fixation. At 6 Years of follow up Patient regain a pain-free complete Range of motion with radiographically subside of lesion.

KEYWORDS

Humerus, Aneurysmal Bone Cyst, Tricalcium phosphate.

INTRODUCTION

An Aneurysmal Bone Cyst is a Primary, Non-neoplastic, Uncommon lesion of bone. Malignant degeneration of an Aneurysmal Bone Cyst with no treatment has been seen as a rare event.¹

Aneurysmal Bone Cyst is first described by Dr. Jeff and Lichtenstein, which is an intraosseous, osteolytic lesion, chiefly affecting the metaphyseal region of long bones and vertebrae. It also suggested that it is a misnomer name as this lesion neither aneurysmal nor true cystic lesion.²

Giant Aneurysmal Bone Cyst are relatively rare. Most commonly found in long bone like Femur, Tibia, Humerus, Vertebrae rarely presented in Clavicle, foot, mandible, calcaneum, Metatarsal.³ These benign type of lesion occur most commonly first and second decade of life. Accounting Only one percent in all benign tumors. There are two types of ABC i.e. Primary (which presents 70 % of All cases) and secondary (around 30% all cases).⁴ It is usually diagnosed as incidental findings or in some cases lead with pathological fracture of a cyst.⁵⁻⁶ Some authors published that more than 50 % of cortical bone destruction by tumor leads to high risk for pathological fracture.⁷

A few treatment modalities have been portrayed for ABC, for example, sole curettage, curettage with cementation or bone grafting, fibrosetting agents (Ethiblock or phenol) or bone marrow injections, arterial embolization, adjuvant cryotherapy or radiotherapy, demineralized bone matrix applications and segmental or en bloc resections.⁸

Case Report

An 18-year old boy presented in Orthopedic OPD in the year of 2012 with chronic right arm pain dull in nature while doing an activity or any range of motion since and swelling which had increased during the previous 2 months. No history of recent trauma, fever, Skin, or any other kind of infection, constitutional symptoms or signs. His medical history and family history were non-contributory. On physical

examination shows deep tenderness and swelling over the middle 3 rd of right side arm which was gradually increased over one month.

The patient had a full, active range of shoulder and elbow movement with pain in the middle of the right arm.

Radiographs of the Right Arm With anteroposterior and lateral view showed an osteolytic lesion involving the middle 3 rd of humerus. Osteolytic lesion showed cortical thinning, Endosteal scalloping and with mild expansion, and a multi-loculated appearance was observed without any pathological fracture (Figure 1). MRI and Ct scan was not done due to the poor condition of the patient. The patient managed conservatively with NSAIDs and the above-elbow cast, kept for 6 weeks.

After removal of cast, Pain was reduced. The patient was advised to avoid heavy weight lifting, avoid playing. periodic follow up of every 2 months was taken, no improvement was seen on x-ray. The patient had a full, active range of shoulder and elbow movement with pain in the middle of the right arm.

The patient came back after 8 months with a history of falls on the same side of the arm, swelling, and pain in the right arm. On X-ray fracture seen on the lytic lesion (figure 2). All the necessary blood investigations were done and the patient was taken for operation. Surgery was performed under general anesthesia. The patient was positioned at supine position.

We have taken anterolateral incision open complete middle 3 rd of Right humerus. Made a large window in the anterior wall cortex, a large cavity with serosanguinous fluid was found with some sclerotic tissue on the rim of the cortical wall. Complete curettage tissue samples were sent for histologic analysis. Also, an intraoperative frozen section was performed. There was no evidence of malignancy. Intraoperative Gram stain and cultures were negative. The lesion was diagnosed as a bone cyst histologic analysis awaited. Intraoperative

findings were that the lesion was completely curetted with the periphery of the cavity burred completely and cauterized with phenol. The cavity was packed with autologous iliac graft with α -TCP tricalcium phosphate crystals and stabilize the fracture with 2 titanium ender's nail (figure 3). Histopathologic examination of the biopsy material revealed fibro collagenous stromal tissue with dilated vascular spaces and prominent blood vessels hemorrhage and haemosiderin laden macrophages are seen chronic inflammatory cell infiltrate and multinucleated giant cells are seen. These histologic findings were consistent with an aneurysmal bone cyst. Postoperative above elbow slab given for 4 weeks. Full range of motion started at shoulder and elbow after removal of slab. periodic follow up taken till 6 years with no recurrence of the tumor. He has regained full range of motion.

DISCUSSION

Aneurysmal bone cysts can present as a primary (Idiopathic or de novo) or secondary lesion (e.g., associated with giant cell tumor, chondroblastoma, osteoblastoma or osteosarcoma).⁹

Primary Aneurysmal bone cyst is most commonly located in the metaphysis of long bones, especially weight-bearing long bones but recently found in small bones like patella, metatarsal, calcaneum, talus. It is an aggressive type of tumor, which may lead to physal extension resulting in growth plate disturbances and subsequent development of deformities¹⁰. In Our case, ABC is purely into diaphysis on the middle one 3rd of humerus not causing any deformity.

Despite the different kinds of treatment modalities suggested in the literature, some authors suggested a recurrence rate that ranges from 5% to greater than 40%¹¹ and some shows Recurrence reported anywhere from 3% to as high as 71% for ABCs in general and at a rate of 18–20% for ABCs of juxtaepiphyseal regions.¹²

The plain radiographs in AP and Lateral views show a radiolucent lytic area with extension, cortical thinning, and apparent septations, which was also seen in our patient. Magnetic resonance imaging (MRI), ABC regularly reveals fluid-fluid levels with low-intensity signals on T1 and high-intensity signals on T2.¹³⁻¹⁴

The treatment for ABC's is debatable in literature due to varies according to the involvement of physis, bone type, grade of tumor, size of a tumor.

In our study, according to lesion size and location of lesion we had gone with curettage, cauterization, filled the defect with autologous bone graft and Tricalcium phosphate cubes with Enders nail fixation. Till this date a lot of controversy about which material is ideal for the reconstruction of the bone defect in benign lesions.

The advantages of Autologous cancellous bone graft over allograft are rapid incorporation, faster revascularization, and non-immunogenic¹⁵. The disadvantage is high failure rate around 50 % when it is used alone because it does not provide adequate structural support and provide limited supply for large bony defects¹⁶. So to overcome used synthetic bone graft with autologous bone graft with internal fixation which provides enough structural support.¹⁷ If you compare allografts, due to a lesser immune response or absence of osteocytes, incorporating the process of allograft is slower than the autologous graft.¹⁸

Advantages of synthetic bone substitute has many; Easy to obtain, an unlimited source, does not require any additional procedures, acts as a scaffold for new bone formation, and prevent complications at the donor site and minimize the infections.¹⁹ There are a lot of trials done in vivo and vitro to evaluate the efficacy of synthetic bone graft .which shows good results and less recurrence rate.

Currently, Alternative strategies for ABC management are Adjuvant radiotherapy, Arterial embolization, Sclerotherapy, Argon beam coagulation, Cryosurgery, Cement Following curettage.

Some Emerging techniques like Curepsy, Percutaneous doxycycline, Bisphosphonate medical therapy in trials for the management of ABCs²

CONCLUSIONS

Treatment for aneurysmal bone cysts varies according to the surgeon. After thoughtful consideration of the location of the tumor, its

aggressiveness, and its extent, We recommend that aggressive and large Aneurysmal Bone Cysts not involving the physis should be extensively curetted and filled with autogenous bone graft with synthetic graft and prophylactic fixation Required to prevent pathological fracture and to give support to the graft.

Figure 3(3 year of follow up)

Figure 2

Figure 1

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