Aneurysmal bone cyst of the medial end of clavicle - A Rare Site
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Procedure: Comparative studies
Imaging Technique: MR
Imaging Technique: Conventional radiography
Imaging Technique: Image manipulation / Reconstruction
Special Focus: Neoplasia Case Type: Clinical Cases
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Patient: 14 years, male

Clinical History:
A 14-year-old male child came to the orthopaedic clinic with painless swelling over the right upper aspect of the chest over the past 9 months, which was gradually progressive with no constitutional symptoms (Fig. 6). The child was asymptomatic throughout these 9 months with no distal neuro-vascular deficit. On examination, the swelling was firm and immobile.

Imaging Findings:
Chest PA radiograph showed a well defined expansile osteolytic lesion with thin sclerotic margins arising from the medial end of right clavicle. Thin septations can be seen within the lesion (Figure 1a). MRI was performed revealing a large well defined expansile lesion of altered signal intensity arising from the medial end of right clavicle. It showed multiple cystic areas of variable sizes with a T1W and T2W hypo-intense rim. Cysts were hyperintense in T2W and STIR images (Figure 2, 3). A few focal areas of T2W and T1W hyper-intensity noted within the cysts indicate areas of blood of varying age. No marrow oedema was noted in the adjoining uninvolved portion of the clavicle (Figure 3, 4). No flow voids were noted within the lesion. The surrounding soft tissue was unremarkable. These features were conclusive of a benign aetiology-aneurysmal bone cyst. Biopsy confirmed it as an aneurysmal bone cyst and the patient was treated by curettage and allograft with hydroxyapatite grafting within (Fig 1-b).

Discussion:
Aneurysmal bone cyst (ABC) is a benign but locally destructive lesion of the bone. It accounts for 2.5% of all bone tumours. Eighty percent of aneurysmal bone cysts occur in skeletally immature patients who are below the age of 20 years [1]. There is no sex predilection; the peak incidence is in the second decade of life. ABC can involve almost any bone, but the most frequent sites are long tubular bones and vertebrae. Among flat bones, the pelvis and scapula are well-known locations. The clavicle is a relatively rare site for this lesion [2]. According to a review of literature, all the aneurysmal bone cysts of the clavicle were found in the acromial end and showed very characteristic eccentric expansion with a thin cortical rim [3]. This shows that an aneurysmal bone cyst of the medial end of the clavicle is
very rare. Histologically, ABC is characterized by channels and multiloculated cyst-like spaces filled with blood and lined by fibrous septa that may or may not contain osteoclast-like giant cells, osteoid, woven bone, and chondroid matrix material. Historically, ABCs have been considered non-neoplastic, noninflammatory mass lesions divided into primary and secondary types, the former unassociated with another primary bone tumour. Today however, we recognize that in all likelihood, primary ABCs are clonal in origin and thus neoplastic. Most often, this involves a translocation between the USP6 on the 17p13 locus and promoter regions on other chromosomes, most frequently the CDH11 gene located at 16q22. In other cases, a translocation is not identified, but rearrangements of these genes, especially USP6, are present [4].

The most effective treatment for aneurysmal bone cyst is complete surgical excision of the lesion, but this approach cannot be exercised everywhere because it may produce functional impairment. Therefore, most of the lesions are treated by curettage and bone grafting (in our case curettage with allograft and hydroxyapatite bone grafting was done). The recurrence rate with curettage and bone grafting is 20–70%. Typically, the lesion recurs within 6 months and almost never after 2 years. Excision of the involved bone may be possible in some situations (such as fibular lesions) where the bone is expendable. In some cases embolization of a feeding vessel may help to decrease vascularity, making the surgical procedure less bloody, (as done for our case pre-operatively) especially in difficult locations such as the spine and pelvis [1, 5].

Hence, aneurysmal bone cyst should be considered as a differential diagnosis of clavicular lesions despite its rarity.

**Differential Diagnosis List:** Aneurysmal Bone Cyst of the medial end of clavicle, Giant cell tumour, Chondromyxoid fibroma

**Final Diagnosis:** Aneurysmal Bone Cyst of the medial end of clavicle

**References:**


Figure 1

Description: A large well defined expansile lesion of altered signal intensity was noted arising from the medial end of the right clavicle appearing hyperintense on unenhanced T1W. Origin: Dr. Lokesh Sharoff, Department of Orthopedics, Sir J.J. Group of Hospitals, Mumbai, India.
Description: On fat suppressed images no marrow oedema was noted in the adjoining uninvolved portion of clavicle. The surrounding soft tissue was unremarkable. Origin: Dr. Lokesh Sharoff, Department of orthopedics, Sir J.J. Group of Hospitals, Mumbai, India.
**Figure 3**

**a**

**Description:** Well defined expansile lesion of altered signal intensity noted arising from medial end of right clavicle appearing isointense on T1W. It shows multiple cystic areas of variable size with a T1W hypo-intense rim. **Origin:** Dr. Lokesh Sharoff, Department of orthopedics, Sir J.J. Group of Hospitals, Mumbai, India.

**b**

**Description:** Well defined expansile lesion of altered signal intensity noted arising from medial end of right clavicle appearing hyperintense on STIR. **Origin:** Dr. Lokesh Sharoff, Department of orthopedics, Sir J.J. Group of Hospitals, Mumbai, India.
**Figure 4**

(a) **Description:** Few focal areas of STIR hyper-intensity noted within the cysts indicate areas of blood of varying age. **Origin:** Dr. Lokesh Sharoff, Department of orthopedics, Sir J.J. Group of Hospitals, Mumbai, India.

(b) **Description:** Few focal areas of T2W hypo-intensity noted within the cysts indicate areas of blood of varying age. **Origin:** GRANT MEDICAL COLLEGE AND SIR JJ GROUP OF HOSPITALS
Figure 5

Description: Routine Chest PA view radiograph shows an expansile lytic lesion arising from the medial end of right clavicle. Origin: Sir JJ Group of Hospitals, Mumbai
Description: Post curettage hydroxypalite graft placement radiograph -

Tiny speckled radiopacities can be seen within the previous lesion site depicting the graft particles.

Origin: Sir JJ Group of Hospitals, Mumbai
Description: A firm immobile non-tender swelling was noted in the medial end of right clavicle. Origin: Sir J.J Group of Hospitals, Mumbai