Aneurysmal Bone Cyst of the Rib in a Child: Report of a Case

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Abstract
An aneurysmal bone cyst (ABC) is a benign tumor of the skeletal system, which is rare in childhood and mostly occurs in long bones. An aneurysmal bone cyst of the rib is also very rare and it is difficult to distinguish from other rib tumors of childhood, especially Ewing’s sarcoma. An unusual case of an aneurysmal bone cyst in the rib of a 12-year-old boy is presented herein. The entity is discussed with special emphasis on the clinicopathologic features, differential diagnosis, and treatment. The most important diagnostic aid in accurately identifying such cysts is to be aware of such a possible diagnosis when a child presents with a rib mass. An en bloc resection of the mass along with the affected portion of the rib is mandatory to obtain a satisfactory outcome.

Key words Aneurysmal bone cyst · Rib · Child

Introduction
An aneurysmal bone cyst (ABC) has a benign pathology, which is usually located in the long bones and spine. The rib is a rare location for ABC and only few such cases occurring in children have been reported in the literature.¹,²

We report herein an ABC of the rib presenting in a 12-year-old boy. The clinicopathologic features of this entity are discussed with special emphasis on the necessity of making a differential diagnosis and treatment.

Case Report
A 12-year-old boy was admitted to our hospital with the chief complaint of right-sided chest pain for 2 months and an enlarging mass. He was referred to us to undergo an excision of the rib mass.

Regarding the patient’s medical history, the chest pain started 2 months before presentation and became progressively worse. There was no history of trauma, fever, or respiratory embarrassment accompanying the pain and mass. He had undergone thoracentesis for pleural effusion and a thoracotomy for the 7th rib mass at another center. The pleural fluid was free of malignant cells. The mass could not be excised but a wedge biopsy had revealed a diagnosis of ABC before referral.

On admission his height and weight were in the 50th percentile, blood pressure was 110/70mmHg, and axillary temperature was 37°C; his pulse was 110 beats/min. A physical examination revealed a palpable mass on the back between the vertebral column and scapula at the right hemithorax and a right posterolateral thoracotomy incision scar was present. The respiratory sounds were slightly decreased on the right side.

Plain and lateral chest radiographs showed a well-circumscribed mass expanding the 7th rib at the right side. Computed tomography (CT) of the chest showed a 53 × 51 mm mass, which originated from the right 7th rib, and massive pleural effusion. The mass expanded and destroyed the rib, and contained calcifications (Fig. 1).

Laboratory investigations showed normal findings regarding the complete blood count, and kidney and liver function tests, including lactate dehydrogenase value (394 IU/l, normal: 230–460 IU/l). His previous radiological investigations were assessed again to make a differential diagnosis. The patient underwent surgery after all investigations were completed, at which time a diagnosis of ABC was confirmed.

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A right-sided thoracotomy revealed a 5 × 7-cm mass originating from the posterior half of the 7th rib. The lung was firmly adhered to the mass over the previous biopsy site. The mass was excised totally en bloc with the 7th rib, and the periosteum and adjacent intercostal muscles (Fig. 2). The chest wall was closed primarily without any grafting.

Microscopically, cystic areas lined by cuboidal cells were detected, with hemorrhaging in most of them. Between the cysts, the septa were rich in fibroblasts and giant cells (Fig. 3). There were focal areas of calcification and osteoid. Lung tissue showing inflammatory cells with intra-alveolar and interstitial hemorrhage was detected in the sections from the adjacent soft tissue, attached to the bone lesion by a thick fibrous capsule. This was probably the site of the previous intervention of a wedge biopsy. No lesion was present at the surgical margins of the rib. All of these pathological findings were consistent with those of an aneurysmal bone cyst. The patient was discharged after an uneventful 1-week postoperative period.

Discussion

Aneurysmal bone cyst was first described by Jaffe and Liechtenstein in 1942 and accounts for only 1.3% of all bone tumors. Histopathologically, it is a non-neoplastic bone lesion, which is composed of blood-filled cavities and trabeculae consisting of osteoid tissue and giant cells.1 Long bones and spine are the most frequent sites affected by ABC.2,3 Among the flat bones the majority are seen in the pelvis. The rib is a rare location of ABC, involving 2.7% of all cases. Aneurysmal bone cyst can be observed in every rib except the lower three.4 Although ABC is predominantly a disease of the first three decades of life and it occurs equally in both sexes, a rib location is seen at an average age of 22.8 years and it is slightly more frequent in females.

The etiology of ABC is unknown but circulatory disturbances and trauma have been proposed to be factors in the pathogenesis.1,4 Approximately one third of all cases have a pre-existing lesion such as fibrous dysplasia, nonossifying fibroma, giant cell tumor, osteoblastoma, chondromyxoid fibroma, angioma, chondroblastoma, hemangioendothelioma, or cartilaginous hamartoma, and these are called “secondary ABC.”5,6 If a pre-existing lesion is not identified as in our case, then it is classified as “primary ABC.”

Fig. 1. Computed tomograph of the chest demonstrating a calcified mass expanding the rib and accompanied by pleural effusion

Fig. 2. Macroscopic appearance of the resected specimen

Fig. 3. Hemorrhagic areas within a cystic space, with giant cells (arrows) (H&E, ×200)