

Osteochondroma Arising from a Rib Mimicking a Calcifying Anterior Mediastinal Mass¹

Chang Yoon Lee, M.D., Soo-Youn Ham, M.D., Yu-Whan Oh, M.D.,
Sung Ho Lee, M.D.², Kwang Taik Kim, M.D.²

In this report, we present an interesting description of an osteochondroma arising from the anterior arc of the left fifth rib mimicking an anterior mediastinal mass. Surgical excision confirmed the lesion to be a non-complicated osteochondroma of the rib abutting underlying the parent bone.

Index words : Osteochondroma

Ribs

Tomography, X-Ray computed

A solitary osteochondroma is a common tumor and constitutes 20 - 25 % of benign bone tumors (1), and has been estimated to be present in 1 - 2% of individuals based on extensive skeletal evaluations. The chest radiography findings in our case resembled those of a mediastinal mass lesion. An osteochondroma usually is composed of cortical and medullary bone that is continuous with the parent bony cortex and medullary canals. The clinical significance of a radiological diagnosis of an osteochondroma concerns the identification of malignant transformation of primary lesions and the differential diagnosis from other tumors of the skeleton (2).

Case Report

A 22 year-old man presented with abnormalities detected on a chest radiograph during a general check-up prior to military service. This examination had revealed a focal contour bulging from the left mid cardiac border,

which was about 3 cm in length and without remarkable calcifications, at the level of the fifth rib anterior arc (Fig. 1). On lateral chest radiography, prominent spiculated opacity along the anterior chest wall was observed. The patient had no remarkable respiratory symptoms, such as, cough or dyspnea, the blood chemistry revealed no remarkable abnormalities, and the patient had no previous history of trauma. The findings of the chest radiography suggested the presence of an anterior mediastinal mass lesion. To evaluate further the mass lesion, chest CT was performed with contrast infusion. On CT scans, the mass lesion was observed to abut tightly the pericardium and a prominent bony spicule was observed on the left fifth rib anterior arc (Fig. 2). Just below the ossified lesion, soft tissue attenuation of the lesion, suggesting a cartilage cap, was observed. From the radiological findings and suspecting an osteochondroma, arising from the rib, sonography was performed, which revealed an oval shaped hypoechoic hyaline cartilage cap within the pericardial fat and continuous to the parent bone. To obtain a pathological confirmation of the diagnosis, the mass lesion was excised. During surgical exploration, a tightly abutting osteophyte arising from the posterior surface of the left fifth rib anterior arc was found. A photograph of a coronally sectioned specimen of the left fifth rib revealed cortical continuity

¹Department of Radiology, ²Cardiothoracic Surgery, Korea University Medical Center, Anam Hospital, Korea University
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Address reprint requests to : Soo-Youn Ham, M.D., Department of Radiology, Anam Hospital, Korea University Medical Center, 126-1, 5ka, Anam-dong, Sungbuk-gu, Seoul 136-705, Korea
Tel. 82-2-920-5657 Fax. 82-2-929-3796
E-mail: syohammd@yahoo.com

with the parent bone and a lobulated cartilage cap (Fig. 3). However, a microscope examination revealed no remarkable evidence of malignant transformation (Fig. 4).

On the tenth day after surgical excision, the patient was uneventfully discharged.

Discussion

Osteochondromas are relatively common skeletal tumors that arise due to the aberrant growth of normal tissue (3, 4). In the case of ribs, an osteochondroma can occur at the costochondral junction, to form predominantly pedunculated osseous protuberances that arise from

the surface of the parent bone. Osteochondromas are developmental lesions, rather than true neoplasms, and are often referred to as simply exostosis (2). These lesions result from the separation of a fragment of epiphyseal growth plate cartilage, and herniate through the periosteal bone cuff that normally surrounds the growth plate. The mechanism for this separation is not entirely clear, although the separation likely results from "cut-back" remodeling during growth of the long bones (2). Persistent growth of this cartilaginous fragment and its subsequent enchondral ossification result in a subpe-



Fig. 1. Chest radiography reveals a focal bulging of the left cardiac border (arrow), suggestive of a pericardial or anterior mediastinal mass lesion.

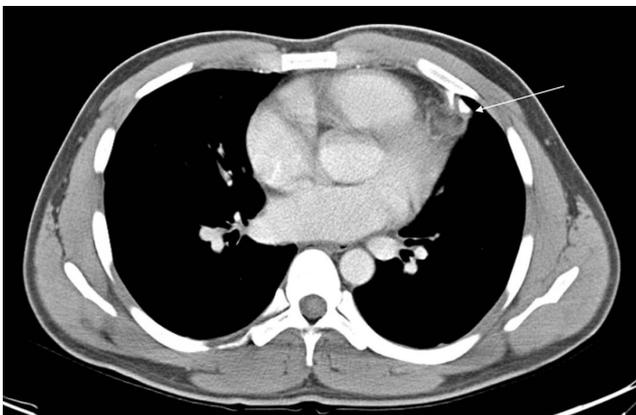


Fig. 2. A contrast enhanced CT scan shows prominent bony spicules arising from the posterior surface of the left fifth rib anterior arc with a soft tissue attenuated lesion (arrow), suggestive of a cartilage cap with osteochondroma.

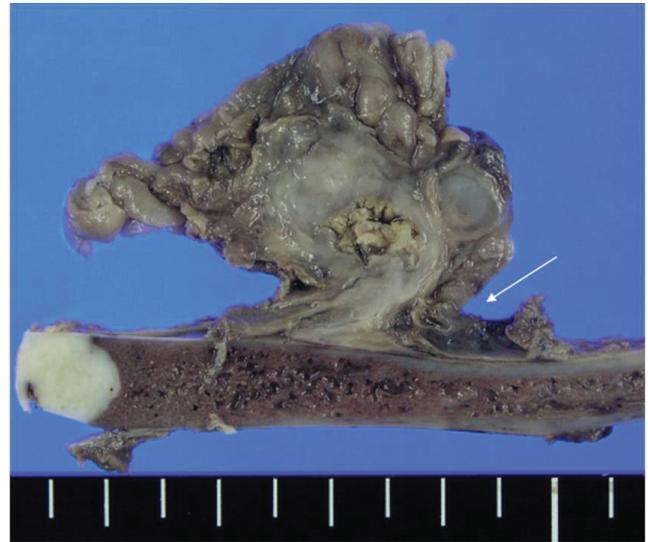


Fig. 3. A photograph of a pathology specimen of the resected left fifth rib reveals cortical continuity with the parent bone (arrow) and lobulated cartilage cap.

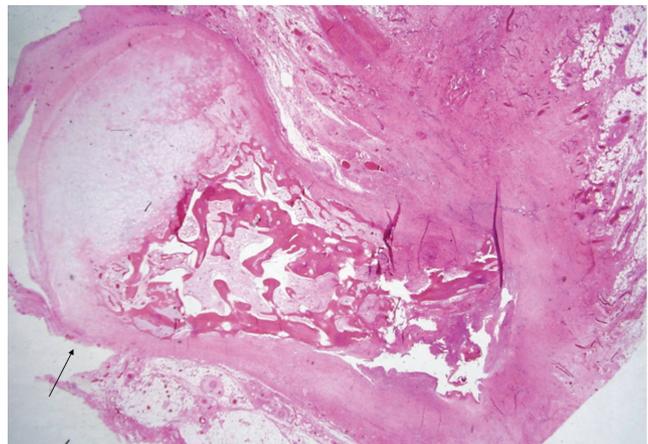


Fig. 4. A photomicrograph demonstrates the pedunculated tumor mass (arrow) with non-tumorous thick fibroadipose tissue on its surface. The mass was composed of proliferating chondrocytes in the cortex and was composed of irregularly thickened bony spicules in the medulla. The chondrocytes were well differentiated without nuclear mitosis or atypism (H & E staining, $\times 12.5$)

riosteal osseous excrescence with a cartilage cap that projects away from the nearest joint. Simple radiographs may show a cap composed of hyaline cartilage, which if calcified, may be more clearly visualized by CT (3).

In the present case, the lesion arose from the anterior arc of the fifth rib, but on axial images, the lesion was observed to abut tightly the osteophytes of the fifth rib to the pericardium. The simple radiograph findings were suggestive of a mediastinal lesion. Though we did not perform MRI, the cartilaginous tissue in the cap is known to have high signal intensity on T2-weighted MR images (3). By sonography, the cartilage portion manifests as a low echoic pattern with posterior shadowing, whereas the fatty marrow manifests as an echogenic component connected to the anechoic lesion. Continuity between the lesion and cortical /medullary bone in parent bone can be detected by CT, but is not always visualized for lesions involving the ribs. Complications associated with this tumor include fractures, osseous deformity, vascular injury, neural compression, and malignant transformation (2). Spontaneous hemothorax or diaphragmatic rupture associated with rib exostoses has also been reported (5, 6). It has been speculated that bleeding arises from pleural vessel enlargement caused by chronic irritation by the inwardly growing mass (5). However, in our case, no remarkable evidence of complications capable of inducing specific symptoms was noted. Moreover, enchondromas, which cause focal expansion of the rib, may also be observed and diagnosed, if typical chondroid calcification can be demonstrated.

If a patient complains of pain at the lesion site, and bone erosion, irregular calcification, a cartilage cap thickness exceeding 2.5 cm, or gradual thickening of the cartilage cap are detected on serial imaging follow-ups, malignant transformation is suggested (2). Moreover, development of sudden dyspnea and chest pain might be caused by spontaneous hemothorax or diaphragmatic rupture.

In conclusion, we present a case of osteochondroma (with pathological confirmation) arising anterior arc of left fifth rib mimicking a mediastinal mass as determined by chest radiography.

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