

Osteochondroma of the Rib Mimicking a Mediastinal Mass: Unexpected Manifestation in Hereditary Multiple Exostoses

Sang Kyun Bae, Won Sik Kang, Seung Hoon Yoo, Jeong Hyeon Cho,
Kyung Won Park, Bu Hyun Lee, Jung Hun Baek, Jae Ho Chung

Department of Internal Medicine, Myongji Hospital, Kwandong University College of Medicine, Koyang, Korea

Osteochondroma is a common bone tumor but a rare tumor in the rib. It is often asymptomatic and observed incidentally. This is a case report of a 49-year-old woman with an osteochondroma mimicking a mediastinal mass in hereditary multiple exostoses. The chest X-ray and computed tomography (CT) scans revealed the bony density feature of the mass. Surgical excision confirmed that the lesion was an osteochondroma.

Key Words: Osteochondroma, Rib, Hereditary multiple exostoses (HME)

INTRODUCTION

An osteochondroma is a cartilaginous tumor, the most common benign tumor of bone and constitutes 20-25% of benign bone tumors. It may be found in any bone that is performed in cartilage and are seen mostly in metaphyseal portions of long bones. These lesions may be solitary or multiple. The multiple forms or the hereditary nature of this disorder is usually transmitted as an autosomal dominant trait with a variable penetrance. Osteochondroma of the rib is exceedingly rare.^{1,2} They may present as a swelling in the chest wall or as an incidental finding on the chest radiograph. We report an osteochondroma of the 8th rib which presented as a mediastinal mass in hereditary multiple exostoses.

CASE

A 49-year-old woman was admitted to our hospital for the investigation of abnormal chest mass in the left lower lung field, detected incidentally. The patient had no remarkable respiratory symptoms, such as, cough or dyspnea, the blood laboratory findings revealed no remarkable abnormalities. Plain radiographs revealed multiple osteochondromas in the femur,

fibula, and tibia. Her two brother's also had numerous lower limbs exostoses. Chest X-ray showed 6 cm size calcified mass in left lower lung (Fig. 1). To evaluate further the mass lesion, chest computed tomography (CT) was performed. Chest CT scan revealed calcifying mass in left posterior thorax, involving left 8th rib (Fig. 2A, 2B). Magnetic resonance imaging (MRI) of the thoracic spine showed maximal cartilaginous cap thickness was 1.3 cm (Fig. 3) and T2-weighted and gadolinium enhanced MRI showed no high signal intensity. Because it was impossible to exclude completely the diagnosis of a well-differentiated chondrosarcoma, the mass lesion was excised and chest wall resection was performed. During surgical exploration, a tightly abutting osteophyte arising from the posterior surface of the left 8th rib posterior arc was found. A photograph



Fig. 1. Chest PA shows an about 5 cm calcified mass in the left lower-lung field.

Corresponding Author: Jae Ho Chung, 697-24 Hwajung-dong, Deokyang-gu, Department of Internal Medicine, Myongji Hospital, Kwandong University College of Medicine, Koyang 210-701 Korea
Tel: (031) 810-5412, Fax: (031) 969-0500
E-mail: pulmochung@kwandong.ac.kr

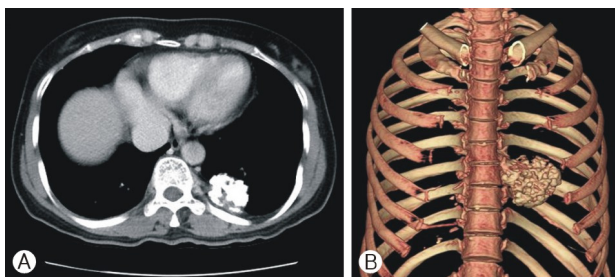


Fig. 2. CT scans show a calcifying mass in the left posterior thorax, involving the left 8th rib.

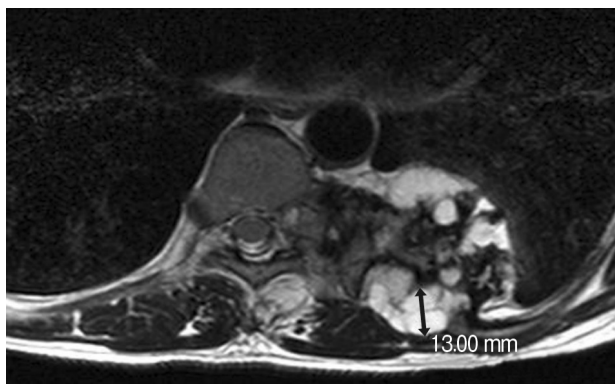


Fig. 3. T2-weighted thoracic spine MRI shows a 5 cm calcifying mass (maximal cartilaginous cap thickness: 1.3 cm).

of a coronally sectioned specimen of the left 8th rib revealed bluish white colored chondroid with bony tissue (Fig. 4). Histologically it was composed of well differentiated osteochondroma (Fig. 5). Postoperative course was uneventful and the patient was discharged.

DISCUSSION

Osteochondromata are benign developmental abnormalities in which a portion of the epiphyseal growth plate cartilage becomes separated from the main epiphysis. This results in the laying down of an abnormal bony spur which is directed away from the epiphysis. Osteochondromas are also known as exostoses. Costal exostoses involve the ribs in the region of the costochondral junction or at the vertebral end of the rib.

Osteochondroma usually present in childhood or adolescence. About 3% of solitary osteochondromas have vertebral and costal origin while they have been said to occur in 7% of individuals with hereditary multiple exostoses. HME (hereditary multiple exostoses) is considered the most frequent benign bone alteration of the skeleton. It is an autosomal dominant disorder characterized by the formation of multiple



Fig. 4. Photograph of the sectioned gross specimen clearly shows a bluish-white-colored chondroid and bony tissue.

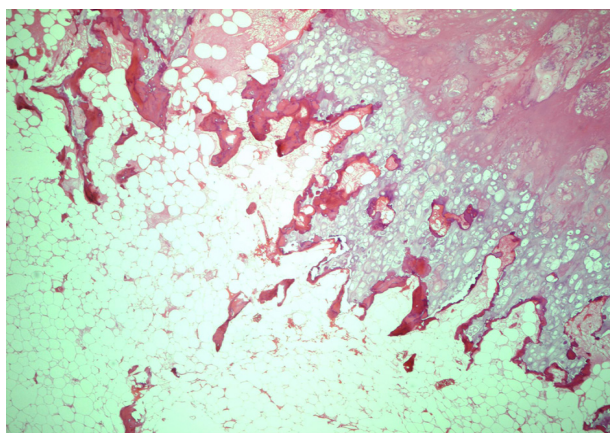


Fig. 5. Photomicrograph shows a thin, well-formed hyaline cartilage cap and underlying trabecular bone (hematoxylineosin stain, $\times 100$).

bone prominences, developing from the epiphysis. The exostosis begins to develop in childhood and continues to grow until puberty. Osteochondromas of costal origin may reach great size and cause marked vertebral erosion without producing signs of spinal cord compression. Spinal cord compression complicating osteochondromas has generally occurred in adolescents or young adults. Tumors that cause spinal cord compression generally arise from posterior vertebral elements or from the heads of the ribs.

Differential diagnosis of rib lesions include enchondroma, osteoblastoma, osteoid osteoma, chondroblastoma, hemangioma and chondrosarcoma. Simple radiographs may show a cap composed of hyaline cartilage, which if calcified, may be more clearly visualized by CT.³ Gadolinium enhanced MRI can be useful to differentiate benign from low grade malignant cartilaginous tumor. Cartilaginous tissue in the cap is known to have high signal intensity on T2-weighted MR images and the size of the cartilaginous cap is the best indicator of malignancy.⁴

Osteochondromas are frequently asymptomatic and the

development of pain may signify malignant degeneration. Most are symptomless but complications associated with this tumor include fractures, osseous deformity, vascular injury, neural compression, and malignant transformation.⁵ Spontaneous hemothorax, diaphragmatic rupture, pneumothorax associated with rib exostoses has also been reported.^{6,7} It has been speculated that bleeding arises from pleural vessel enlargement caused by chronic irritation by the inwardly growing mass.

If a patient complains of pain at the lesion site, and bone erosion, irregular calcification, a cartilaginous cap thickness exceeding 2.5 cm, or gradual thickening of the cartilaginous cap are detected on serial imaging followups, malignant transformation is suggested.⁸ Secondary chondrosarcoma occurs in 0.5-1% of patients with a solitary osteochondroma. Chondrosarcoma transformation is more common in hereditary form. 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 arising posterior arc of left 8th rib mimicking a mediastinal mass in hereditary multiple exostoses.

REFERENCES

1. Lee CY, Ham SY, Oh YW, Lee SH, Kim KT. Osteochondroma arising from a rib mimicking a calcifying anterior mediastinal mass. *J Korean Radiol Soc* 2007;57:533-5.
2. Kikuchi R, Mino N, Matsukura T, Hirai T. Resected osteochondroma of the rib in an elderly patient. *Gen Thorac Cardiovasc Surg* 2010;58:588-91.
3. Tateishi U, Gladish GW, Kusumoto M, Hasegawa T, Yokoyama R, Tsuchiya R, et al. Chest wall tumors: radiologic findings and pathologic correlation: part 1. benign tumors. *Radiographics* 2003;23:1477-90.
4. Phatak SV, Kolwadkar PK, Rajderkar D. Solitary osteochondroma of rib. *Ind J Radiol Imag* 2006;16:339-40.
5. Murphey MD, Choi JJ, Kransdorf MJ, Flemming DJ, Gannon FH. Imaging of osteochondroma: variants and complications with radiologic-pathologic correlation. *Radiographics* 2000;20:1407-34.
6. Bini A, Grazia M, Stella F, Petrella F. Acute massive haemopneumothorax due to Solitary costal exostosis. *Interact Cardiovasc Thorac Surg* 2003;2:614-5.
7. Glass RB, Norton KI, Mitre SA, Kang E. Pediatric ribs: a spectrum of abnormalities. *Radiographics* 2002;22:87-104.
8. Fabaron F, Vandermarcq P, Pascard JP, Defaux F, Azais O, Barret D, et al. Intrathoracic chondrosarcoma arising at a rib in a patient with multiple exostoses. *J Radiol* 1990;71:657-62.