



LETTER / *Musculoskeletal imaging*

Cavernous hemangioma of the rib mimicking a chondrosarcoma: Diagnostic value of delayed phase MRI



Keywords Hemangioma; Ribs; Magnetic resonance imaging (MRI)

Dear Editor,

Bone hemangioma of the rib is extremely rare. We report the computed tomography (CT), magnetic resonance imaging (MRI) and F18-fluorodeoxyglucose (FDG) positron-emission tomography/CT (PET/CT) features of a rib hemangioma with imaging and pathology correlation.

A 57-year-old woman was referred for the evaluation of an expanding bone mass of her right sixth rib. The lesion was incidentally detected during screening 5 years ago, and the patient was followed-up regularly. She was asymptomatic and did not have pain or weight loss. All laboratory findings were within the normal range. Unenhanced CT images in bone window revealed a localized expansile bone mass with septum- or honeycomb-like calcifications protruding from the right sixth rib toward the thoracic cavity (Fig. 1A). The tumor was sharply demarcated and was approximately 4-cm in diameter. MRI performed at 1.5-T revealed a bone mass that was hypointense on T1-weighted images and markedly hyperintense on fat-saturated T2-weighted images (Fig. 1B) compared to background bone structures. On post-contrast dynamic T1-weighted images with fat saturation, septum-like enhancements within the mass on early phase images (Fig. 1C) and diffuse mass enhancement on delayed phase images (Fig. 1D) were observed. F18-FDG PET/CT revealed mild F18-FDG uptake with a maximum standardized uptake value of 2.3 without any other abnormal F18-FDG uptake foci (Fig. 1E). Based on imaging features, a chondrosarcoma could not be excluded, although diffuse enhancement within the mass on delayed phase MR images were atypical of a conventional chondrosarcoma. Biopsy specimens revealed venous and normal bone structures without a chondroid matrix and malignant cells, but these findings could not provide the definitive diagnosis. Surgical excision was subsequently performed for definite diagnosis to exclude malignancy. Macroscopic examination of resected tumor revealed a reddish mass encasing the rib with septum-like

structures (Fig. 1F). At histopathological examination the mass was composed of thin-walled blood vessels containing red blood cells and lined by a single layer of endothelial cells supported by fibrous stroma. No papillary endothelial proliferations or cellular atypias were detected. The lesion was diagnosed as a cavernous hemangioma of the rib. The patient has been regularly followed up without recurrence.

Bone hemangioma of the rib is rare, predominantly asymptomatic and usually incidentally detected lesion [1]. On imaging, rib hemangioma presents as an expansile, well-circumscribed bone mass with a honeycomb appearance in the medullary cavity and thin bony cortex of the rib with/without cortical disruption. On MRI, bone hemangioma is hypointense on T1-weighted images and hyperintense on T2-weighted images. On contrast-enhanced images, bone hemangioma displays peripheral and/or septum-like early enhancement and progressive and centripetal enhancement [2]. Honeycomb-like bony structures in the bone mass of cavernous hemangioma can have a similar appearance to rings and arcs calcifications located peripherally in the multilobulated chondroid matrix of a conventional chondrosarcoma with septal and peripheral rim-like contrast-enhancement [3]. These findings were observed in our patient on CT and MRI. However, diffuse mass enhancement on delayed MR images were atypical findings because conventional chondrosarcoma with abundant chondroid matrix displays low degrees of enhancement on delayed phase CT and MRI [3]. We consider that in case of rib masses with septum- or honeycomb-like calcifications on CT images and marked hyperintensity on T2-weighted, internal enhancement on delayed phase MR images indicates rich fibrous stroma and is an important clue to suggest the diagnosis of bone hemangioma.

Human and animal rights

The authors declare that the work described has been carried out in accordance with the Declaration of Helsinki of the World Medical Association revised in 2013 for experiments involving humans.

Informed consent and patient details

The authors declare that this report does not contain any personal information that could lead to the identification of the patient(s).

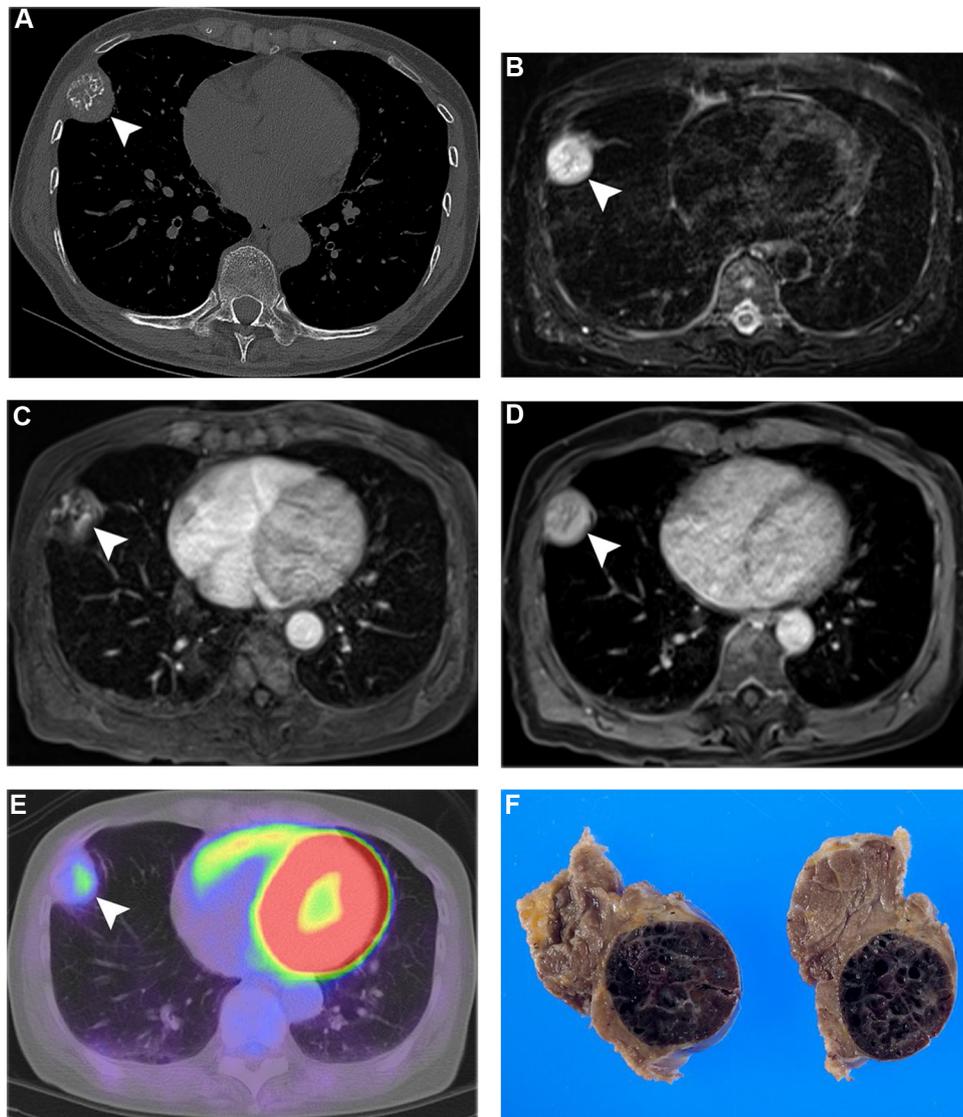


Figure 1. A 57-year-old woman with a bone mass of the right sixth rib. A. Unenhanced CT image in the transverse plane shows a localized, expansile bone mass with septum- or honeycomb-like calcifications protruding from the rib toward the thoracic cavity (arrowhead). B. Fat-saturated T2-weighted MR image in the transverse plane (TR/TE = 2800/81 msec) shows markedly hyperintense bone mass (arrowhead). C, D. Fat-saturated contrast-enhanced T1-weighted image after intravenous injection of gadopentetate dimeglumine (dose, 0.1 mmol/kg) shows septum-like enhancement (arrowhead) within the mass during the early phase (C, TR/TE = 4.1/1.5 msec) and diffuse mass enhancement during the delayed phase (D, TR/TE = 241/2.8 msec). E. F18-FDG PET/CT image in the transverse plane mild F18-FDG uptake with a maximum standardized uptake value of 2.3 (arrowhead). F. Macroscopic examination of the tumor after resection reveals a reddish mass encasing the rib with septum-like structures. Histologically, the mass was composed of thin-walled blood vessels containing red blood cells and lined by a single layer of endothelial cells, supported by fibrous stroma in the normal osseous structure.

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Disclosure of interest

The authors declare that they have no competing interest.

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