Clinical Case Reports

Open Access

CLINICAL IMAGE

Breath of relief: apparent pulmonary nodule due to heterotopic ossification

Eric Abston[1], Robert Novaco[2], Stephanie Hon[1], Jonathan Scalera[2] & Katrina Steiling[1]

[1]Department of Pulmonology, Allergy, Sleep, and Critical Care Medicine, Boston University School of Medicine, Boston, Massachusetts
[2]Department of Radiology, Boston University School of Medicine, Boston, Massachusetts

Correspondence
Eric Abston, Boston University School of Medicine, 72 E Concord St., R-304 Boston, 02118, MA. Tel: (617) 638-4860; Fax: (617) 536-8093; E-mail: Eric.Abston@bmc.org

Funding Information
No sources of funding were declared for this study.

Received: 9 October 2017; Revised: 8 December 2017; Accepted: 13 December 2017

Clinical Case Reports **2018; 6(6): 1174–1175**

doi: 10.1002/ccr3.1378

Key Clinical Message

Extrapulmonary heterotopic ossification appears similarly to pulmonary nodules on CXR, and is in the differential for pulmonary nodules. It occurs following the bone trauma, and in early stages appears similarly to tumors. Heterotopic ossification is diagnosed by its calcification pattern via MRI or ultrasound and managed conservatively unless symptoms develop.

Keywords

Heterotopic ossification, pulmonary nodule.

Question: What is the etiology of this pulmonary nodule, and what are the next steps in diagnosis/treatment?

Case

The patient is a 65-year-old Chinese woman who recently immigrated to the United States. Routine purified protein derivative skin testing was positive to 10 cm, and chest x-ray findings were suspicious for a pulmonary lesion. She denied cough, chest pain, dyspnea, weight loss, fevers, or night sweats. History was negative for smoking, toxic inhalational exposure, thoracic surgery, or trauma. Three serial-induced sputum samples obtained were negative for mycobacteria by both PCR and culture. A chest CT was obtained to further evaluate the lesion (Fig. 1).

Heterotopic Ossification (HO) is the formation of bone where it does not belong [1]. It is most commonly seen after trauma or surgery when a combination of soft tissue injury, ischemia, and activation of pluripotent stem cells by factors including bone morphogenetic proteins lead to deposition of bone in an area that was previously soft tissue. Abnormal bone deposits can cause joint pain and limit mobility. HO can be painful when it impinges on a neurovascular bundle.

Radiography demonstrating a classic peripheral ossified pattern is sufficient to diagnose HO in most cases and biopsy is not indicated [2]. Nonetheless, detection of HO during its early stages is difficult due to the lack of detectable calcification on radiographs. Prior to developing its characteristic calcification, heterotopic tissue can be indistinguishable on imaging from many soft tissue abnormalities including malignancy. In contrast to HO, the mineralization pattern of malignancy tends to be more central, which is helpful to differentiate the etiologies.

Bone scintigraphy traditionally demonstrates a characteristic vascular blush within the soft tissues on the angiographic and blood pool phases due to the hypervascularity of early HO [2]. Ultrasound is gaining favor in the evaluation of early HO due its low cost and safety. However, its efficacy can be limited by location, such as lesions deep to the scapula, as in our case. MRI is particularly helpful in evaluating secondary soft tissue impingement of HO, even though its appearance varies with stage. CT is not a first-line diagnostic tool for the evaluation of HO, but in this instance was sufficient for diagnosis.

In patients who have undergone acromioplasty for rotator cuff injury, HO from the scapula is common. However, spontaneous development of HO in someone without surgery or trauma, such as in our patient, is rare.

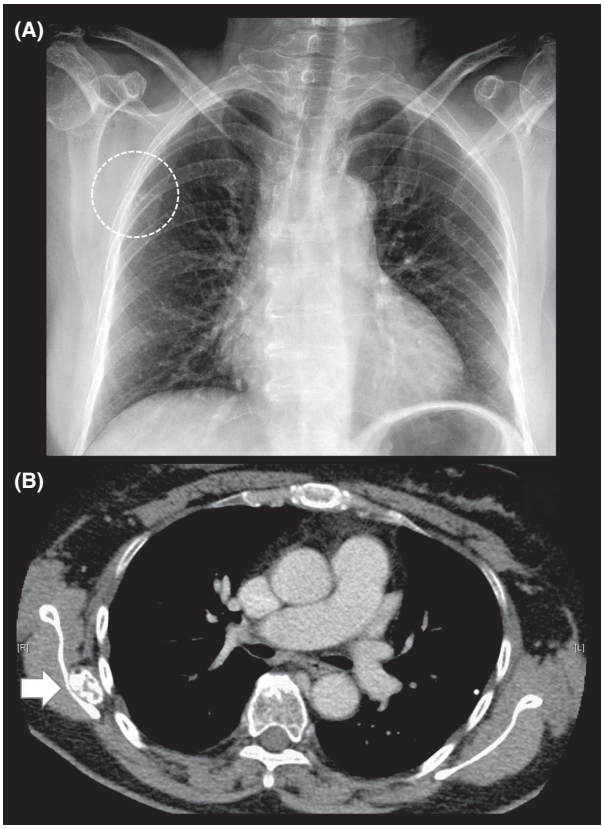

Figure 1. (A) Frontal chest radiograph shows a 1.3 cm density projecting over the right upper lung. Also, a 2 mm calcified nodule is seen between the left posterolateral 5th and 6th ribs, which are likely related to prior granulomatous disease, such as tuberculosis. (B) Noncontrast CT performed 1 month following the chest x-ray in A shows a 1.8 cm (AP) by 1.2 cm (TV) subscapular mass. The lesion is peripherally ossified with central marrow attenuation and preserved adjacent fat planes. These findings are consistent with heterotopic ossification (HO).

Prevention strategies for heterotopic ossification include NSAIDs (aspirin and indomethacin) and radiation therapy [3]. Treatment of existing lesions includes watchful waiting if asymptomatic or surgical intervention if the lesion is causing pain or limits range of motion [4]. Our patient was relieved when, in consultation with orthopedic surgery, we recommended watchful waiting given that she had no pain or limitations in mobility.

Authorship

EA: involved in conception and design of the work. RN, SH, and JS: involved in critical revision of the work. KS: supervised the project. All authors were involved at each stage of the revision process and contributed substantially to the project's intellectual content.

Conflict of Interest

None declared.

References

1. Barfield, W. R., R. E. Holmes, and L. A. Hartsock. 2017. Heterotopic ossification in trauma. Orthop. Clin. North Am. 48:35–46.
2. Subedi, N., P. Heire, V. Parmer, S. Beardmore, C. Oh, F. Jepson, et al. 2016. Multimodality imaging review of the post-amputation stump pain. Br. J. Radiol. 89:20160572.
3. Baird, E. O., and Q. K. Kang. 2009. Prophylaxis of heterotopic ossification - an updated review. J. Orthop. Surg. Res. 4:12.
4. Edwards, D. S., K. M. Kuhn, B. K. Potter, and J. A. Forsberg. 2016. Heterotopic ossification: a review of current understanding, treatment, and future. J. Orthop. Trauma 30 (Suppl. 3):S27–S30.

