A 78-year-old man with clinical history of pulmonary nodules came for a follow-up chest CT examination.

Imaging Findings:

Analysis of the axial images with coronal and sagittal reformation (Fig. 1 a-c) shows a defect on the body of the sternum at the level of the insertion of the 4th and 5th costal arches. This bone defect has 22 mm on the largest axis and is filled with fat density tissue (Fig. 1 d) that is contiguous with epicardial fat. The defect is surrounded by well-corticalized sternum. Figure 2 shows a volume rendering of the sternum where the bone defect is evident. Apart from pulmonary nodules no other significant alteration was noticed.

Discussion:

The normal sternum is a bone composed by three segments: the manubrium, body and xiphoid process. Sternum development starts with the fuse at midline of two mesodermic plates that give rise to six centres of ossification. The ossification and fusing of bone segments starts at the most cranial centre, the manubrium, and progress caudally [1].

A defect of ossification or fusing on the lower third of the body of the sternum can lead to a so called sternal foramen [1, 2]. This anatomical variation has a prevalence of around 6% in some autopsy and CT series [3, 4]. Association of this defect to displacement of the heart, midline abnormalities and accessory fissures on the left lung have been reported [5].

This defect might be confused with a bullet hole or even with a bone lesion [4, 6]. Complications of otherwise safe procedures such as acupuncture or bone marrow aspiration have been reported in individuals with this variant [6]. One example in the literature is a fatal heart tamponade after the insertion of an acupuncture needle over the lower third of the body of the sternum which, due to the presence of a strenal foramen, pierced the right ventricle [7].

Acknowledging the existence of sternal foramen is of key importance to the radiologist so as not to mistake this anatomical variant for a bone lesion. It is also fundamental to the clinician to be aware of its existence and to search for it before performing bone marrow aspiration on the lower portion of the body or even acupuncture.
Differential Diagnosis List: Sternal foramen, Normal variant, Lytic lesion

Final Diagnosis: Sternal foramen

References:


Description: Axial Origin: Luís Amaral Ferreira, Serviço de Imagem Médica, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal
Description: Coronal Origin: Luís Amaral Ferreira, Serviço de Imagem Médica, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal
Description: Sagittal Origin: Luís Amaral Ferreira, Serviço de Imagem Médica, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal
**Description:** Axial in soft tissue window  
**Origin:** Luís Amaral Ferreira, Serviço de Imagem Médica, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal
Description: 3D rendering of the sternum showing the defect. Origin: Luís Amaral Ferreira, Serviço de Imagem Médica, Centro Hospitalar e Universitário de Coimbra, Coimbra, Portugal