

Case 170: Pericardial Fat Necrosis¹

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History

A 30-year-old man presented to our emergency department with acute pleuritic chest pain. He had no fever, dyspnea, or other symptoms, nor did he have a history of chest trauma. A physical examination yielded normal findings. Laboratory test results and electrocardiographic findings were normal. Axial chest computed tomography (CT) was performed.

Imaging Findings

Contrast material-enhanced (90 mL of iomeprol administered at a rate of 2.5 mL/sec, Iomeron 400; Bracco Diagnostics, Milan, Italy) thoracic CT revealed an encapsulated low-attenuation lesion (−50 HU) with high-attenuation strands, which indicated inflammatory changes adjacent to the pericardium in the left epipericardial fat. There were no other associated abnormalities, with the exception of bilateral pleural effusion, which affected the left side of the pleural space more than the right (Fig 1). Sagittal and coronal multiplanar reformation CT images revealed the absence of diaphragmatic defects and no connection with abdominal fat (Fig 2). Follow-up unenhanced CT was performed 2 weeks later after conservative treatment. This examination revealed complete resolution of the inflammatory changes in the epipericardial fat. Pleural effusion had resolved (Fig 3).

Discussion

Pericardial fat necrosis is an uncommon benign condition that was first described in 1957 (1–4). Since the involved fat tissue is in the outer side of the pericardium, Pineda et al (2) suggested the term *epipericardial fat necrosis*. The pathogenesis is unknown, but it has been postulated that vascular pedicle torsion is a possible cause (3). Other potential causes include the Valsalva maneuver

or preexisting structural abnormalities of adipose tissue, such as lipoma, hamartoma, or lipomatosis (3).

In a patient with sudden onset of chest pain, the spectrum of diagnosis includes severe causes, such as myocardial infarction or pulmonary embolism, and less severe causes, such as pericarditis or pericardial fat necrosis (2,5). Pericardial fat necrosis should be suspected when patients present with acute chest pain but have no systemic symptoms and when laboratory tests and echocardiography reveal no abnormalities (2). At chest radiography, juxtacardiac increased attenuation, usually on the left side of the heart and with or without concomitant pleural effusion, is seen (2). The typical CT finding is a lesion of fat attenuation surrounded by the increased attenuation of the anterior mediastinal paracardiac fat adjacent to the pericardium (2,3).

Pathologic features of fat necrosis can be seen in other locations, such as the breast, omentum, and epiploic appendices, as well as in areas of pericardial fat necrosis that are similar to these other locations. Central necrotic fat cells are surrounded by lipid-filled macrophages and neutrophilic infiltrations in the early stages of disease, with progressive fibroblastic infiltration and fatty cell replacement by lipid-laden macrophages (3).

After gallium 67 scintigraphy performed as a diagnostic screening test in a patient with hemoptysis of unknown

Part one of this case appeared 4 months previously and may contain larger images.

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Figure 1

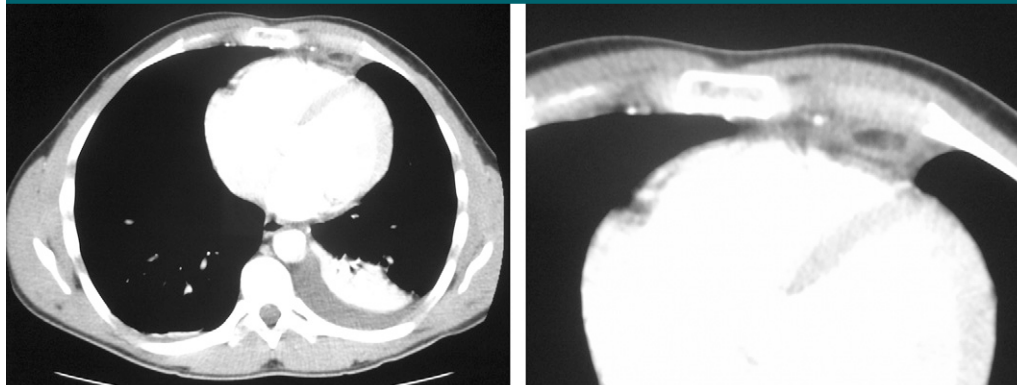


Figure 1: (a) Axial contrast-enhanced chest CT image shows encapsulated low-attenuation lesion with high-attenuation strands in the left paracardiac area. Mostly left-sided pleural effusion is present. There is no pericardial effusion. (b) Localized axial contrast-enhanced CT image in the left epipericardial area shows the oval-shaped fat attenuation lesion.

Figure 2

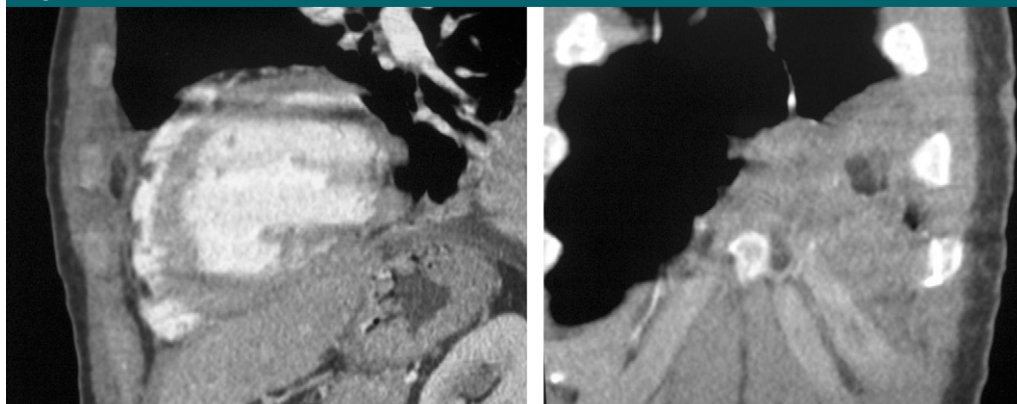


Figure 2: (a) Sagittal reformation CT image shows lack of continuity with infradiaphragmatic or mediastinal fatty tissues. (b) Coronal reformation CT image enables us to confirm lack of continuity with infradiaphragmatic or mediastinal fatty tissues.

origin, it has been described as increased gallium uptake in the epipericardial area in patients with paracardiac fat necrosis (6).

The differential diagnosis should be established with all the entities that manifest as an increase of fat in the paracardiac area.

In obese or overweight individuals, it is not uncommon to see an amount of normal paracardiac fat, especially in patients with external causes related to their obesity, such as steroid therapy or Cushing syndrome.

Other causes of mediastinal fat stranding are mediastinitis and medias-

tinal abscess; however, these are usually accompanied by more radiologic findings for both the acute form and the chronic form (7).

Diaphragmatic hernias with abdominal fat occupying the cardiophrenic space could be ruled out, with multiplanar reformations showing the diaphragm defect, as well as herniated abdominal fat and other abdominal structures, if present. Primary fatty masses include lipoma and liposarcoma. Lipoma is an encapsulated fatty tumor that originates in the pericardium surface and can grow into the pericardial space. The more frequent posterior mediastinal location

and the presence of solid components and concomitant symptoms of liposarcoma help in the diagnosis (6).

Other fatty infrequent masses in the cardiophrenic space are pericardial mesotheliomas, teratomas, and thymolipomas (5,8).

The presence of stranding and the capsule surrounding the fatty tissue as inflammatory changes oriented to pericardial fat necrosis, the lack of solid components, and the diaphragmatic indemnity enabled us to rule out the other causes of fatty lesions described previously.

In this case, the diagnosis was made confidently because of the patient's

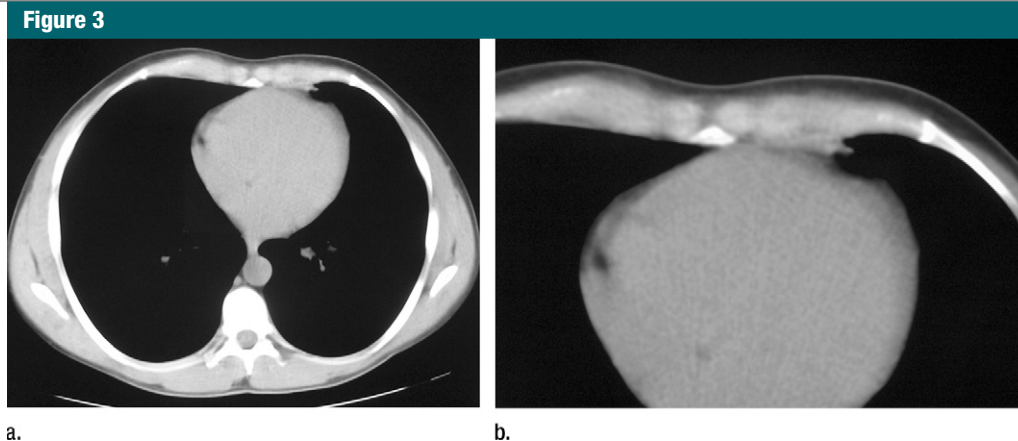


Figure 3: (a) Axial unenhanced chest CT image obtained after 2 weeks of conservative treatment shows complete resolution of the inflammatory process and pleural effusion. (b) Localized image in the left paracardiac area obtained at the same time as a.

history, laboratory test results, and highly suggestive imaging findings. Radiologic follow-up revealed spontaneous resolution of CT findings, which is usually sufficient to confirm the diagnosis (2,4). Although surgical excision of encapsulated fat necrosis has been described (9,10), it seems to be the treatment of choice in only those patients with no self-limited chest pain or no resolution of inflammatory changes in radiologic control.

In summary, pericardial fat necrosis is an uncommon condition that can be diagnosed on the basis of its characteristic CT findings. We consider it important to be familiar with this self-limited benign entity because it can be diagnosed confidently on the basis of CT findings, without aggressive diagnostic options.

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Congratulations to the 139 individuals and four resident groups that submitted the most likely diagnosis (pericardial fat necrosis) for Diagnosis Please, Case 170. The names and locations of the individuals and resident groups, as submitted, are as follows:

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