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Case Report

Epipericardial fat necrosis: A case report☆,☆☆

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ABSTRACT

Epipericardial fat necrosis is a rare cause of acute pleuritic chest pain and is a benign and self-limiting condition. It is important to distinguish epipericardial fat necrosis from other diseases that cause acute chest pain, such as acute myocardial infarction, pulmonary embolism, and acute pericarditis, because conservative treatment is recommended for epipericardial fat necrosis. This report presents the case of a 25-year-old man with severe pleuritic chest pain located on the left anterior side that was associated with dyspnea. Electrocardiogram and laboratory data were normal, except for a slight elevation of C-reactive protein level. Contrast-enhanced chest computed tomography revealed a fatty ovoid lesion surrounded by a thick rim on the left side of the pericardial fat. Fat stranding was observed both inside and adjacent to the fatty ovoid lesion. A slight contrast enhancement of the thick rim and a slight linear enhancement inside the lesion were observed. Furthermore, a small amount of left pleural effusion was observed. The patient was diagnosed with epipericardial fat necrosis and treated with analgesics, and the symptoms improved 1 week after the emergency department visit. Radiologists should be familiar with epipericardial fat necrosis to prevent overlooking and misdiagnosing the condition.

Introduction

Multiple diseases can cause chest pain. In the emergency department, it is necessary to rule out life-threatening diseases such as acute myocardial infarction, aortic dissection, pulmonary embolisms, esophageal perforation, or pneumonia. Epipericardial fat necrosis (EFN) typically affects previously healthy individuals and causes acute pleuritic chest pain, lasting a few hours to several weeks. Physical examination, laboratory tests, and electrocardiography of patients with EFN are usually normal. EFN can mimic acute

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myocardial infarction, pulmonary embolism, pneumonia, or acute pericarditis [1–3]. Conservative treatment is recommended for EFN; therefore, it is necessary to distinguish EFN from the aforementioned diseases that cause chest pain. However, EFN is a rare and unfamiliar cause of acute chest pain and can be overlooked or misdiagnosed [3]. This report describes the case of a patient who presented with acute pleuritic chest pain and was diagnosed with EFN based on clinical and imaging findings on contrast-enhanced chest computed tomography (CT).

Case report

A 25-year-old man experienced mild left anterior chest pain for a week and presented to the hospital with worsening pain. Electrocardiography and chest radiography findings revealed no abnormalities; however, because of the lack of pain improvement, the patient presented to the emergency department of our hospital the following day.

The patient had a medical history of an atrial septal defect, and the chest pain was severe (10 out of 10 on a numerical rating scale), located on the left anterior side, pleuritic, and associated with dyspnea. The patient's physical examination findings were as follows: blood pressure, 163/129 mmHg; heart rate, 87 beats/min; respiratory rate, 33 breaths/min; percutaneous oxygen saturation, 96% in room air; and temperature, 36.0°C. Cardiac and breathing sounds were normal, and no murmurs were observed. The patient's C-reactive protein (CRP) level was slightly elevated (0.69 mg/dL); however, no elevation of creatine kinase (CK, 144 U/L), lactate dehydrogenase (192 U/L), troponin T (0.008 ng/mL), white blood cell (5,720 /μL), and D-dimer (0.7 μg/mL) levels was observed. Electrocardiography revealed normal sinus rhythm (88 beats/min) and no ST-T wave abnormalities. A portable chest radiograph was obtained in the emergency room (Fig. 1). No lung abnormalities were observed, and a slight widening of the mediastinum was suspected. Although this may have been due to the influence of the patient's tilted position, it was considered necessary to rule out aortic dissection. Therefore, contrast-enhanced chest CT was performed (Fig. 2). There was no evidence of aortic dissection, pulmonary embolism, or pneumothorax. An ovoid fatty lesion (11 × 6 × 8 mm) surrounded by a thick rim was observed on the left side of the pericardial fat. Slight fat stranding was observed inside and adjacent to the lesion. Pericardial thickening was not observed, although a small amount of left-sided pleural effusion was observed. A slight contrast enhancement of the thick rim and a slight linear enhancement inside the lesion were observed. Based on these clinical and imaging findings, the patient was diagnosed with EFN.

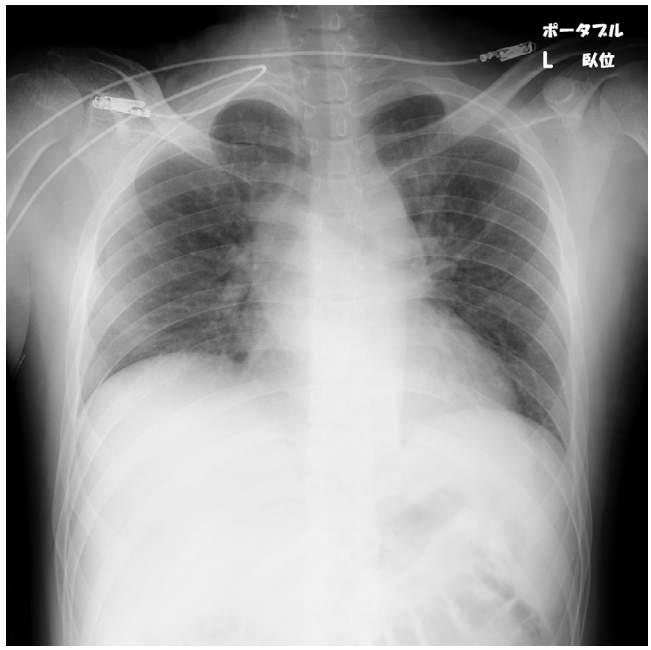

Fig. 1 – Portable chest radiograph obtained in the emergency department. Slight widening of the mediastinum is observed, and no lung abnormalities are observed.

The patient was administered analgesics. A follow-up chest radiograph after 1 week revealed no pleural effusion (Fig. 3), and the chest pain was almost resolved (1 of 10 on the numerical rating scale). The patient's symptoms disappeared completely after 4 months.

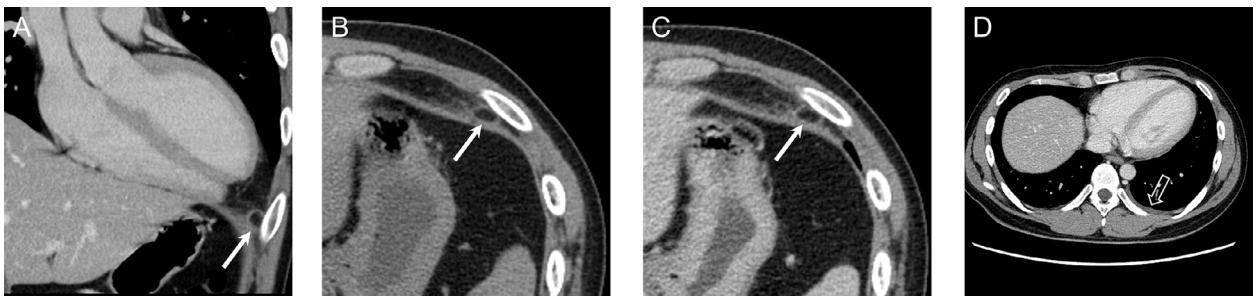

Fig. 2 – Contrast-enhanced chest computed tomography (CT). (A) Oblique coronal contrast-enhanced, (B) axial pre-contrast, and (C) axial contrast-enhanced chest CT images show the ovoid fatty lesion (white arrows) surrounded by a thick rim on the left side in the pericardial fat. Slight fat stranding inside the lesion is seen, and a slight contrast enhancement of thick rim of the lesion and slight linear enhancement inside the lesion are observed. (D) Contrast-enhanced axial chest CT image shows a small left pleural effusion (white open arrow).

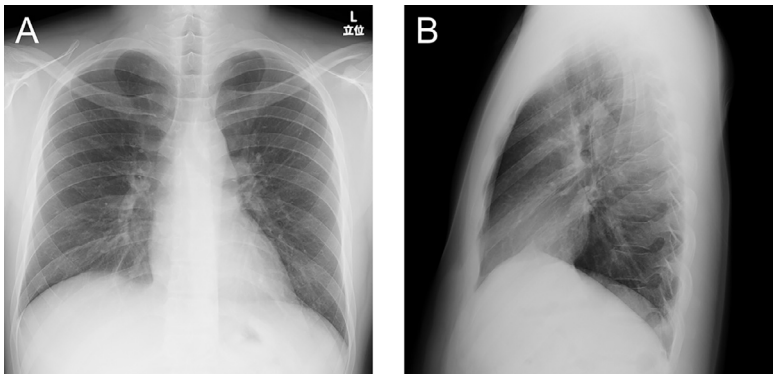

Fig. 3 – Follow-up chest radiographs 1 week after emergency room visit. (A) Posteroanterior and (B) lateral chest radiographs show no abnormalities.

Discussion

EFN was first reported in 1957 [4]. EFN occurs in previously healthy individuals; it is a rare cause of acute chest pain and a benign and self-limited condition [3,5]. EFN has been reported in 0.26% of 7463 chest CT examinations and 2.15% of 926 patients who underwent chest CT because of atypical chest pain in the emergency department of 1 institution [1]. The etiologies of EFN are unclear, although acute torsion of avascular pedicle, increased intrathoracic pressure due to heavy lifting or Valsalva's maneuver leading to hemorrhagic necrosis, and trauma to structural abnormalities have been suggested [5,6].

EFN is more common in males than in females, and the mean age of patients with EFN is 42.7 ± 13.6 years, with some reports of patients in their twenties. EFN is significantly more common in the left hemithorax, and there is no relationship between EFN and medication use, smoking, or obesity [1,3]. Patients with EFN present with acute and pleuritic chest pain, which is ipsilateral to the lesion and can mimic acute myocardial infarction, pulmonary embolism, pneumonia, or acute pericarditis [1–3,7]. Other symptoms include dyspnea, syncope, dizziness, tachycardia, and diaphoresis [3,6–8]. Patients with EFN typically have normal physical examination results, although high blood pressure and pericardial friction rub have been reported [1,7]. Laboratory data, including troponin, CK, muscle and brain CK, CRP, and D-dimer levels, are typically normal; however, a case of a patient with EFN with elevated CRP levels has been reported [1,2,9]. Electrocardiogram findings of the EFN are usually normal. In this case, the patient presented with pleuritic chest pain on the left side of the hemithorax, dyspnea, normal laboratory data other than CRP elevation, high blood pressure, and normal electrocardiogram findings, consistent with EFN.

On chest radiography, an ill-defined paracardial opacity is often observed on the same side as the chest pain, predominantly on the left side, and pleural effusions may also be identified [3,5,8,9]. In this patient, EFN imaging findings were not observed on chest radiography. The mean lesion size is 3.3 ± 0.9 cm [1], and the lesion size in the patient in this case was relatively small, which made it difficult to identify a fatty lesion on chest radiography. Furthermore, it was difficult to delineate the left pleural effusion because it was small and a portable chest radiograph was obtained in the supine position in the emergency department.

Chest CT is an effective modality for diagnosing EFN. Chest CT findings often show an encapsulated fatty lesion with inflammatory changes such as dense strands, thickening of the adjacent pericardium, or ipsilateral pleural effusion. A diagnosis of EFN has been suggested by a triad of findings, including an encapsulated fatty lesion with inflammatory changes, thickening of the adjacent pericardium, and acute chest pain [1,5]. The imaging findings of an encapsulated fatty lesion with inflammatory changes and thickening of the adjacent pericardium are similar to those of epiploic appendagitis [10], and atelectasis or calcifications are occasionally seen [1,9]. Although it has been reported that thickening of the adjacent pericardium is present in 65% of patients with EFN [1], it was not observed in this patient. In our patient, the fatty ovoid lesion was relatively small, fat stranding adjacent to the fatty ovoid lesion was mild, and the fatty ovoid lesion and pericardium were far apart and not in contact; therefore, thickening of the adjacent pericardium was not observed. On contrast-enhanced chest CT, slight contrast enhancement of the thick rim of the lesion and slight linear enhancement inside the lesion were observed. The peripheral rim and central dot-and-line of the lesion, adjacent pericardium, and pleura show increased enhancement on contrast-enhanced magnetic resonance imaging [10]. The contrast-enhanced chest CT findings in our patient were consistent with those of EFN.

The treatment for EFN is conservative, and analgesics or nonsteroidal anti-inflammatory drugs are effective in relieving symptoms [1,3,5]. Therefore, distinguishing EFN from other diseases is important to prevent unnecessary invasive procedures. It is necessary to differentiate EFN from the other diseases that present acute chest pain, such as acute myocardial infarction, pulmonary embolism, pneumonia, and acute pericarditis, in clinical practice [1,2]. The differential diagnosis of EFN based on imaging findings includes diaphragmatic hernia and fat-containing tumors, such as lipoma, liposarcoma,

and thymolipoma. The presence of stranding and rim surrounding the fatty lesion, intrinsic fat stranding of the lesion, peripheral rim enhancement, the lack of solid components, and diaphragmatic integrity are effective in distinguishing EFN from other diseases [2,5,9,10]. In this patient, all of the aforementioned imaging findings were observed.

Follow-up CT 4–8 weeks after the episode is recommended to confirm the improvement in imaging findings [1,3,5]. We confirmed improvement in chest pain and no abnormalities on chest radiography 1 week after emergency department visit. However, follow-up CT was not performed because improvement in the patient's symptoms was observed, clinical and imaging findings were consistent with those of EFN, liposarcoma was not suspected, and owing to the young age of the patient, we wished to avoid unnecessary radiation exposure.

Conclusion

This report presents the case of a patient with EFN, which is a rare cause of acute pleuritic chest pain. It is important to distinguish EFN from differential diagnoses in clinical and imaging findings because EFN is a benign and self-limiting condition, and conservative treatment is recommended.

Patient consent

Informed consent was obtained from the patient included in this study.

Authors' contributions

All authors contributed to the data analysis and drafting or revision of the article, approved the final version to be published, and agreed to be accountable for all aspects of the study.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.radcr.2024.04.022.

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