Case report: epipericardial fat necrosis—a rare cause of chest pain

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Background

Epipericardial fat necrosis (EFN) is a rare cause of chest pain, which is often unrecognized.

Case summary

A 58-year-old man previously known with a transient ischaemic attack presented with a sharp, substernal chest pain. Pulmonary embolism was ruled out by computed tomography (CT) angiography. However, CT angiography revealed an inhomogeneous epipericardial mass. On cardiovascular magnetic resonance imaging, the mass had an inhomogeneous signal intensity without infiltration of surrounding tissue. Late gadolinium enhancement imaging showed subtle hyperenhancement. Tissue characterization by means of parametric mapping revealed very low native T1 relaxation times and increased T2 relaxation times. In conclusion, the epipericardial mass showed fibrofatty inflammatory markers, suggestive of EFN. The chest pain resolved spontaneously. Follow-up CT 3 months later showed a marked regression of the mass which confirmed the diagnosis EFN.

Discussion

Epipericardial fat necrosis is a benign and self-limiting inflammatory cause of chest pain, which can be diagnosed with multi-modality imaging and must not be overlooked in the differential diagnosis of patients with acute pleuritic chest pain.

Keywords

Epipericardial fat necrosis • Computed tomography angiography • Cardiovascular magnetic resonance imaging • Chest pain • Case report

ESC Curriculum

2.4 Cardiac computed tomography • 2.3 Cardiac magnetic resonance • 2.1 Imaging modalities

Learning points

• Epipericardial fat necrosis is a rare and benign cause of chest pain.
• Epipericardial fat necrosis can be diagnosed with cardiovascular magnetic resonance imaging using parametric mapping.

Introduction

Chest pain is a frequent cause of emergency department admission and has a wide differential diagnosis ranging from benign to life-threatening diseases. One of those benign diseases is epipericardial fat necrosis (EFN), which is a rare cause of chest pain and is often not recognized. In this case report, we present a case of EFN diagnosed with multi-modality imaging.
A 58-year-old man, presented to the emergency department with 2 days of sharp, substernal chest pain which worsened during inspiration. The patient was previously known with hypertension and a transient ischaemic attack and was on clopidogrel, atorvastatin, and valsartan at admission. He presented with a temperature of 36.2°C, a blood pressure of 131/78 mmHg, a regular pulse of 98 beats per minute, and a saturation of 98% on ambient air. Clinical examination was unremarkable without pericardial or pleural friction rub. The electrocardiogram was normal without repolarization disorders or signs of pericarditis. Laboratory examination showed normal leucocyte count, elevated C-reactive protein of 44 mg/L (reference value < 10 mg/L), and mildly elevated high-sensitivity troponin T of 20 ng/L (reference value < 14 ng/L) with a rise to 30 ng/L. Polymerase chain reaction of a nasopharyngeal sample was negative for coronavirus. Our differential diagnosis included (myo)pericarditis, non-ST elevation myocardial infarction, pulmonary embolism, pleuritis, and acute aortic syndrome. The patient was hospitalized for further analysis. Obstructive coronary artery disease was ruled out by invasive coronary angiography. A contrast-enhanced computed tomography (CT) angiography showed no pulmonary embolism, aortic dissection, pericardial effusion, or intrapulmonary abnormalities, but revealed an inhomogeneous epipericardial mass (Figure 1). The chest pain resolved spontaneously the following day and the patient was discharged without any treatment.

Cardiovascular magnetic resonance imaging (CMR) was performed 5 days later using a 1.5 Tesla clinical magnetic resonance imaging (MRI) scanner, which showed normal anatomy and myocardial function. On cine MRI, the epipericardial mass had an inhomogeneous signal intensity without infiltration of surrounding tissue and absence of pericardial effusion (Video 1). Further tissue characterization of the mass by means of parametric mapping showed very low...
native T1 relaxation times (283 ms) (Figure 2A) consistent with fat. T2 relaxation times (100 ms) were elevated (Figure 2B) and T2-weighted oedema imaging (Figure 2C) revealed hyperintense areas of the mass both consistent with oedema. Late gadolinium enhancement imaging demonstrated hypo-enhanced areas surrounded by areas of hyperenhancement (Figure 2D). In conclusion, the mass showed fibrofatty inflammatory markers, suggestive of EFN. Follow-up CT 3 months after admission showed a marked regression of the epipericardial mass which confirm the diagnosis EFN (Figure 3). The patient remained asymptomatic and no further follow-up was indicated.

Discussion

Epipericardial fat necrosis is a rare and underdiagnosed cause of chest pain.\(^1,2\) The incidence of EFN is about 2.2% among patients who underwent chest CT for chest pain on the emergency department.\(^3\) Chest pain is most often classified as acute pleuritic chest pain\(^1\) which can mimic other acute conditions such as acute myocardial infarction, pericarditis, pulmonary embolism, and pleuritis. Clinical examination is often unremarkable, without abnormalities on electrocardiogram and no typical rise and fall in troponin.\(^1\) Epipericardial fat necrosis can be diagnosed using contrast-enhanced CT or CMR using parametric

Figure 2 Cardiovascular magnetic resonance imaging of the mass. (A) Cardiovascular magnetic resonance imaging T1 mapping with very low native T1 relaxation times (283 ms) of the mass (arrow). (B) Cardiovascular magnetic resonance imaging T2 mapping with high T2 relaxation times (100 ms) of the mass (arrow). (C) Cardiovascular magnetic resonance imaging T2-weighted short-tau inversion recovery shows hyperintense areas of the mass (arrow). (D) Cardiovascular magnetic resonance imaging late gadolinium enhancement imaging shows hypo-enhanced areas surrounded by areas of hyperenhancement of the mass (arrow). LA, left atrium; LV, left ventricle; RA, right atrium; RV, right ventricle.
mapping. Main CT features of EFN are soft tissue lesions, with or without fatty centre, located in the epipericardial fat.1 Main CMR features of EFN consist of an epipericardial mass with fibrofatty markers as determined on T1- and T2-weighted imaging or mapping. Epipericardial fat necrosis is a benign and self-limiting inflammatory process, but could be treated with non-steroidal anti-inflammatory medication.1,4 There are currently no clear recommendations in the literature or guidelines on when to start non-steroidal anti-inflammatory medication.1,4 As recommended in the literature,1 follow-up CT after 4–8 weeks is recommended to confirm regression of the mass and exclude malignancy. In conclusion, EFN is a rare cause of chest pain and must not be overlooked in the differential diagnosis of patients with acute pleuritic chest pain.

Supplementary material

Supplementary material is available at European Heart Journal - Case Reports online.

Slide sets: A fully edited slide set detailing this case and suitable for local presentation is available online as Supplementary data.

Consent: The authors confirm that written informed consent for submission and publication of this case report including images and associated text has been obtained from the patient in line with COPE guidance.

Conflict of interest: None declared.

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Figure 3 Follow-up computed tomography after 3 months. Computed tomography 3 months later showed a marked regression of the epipercardial mass compared to admission.