

## Lessons from practice

# Epipericardial fat necrosis: chest pain in a young pregnant woman

## Clinical record

A 28-year-old woman at 16 weeks' gestation presented to the emergency department with a 2-day history of severe, worsening left-sided pleuritic chest pain. She denied fever, dyspnoea and other symptoms. There was no history of chest trauma. The pain was exacerbated by movement and relieved by lying in the right recumbent position. She had two previous uncomplicated pregnancies with no cardiac or other medical history.

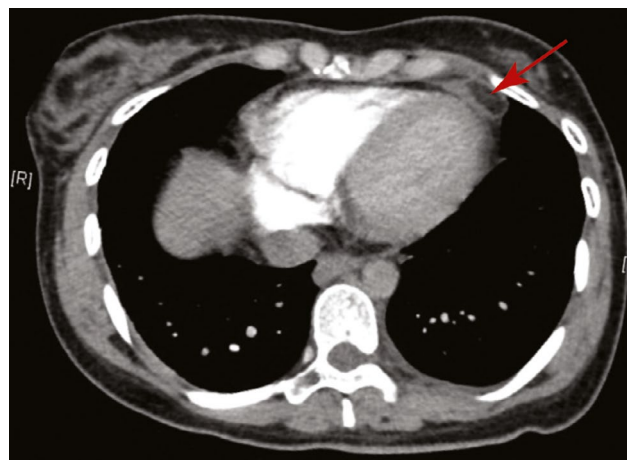
Physical examination demonstrated regular heart rate 70 beats per minute, blood pressure 100/60 mmHg, respiratory rate 18 breaths per minute, and oxygen saturation 95% on room air. The left anterior ribs were tender to palpation at the costochondral margin. There was no pericardial friction rub and the lungs were clear to auscultation. There was mild left-sided calf tenderness to deep palpation but no unilateral calf swelling or erythema.

Investigations revealed a white blood cell count of  $11.38 \times 10^9/L$  (reference interval [RI],  $3.9\text{--}12.7 \times 10^9/L$ ), neutrophilia (70%), C-reactive protein (CRP) 13 mg/L (RI,  $< 5$  mg/L), undetectable troponin, and D-dimer  $0.44 \mu\text{g/mL}$  (RI,  $< 0.50 \mu\text{g/mL}$ ). An electrocardiogram showed sinus rhythm. Chest x-ray was unremarkable. Left lower limb Doppler ultrasound ruled out venous thrombosis.

The patient was admitted to short stay for observation with a presumed diagnosis of costochondritis and a differential diagnosis of pulmonary embolism. Despite analgesia and supportive care, she continued to experience significant ongoing chest pain and it was decided to exclude pulmonary embolism.

Ventilation-perfusion (V/Q) scanning is the preferred imaging modality for pulmonary embolism in pregnancy at our institution but was limited during the coronavirus disease 2019 (COVID-19) pandemic due to the risk of respiratory secretion aerosolisation. Computed tomography pulmonary angiography (CTPA), which was performed after discussion of its risks and benefits, did not demonstrate pulmonary embolism. However, there was a region of focal inflammatory fat stranding in the pericardium adjacent to the left ventricular apex (Box), consistent with epipericardial fat necrosis. This radiological finding, in combination with her clinical presentation and biochemical evidence of inflammation (raised white blood cell count with predominant neutrophilia), led to the diagnosis of epipericardial fat necrosis. While the CRP was only mildly elevated, in

Computed tomography pulmonary angiography showing an encapsulated fatty lesion (arrow) in the anterior mediastinum with focal inflammatory fat stranding in the pericardium adjacent to the left ventricular apex



combination with the other findings, it supported the diagnosis.

She was subsequently discharged with analgesia. Six weeks later, her pain had resolved and cardiac magnetic resonance imaging demonstrated reduced prominence of the pericardial fat adjacent to the left ventricular anterior apical wall with no signs of pericardial fat oedema. She had not experienced any pregnancy-related complications.

## Discussion

Epipericardial fat necrosis is an underdiagnosed cause of pleuritic chest pain. In a retrospective series, epipericardial fat necrosis was found in up to 2.6% of patients undergoing chest computed tomography (CT) scanning compared with 0.3% for whom fat necrosis was the provisional diagnosis.<sup>1</sup>

The exact aetiology of epipericardial fat necrosis remains unknown. Hypotheses include acute torsion of a vascular pedicle, pre-existing structural abnormality of the adipose tissue that makes it vulnerable to trauma, and abrupt changes in intravascular pressure associated with the Valsalva manoeuvre leading to haemorrhage in the loosely attached adipose tissue.<sup>2</sup>

The diagnosis is suggested by the triad of acute pleuritic chest pain with characteristic CT findings of an encapsulated fatty lesion with inflammatory changes and thickening of the adjacent pericardium.<sup>3</sup> Clinically, the patient often has isolated pleuritic chest

Rohan V Navani 

Claudia Ashkar

Harry Gibbs

Alfred Health,  
Melbourne, VIC.

r.navani@alfred.  
org.au

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pain, with an elevated CRP being the only laboratory abnormality, reflecting inflammation around the necrotic fat, as occurred with our patient.<sup>2</sup> We found no other cases associated with pregnancy in our literature review.

CTPA is the recommended imaging modality for suspected pulmonary embolism due to its high diagnostic accuracy and frequent identification of an alternative diagnosis.<sup>4</sup> V/Q scanning, however, is preferred for suspected pulmonary embolism in pregnancy due to a lower breast radiation dose.<sup>4</sup> In this case, CTPA was performed as there was reduced availability of V/Q scanning due to the COVID-19 pandemic. The diagnosis of epipericardial fat necrosis would not have been made if a V/Q scan had been performed. We suggest that CTPA should be considered in pregnancy if an alternate thoracic pathology may be present.

Before epipericardial fat necrosis was a recognised entity, the mass demonstrated on CT in these patients was often presumed to be a tumour and surgically excised, as was done for 19 published cases between 1957 and 1999.<sup>5</sup> It is now appreciated that epipericardial fat necrosis is a benign, self-limiting condition with no need for surgical resection. The clinical approach is conservative, using non-steroidal anti-inflammatory

### Lessons from practice

- Epipericardial fat necrosis is an uncommon cause of pleuritic chest pain.
- The diagnosis of epipericardial fat necrosis can be established by a computed tomography scan, which typically demonstrates a characteristic, ovoid, fatty lesion in the anterior mediastinum with associated inflammatory fat stranding and/or an adjacent thickened pericardium.
- Compared with a ventilation–perfusion scan, computed tomography pulmonary angiography has the advantage of providing alternative diagnoses in patients with suspected pulmonary embolism.

analgesia with a follow-up CT scan in 4–8 weeks to ensure a reduction of lesion size and resolving inflammatory changes.<sup>3</sup>

We highlight the importance of this uncommon, benign condition. Furthermore, we emphasise the utility of a CT scan in contrast to a V/Q scan in a patient with undifferentiated pleuritic chest pain.

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