EJCRIM
European Journal
of Case Reports
in Internal Medicine

EPIPERICARDIAL FAT NECROSIS AND COVID-19

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Received: 31/01/2024 **Accepted:** 05/02/2024 **Published:** 29/02/2024

Conflicts of Interests: The Authors declare that there are no competing interests.
Patient Consent: We obtained informed consent for this publication from the patient.
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How to cite this article: Haseeb M, Shafiq A, Sheikh MA, Khan MF. Epipericardial fat necrosis and COVID-19. *EJCRIM* 2024;**11**:doi:10.12890/2024_004346.

ABSTRACT

Background: Epipericardial fat necrosis (EFN) is a rare and self-limiting cause of acute chest pain. We describe a case of EFN in a patient with a recent coronavirus disease (COVID-19).

Case Presentation: A 55-year-old male presented with a sudden onset of left-sided pleuritic chest pain for the past two days. The patient was diaphoretic, tachypneic, and tachycardic. Acute coronary syndrome was ruled out. A computed tomography (CT) pulmonary angiogram revealed an ovoid encapsulated fatty mass surrounded by dense appearing tissue. Patient symptoms improved remarkably with a short course of non-steroidal anti-inflammatory drugs (NSAIDs).

Discussion: EFN typically presents with a sudden onset of excruciating chest pain. Misdiagnosis, under-diagnosis, and mismanagement are unavoidable. EFN is incidentally diagnosed on CT scan. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infects visceral adipose tissue and appears to increase the risk of EFN by promoting inflammatory cytokine production and death of adipocytes.

Conclusion: EFN is a rare cause of acute chest pain. SARS-CoV-2 is likely to induce EFN. This rare clinical entity should be considered in the differential of acute chest pain especially in patients with active or recent COVID-19.

KEYWORDS

Epipericardial fat necrosis, chest pain, COVID-19, epipericardial adipose tissue

LEARNING POINTS

- Epipericardial fat necrosis (EFN) is a rare cause of acute pleuritic chest pain that is often misdiagnosed and mismanaged.
- SARS-CoV-2 can possibly increase the risk of EFN and this entity should be considered in the differential of chest pain, especially in patients with active or recent coronavirus disease (COVID-19).
- Clinician awareness of EFN and its potential association with COVID-19, can reduce unnecessary testing and emotional distress.

INTRODUCTION

Epipericardial fat necrosis (EFN) is a rare and self-limiting cause of acute chest pain that mimics serious clinical conditions such as acute coronary syndrome (ACS) and pulmonary embolism (PE). We describe a case of EFN in a patient with a recent coronavirus disease (COVID-19).

EFIM
European Federation of Internal Medicine

Publisher
smc media srl

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CASE DESCRIPTION

A 55-year-old male with a past medical history of hypertension and hyperlipidaemia presented with sudden onset of excruciating left-sided pleuritic chest pain and shortness of breath for the past two days. The patient was diagnosed with COVID-19 two weeks prior. Physical examination revealed diaphoresis, tachypnoea, tachycardia and reduced breath sounds at the base of the lung. The white blood cell (WBC) count and C-reactive protein (CRP) level were mildly elevated. Multiple electrocardiograms and serum biomarkers for myocardial ischemia and venous thromboembolism were unremarkable. A chest X-ray showed bilateral basilar opacities. Because of the persistent chest pain, a computed tomography (CT) pulmonary angiogram revealed findings suggestive of EFN *(Fig. 1)*. The patient was treated with ibuprofen and his symptoms resolved in two weeks.

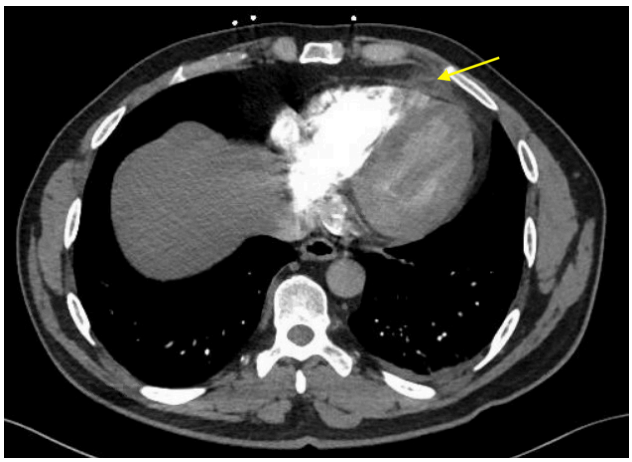

Figure 1. Computed tomography scan of the chest demonstrating epipericardial fat necrosis (yellow arrow) as an oval-shaped mass, with a central hypodense area, surrounded by a rim of hyperdense, inflammatory tissue.

DISCUSSION

EFN is a rare and self-limiting cause of acute chest pain. The prevalence, based on limited studies, is approximately 2% in patients presenting to the Emergency Department with atypical chest pain[1]. However, only 57 cases of EFN have been reported in the English-language medical literature from 1957 to 2016; highlighting the problem of under-diagnosis[1]. In addition, misdiagnosis, and mismanagement are unavoidable and lead to excessive diagnostic work up and emotional distress for the patient[1,2]. The definitive cause of EFN is unclear but different mechanisms have been proposed: haemorrhagic necrosis induced by a sudden increase in intrathoracic pressure due to the Valsalva manoeuvre, ischemia secondary to torsion of a vascularized pedicle, and pre-existing benign tumours of epicardial adipose tissue such as lipoma and hamartoma. Updated evidence has ruled out obesity as a risk factor[1]. The patient typically presents with sudden onset of excruciating chest pain which increases with inspiration and is predominantly left-sided[1]. During the earlier stage of the disease, the patient may be in severe distress and may have tachypnoea, tachycardia, or diaphoresis -mimicking life-threatening clinical conditions such as pneumothorax, ACS, and, PE[2]. Laboratory tests may reveal a mildly elevated WBC count and inflammatory biomarkers. Cases of EFN are usually detected incidentally on CT scan, and CT scan is the imaging modality of choice for the diagnosis of EFN[1,2]. Characteristic radiologic findings are an ovoid encapsulated fatty mass encased by varying degrees of inflammatory stranding of the surrounding tissue[1]. A triad of pleuritic chest pain, typical radiologic findings, and focal pericardial thickening is highly suggestive of EFN[1]. In the majority of cases, a short course of nonsteroidal anti-inflammatory agents provides excellent symptom relief[1]. With the current widespread use of advanced imaging modalities; thoracotomy, once preformed frequently, has fallen out of favour. Follow-up imaging is typically done to rule out underlying benign tumours such as lipoma and hamartoma[1,2].

In the literature, there is very little evidence of recent or concomitant infection in patients with EFN[2]. We have described a rare case of EFN in a patient with a recent COVID-19. We also highlight two recently reported cases of EFN in patients with recent SARS-CoV-2 infection suggesting the possibility that SARS-CoV-2 is likely to induce EFN[3,4]. To explain this possible association, we identified a close link between SARS-CoV-2 and visceral fat[5]. Visceral adipocytes are more prone to SARS-CoV-2 infection than subcutaneous adipocytes because of increased expression of ACE2 receptors[5]. Adipocytes, *in vitro*, infected by SARS-CoV-2 demonstrate upregulated inflammatory cytokine expression and increased cell death[5]. Epicardial adipose tissue also promotes the development of coronary artery disease, heart failure, and atrial fibrillation possibly via inflammatory cytokines[6]. Beside visceral tissue, SARS-CoV-2 also increases inflammatory cytokine levels in plasma[7]. Epicardial adipose tissue is postulated to be a reservoir and amplifier of COVID-19[8]. Inflammation of epicardial adipose tissue increases with severity of COVID-19 and decreases with the use of steroids suggesting a close link between visceral adipose tissue and SARS-CoV-2[6].

CONCLUSION

We conclude that SARS-CoV-2 appears to increase the risk of EFN and this rare clinical entity should be considered in the differential of acute chest pain, especially in patients with concomitant or recent COVID-19. Clinician awareness of this uncommon disease and its association with COVID-19 can prevent unnecessary testing, mismanagement, and emotional distress in patients.

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