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DOI:

10.4103/tjem.tjem_256_24

A rare case of purulent pericarditis arising from a hepato-pericardial fistula

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Abstract:

Purulent pericarditis is a rare but severe complication of bacterial pericarditis, often secondary to intrathoracic infections, and can cause a hepatic abscess that ruptures into the pericardium, which is an uncommon symptom with a high mortality rate if untreated. We report on a 52-year-old man with a poorly differentiated hepatocellular carcinoma who presented with chest pain and pericardial effusion caused by a hepato-pericardial fistula. Imaging revealed hepatic microabscesses extending into the pericardium. The patient underwent a pericardial window procedure with purulent fluid drainage and was treated with meropenem for *Enterobacter cloacae*. Postoperatively, the bilateral pleural effusions required chest drains. After 3 weeks of multidisciplinary care, the patient was discharged in a stable condition. This case highlights the importance of early diagnosis and a multidisciplinary approach in managing rare complications of purulent pericarditis caused by hepatic abscesses. Timely surgical intervention and appropriate antibiotic therapy are crucial for favorable outcomes.

Keywords:

Bacterial infections, echocardiography, *Enterobacter* infections, hepatic abscess, hepato-pericardial fistula, multidisciplinary care, pericardial effusion, pericardectomy, purulent pericarditis, sepsis

Introduction

Purulent pericarditis is a severe bacterial pericarditis characterized by pus in the pericardial space. It presents with high fever, tachycardia, and chest pain and requires a timely diagnosis, especially in patients with predisposing factors, such as existing infections or previous pericardial injury. The infection typically spreads from primary intrathoracic sources, such as pneumonia, but can also result from myocardial infections, trauma, postsurgical infections, or abscess extensions.^[1]

We report a case of a 52-year-old patient who presented with purulent pericarditis arising

from a hepato-pericardial fistula. Such complications are extremely uncommon and carry the risk of fatal outcomes if not managed expeditiously and effectively.^[2]

Case Report

The 52-year-old patient, with a known case of poorly differentiated hepatocellular carcinoma, presented to the emergency room with intermittent chest pain that started around 10 days earlier. The pain radiated to the back and worsened when the patient lay flat but improved when he leaned forward. The pain was associated with intermittent sweating and significant distress. The patient was recently admitted for several procedures, including endoscopic retrograde cholangiopancreatography

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How to cite this article: Alkheder KA, Al-Nahhas OF, Al-Khafaji YB, Alssabagh AA, Thiyyagura SR. A rare case of purulent pericarditis arising from a hepato-pericardial fistula. Turk J Emerg Med 2026;26:75-7.

(ERCP) with stent insertion, liver biopsy, and percutaneous transhepatic cholangiography. The patient was deemed not fit for oncological interventions, but he was offered palliative treatment.

His vitals were normal except for persistent tachycardia. The physical examination was unremarkable except for epigastric tenderness and jaundice.

Further investigations showed diffused ST elevation on the electrocardiograph (ECG), although troponin levels were negative. A bedside ultrasound scan was completed and confirmed the presence of a pericardial effusion [Figure 1]. Laboratory results showed deranged liver function tests and elevated inflammatory markers indicating sepsis. A computed tomography (CT) angiography of the aorta was ordered to rule out medical emergencies, such as aortic dissection. The report revealed the startling discovery of microabscesses in the liver connected to the pericardium indicating spontaneous rupture, which results in marked pericardial effusion [Figure 2]. Thoracic and general surgeons were consulted, and the patient was admitted for further management and investigations before being transferred to the operating room 2 days later for a pericardial window. A hepato-pericardial fistula was identified as the cause of the effusion and 25 mL of purulent fluid was drained throughout 2 days, with lavage of the pericardial space [Figure 3].

The patient suffered plural effusion postoperatively, which was managed with chest drains.

He was admitted under the care of the internal medicine team, with other teams, including infectious disease, cardiology, and thoracic surgery teams, involved in his care. He was then admitted for more than 3 weeks for daily intravenous antibiotics and follow-up for his

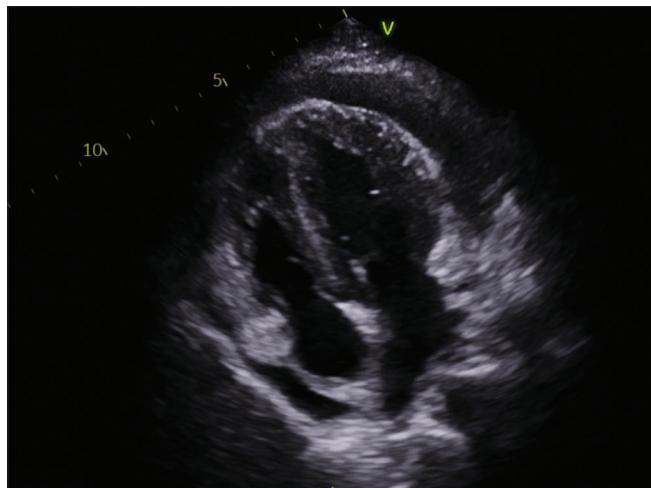


Figure 1: Ultrasound image point-of-care ultrasound demonstrating pericardial effusion with hypoechoic fluid surrounding the heart. No signs of tamponade are evident

condition with imaging and lab investigations. The patient was subsequently discharged with regular follow-up appointments to monitor for potential development of constrictive pericarditis. Written informed consent for publication of this case report, including accompanying images and details, was obtained from the patient.

Discussion

Purulent pericarditis is a serious and acute type of bacterial pericarditis marked by the accumulation of pus in the pericardial cavity.^[2] This alarming condition remains a critical clinical entity despite the advent of antibiotics and improved diagnostic techniques, such as echocardiography, which is crucial for assessing pericardial diseases. Purulent pericarditis manifests with a constellation of systemic symptoms, including high fever, tachycardia, and chest pain, and demands a high index of suspicion for timely diagnosis, particularly in patients with predisposing factors, such as existing infections or previous pericardial injury.

Hepatic abscesses extending through the diaphragm are an extremely uncommon etiology of purulent pericarditis.^[1] In cases where no treatment is administered, the mortality rate can reach 100%. Despite the use of broad-spectrum antibiotics and immediate pericardial drainage, the mortality rate can still be as high as 30%–40%.^[1]

A high index of suspicion must be maintained when a purulent pericardial effusion affects patients at risk for

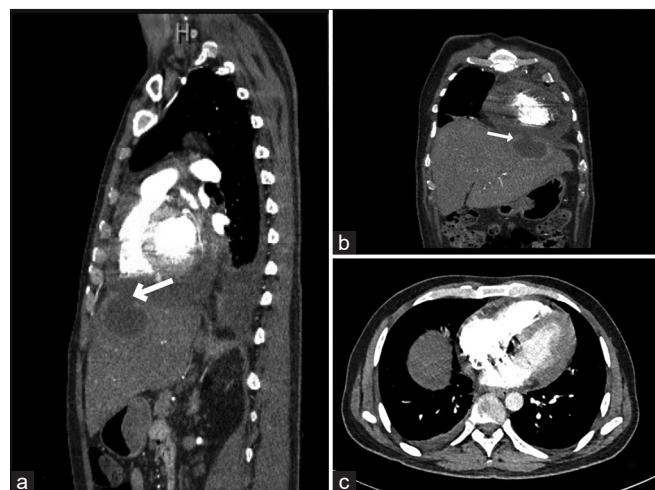


Figure 2: (a-c) Computed tomography (CT) angiography of the abdomen and thorax CT angiographic cuts demonstrate a ruptured hepatic abscess in segment 2 with a connection to the pericardium. The findings include a coalesced hepatic lesion measuring 6 cm × 5 cm, with a spontaneous rupture into the pericardium, resulting in a pericardial effusion measuring up to 24 mm with peripheral enhancement. A subcapsular hepatic abscess is noted, which contains an internal air bubble measuring 16 mm × 11 mm, along with multiple ring-like nodular enhancements suggestive of hepatic microabscesses. Segmental portal vein thrombosis involving the right hepatic segments is evident, accompanied by mild bilateral pleural effusions that are more prominent on the right side (Arrow shows ruptured hepatic abscess)

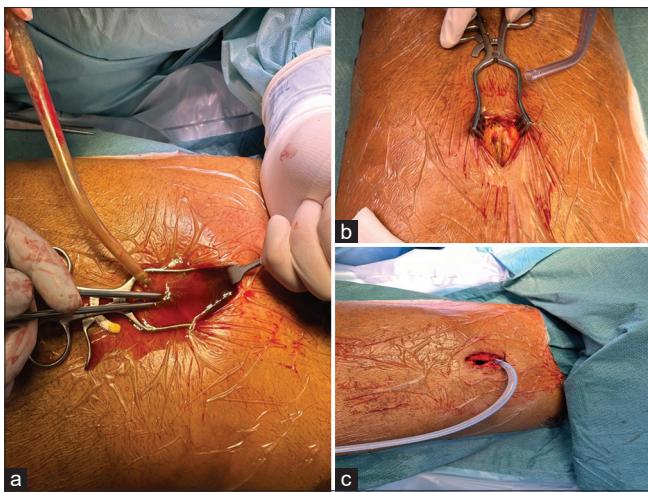


Figure 3: (a-c) Operative images of pericardial window intraoperative images revealing the hepato-pericardial fistula as the cause of the pericardial effusion. A total of 25 mL of purulent fluid was drained, and the pericardial space was washed out via lavage over 2 days

hepatic abscesses, including those with a history of hepatic surgery, hepatic metastases, or ascending cholangitis.^[2]

In one study that reported on a liver abscess complicated by pericardial effusion, Raza *et al.*^[3] published a case of a liver abscess that was amoebic, unlike our case report, in which it was bacterial. Hence, the management course will differ dramatically based on the underlying etiology. In their study, the subject was treated with metronidazole, as it is the preferred drug for amebic infections. However, we encountered a challenging aspect as the multi-drug resistant (MDR) *Enterobacter cloacae* was sensitive to meropenem. The presence of such a bacterial infection posed a significant challenge to the care team.

A standard investigation that searches for pericardial effusion includes ECG and echocardiography, which can reveal signs of the disease. Ultrasonography, chest X-ray, and CT scans typically validate the presence of a liver abscess and accumulation of fluid in the pericardial sac through increased echogenicity, with or without the presence of a fistulous tract.^[4]

The recommended procedure is a percutaneous aspiration of the liver abscess, especially when presented with a high probability of a rupture, which includes a large abscess (with a diameter that exceeds 5 cm), an abscess located in the left lobe that poses a risk of perforation into the pericardial sac, and a liver abscess that is unresponsive to 5–7 days of conservative treatment.^[4] This criteria were met in our study, and a percutaneous drainage of the liver abscess was completed.

Usually, aspiration should be accomplished by needle aspiration or by catheter. A meta-analysis study showed that percutaneous needle aspiration (PNA) and

percutaneous catheter drainage (PCD) are both considered safe techniques for draining liver abscesses. Nevertheless, PCD is superior to PNA, as it achieves a higher success rate, hastens the time needed for clinical improvement, and results in a 50% decrease in abscess cavity size.^[5]

As pericardial effusion persisted despite draining the liver abscess and medical treatment, Francis *et al.*^[6] performed surgical drainage through a pericardial window, as in our case. Following this, the patient's symptoms improved.

Conclusion

Purulent pericardial effusion is a rare complication of liver abscesses, whether amoebic or bacterial. Research has shown that in addition to receiving proper medical treatments, draining the liver and pericardial collections may be necessary to alleviate symptoms, especially in cases where conservative therapy alone is not effective.

Author contribution

KA: Conceptualization (lead); writing – original draft (lead); formal analysis (lead); writing – review and editing (equal). YB: Analysis (equal); writing – review and editing (equal). OA: Analysis (equal); writing – review and editing (equal). AA: Analysis (equal); writing – review and editing (equal). EB: Supervision (Lead); writing – review and editing (equal).

Conflicts of interest

None Declared.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understands that name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

Funding

None.

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