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Case Presentation

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Hydatid Pulmonary Embolism: A Case Report

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Abstract

Hydatid disease is a parasitic infection common in certain regions, particularly in Mediterranean countries, where it primarily affects the liver and lungs. Hydatid pulmonary embolism (HPE) is a rare and potentially life-threatening complication characterized by the rupture of a hydatid cyst and the release of cystic material into the circulation, it commonly occurs when a hydatid cyst of the right heart or liver through the inferior vena cava or hepatic vein. Although HPE is uncommon, it carries significant morbidity and mortality risks, underscoring the critical need for prompt diagnosis and management.

Introduction

Human echinococcosis, also known as hydatidosis or hydatid disease, is caused by the larval stage of the Echinococcus granulosus parasite and can affect any organ or tissue [1]. Cardiovascular complications of hydatid cysts are rare, occurring in only 0.02% to 2% of cases [2]. Pulmonary artery embolismis an extremely rare complication that can occur as a result of ruptured hepatic cysts. Here, we present a case of a 26-year-old woman with a history of hepatic hydatidosis who developed a massive left pulmonary embolism.

Case Presentation

We present the case of a 26-year-old female patient who was admitted to the hospital with a history of chest pain and shortness of breath persisting for the

previous 2 months. She had a surgery for a hepatic hydatid cyst five years prior at a different medical facility. Physical examination revealed no notable findings. However, a chest X-ray showed an opacity in the left hilar region **(Figure 1)**. Laboratory tests showed normal results except for eosinophilia and an elevated D-dimer level of 1700 ng/mL. Serologic testing for antibodies against cystic hydatidosis (IgG) was positive, with a titer of 46.70. Due to suspicion of pulmonary embolism, a CT Pulmonary Angiography (CTPA) was performed, revealing a filling defect in the trunk of the left pulmonary artery with three oval-shaped, well-defined lesions were observed in the lower lobe branch of the left pulmonary artery, measuring 13 mm, 14 mm, and 15 mm in their large axes, and showed a cavity lesion in the ventral segment of the left lung, measuring 30x23 mm, with a thin wall and a possible bronchial fistula. Additionally, a well-defined oval-shaped lesion with regular contours measuring 46x33 mm, was noted in segments IV and VIII of the liver. Hepatic Doppler ultrasound revealed a hydatid cyst invading segments IV and VIII of the liver close to the inferior vena cava. Echocardiography showed right heart enlargement and an intermediary probability of pulmonary hypertension (45 mmHg) **(Figure 2 and 3)**.

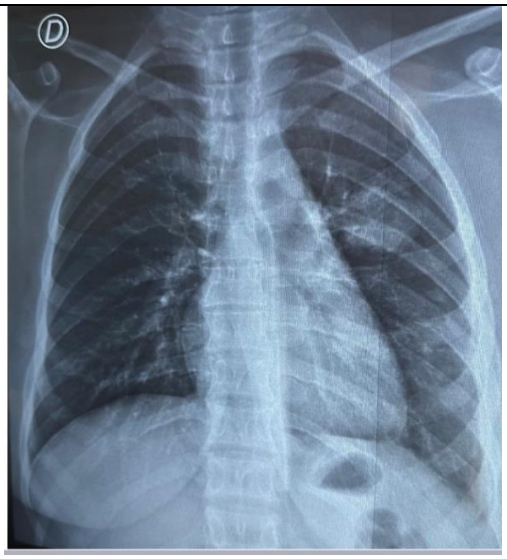

Figure 1: Chest X-ray revealed heterogeneous opacity in the left hilar region.

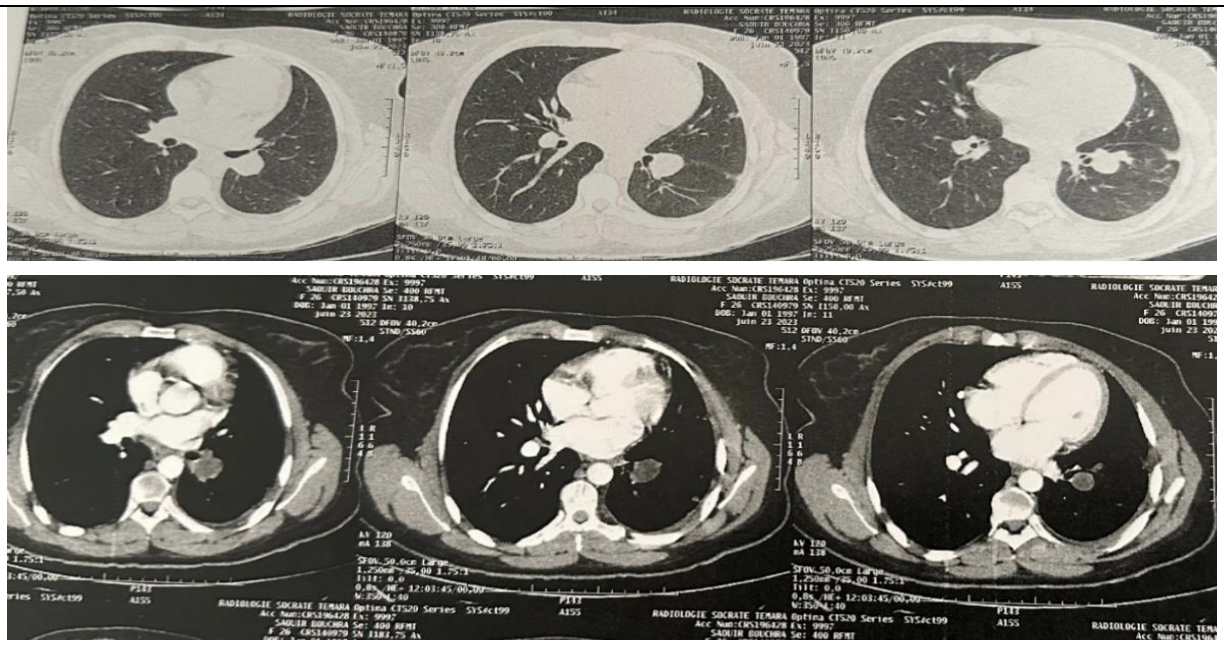

Figure 2(A) and (B): CT pulmonary angiography revealing a defect in the trunk of the left pulmonary artery.

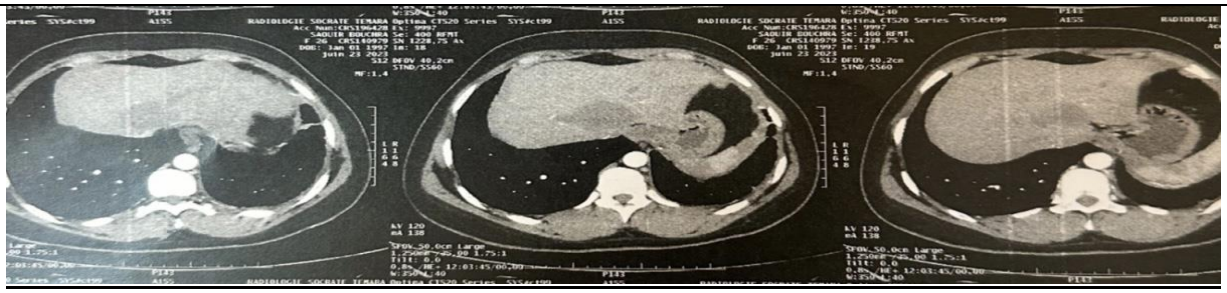

Figure 2(C): CT pulmonary angiography showed an oval-shaped lesion with regular contours measuring 46x33 mm in segments IV and VIII of the liver.

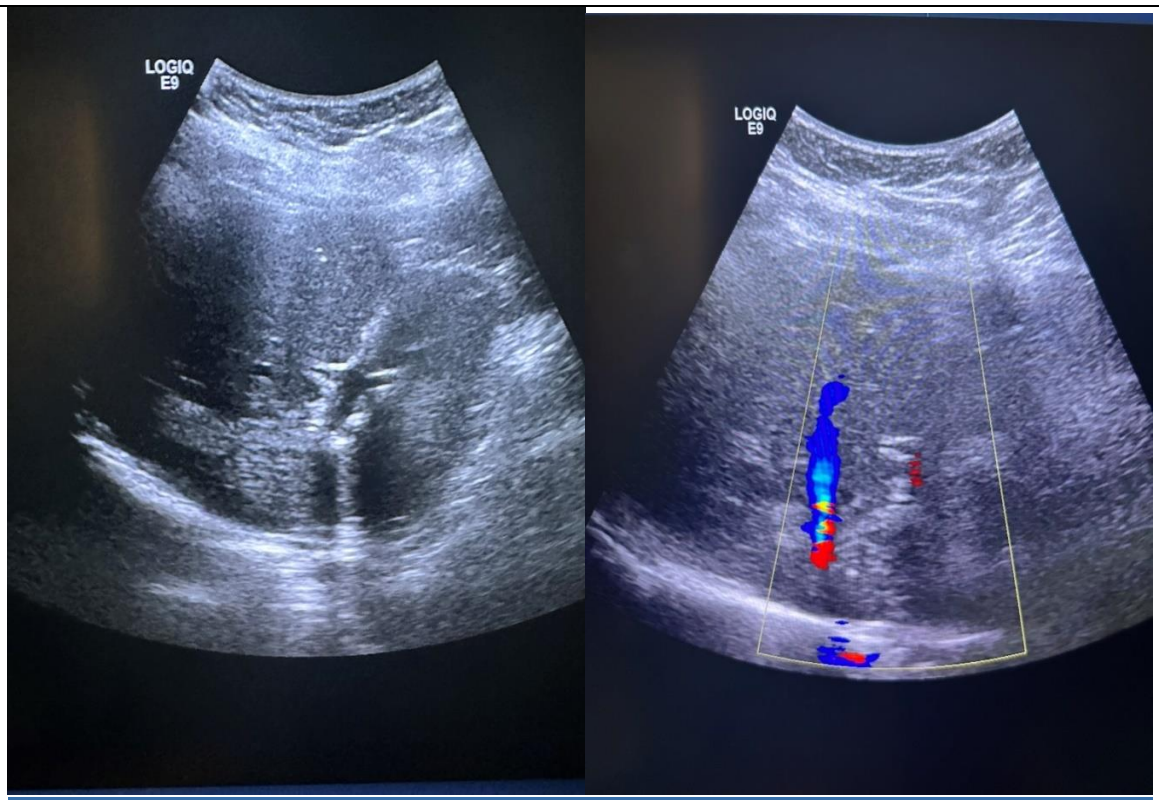

Figure 3: Hepatic Doppler ultrasound revealed Hydatid cyst invading segments IV et VIII of the liver close to the inferior vena cava.

The patient was initiated on medical therapy consisting of Albendazole 400 mg twice daily, along with clinical, biological (liver function tests), and radiological (CT scan) surveillance.

At 9 months following medical treatment, the evolution was characterized by the persistent left hydatid pulmonary embolism affecting the segmental branches of the lower and upper left pulmonary artery, as well as the two contiguous hepatic lesions at the hepatic dome consistent with CE4 classified hydatid cysts according to the WHO classification, without signs of rupture at the level of the inferior vena cava or the right atrium **(Figure 4A and B)**. There were no further hydatid cysts identified in the lung parenchyma. Follow-up echocardiography demonstrated a notable improvement, indicating a non-dilated right cavities with low probability of pulmonary hypertension, with a good tolerance to the medical treatment.

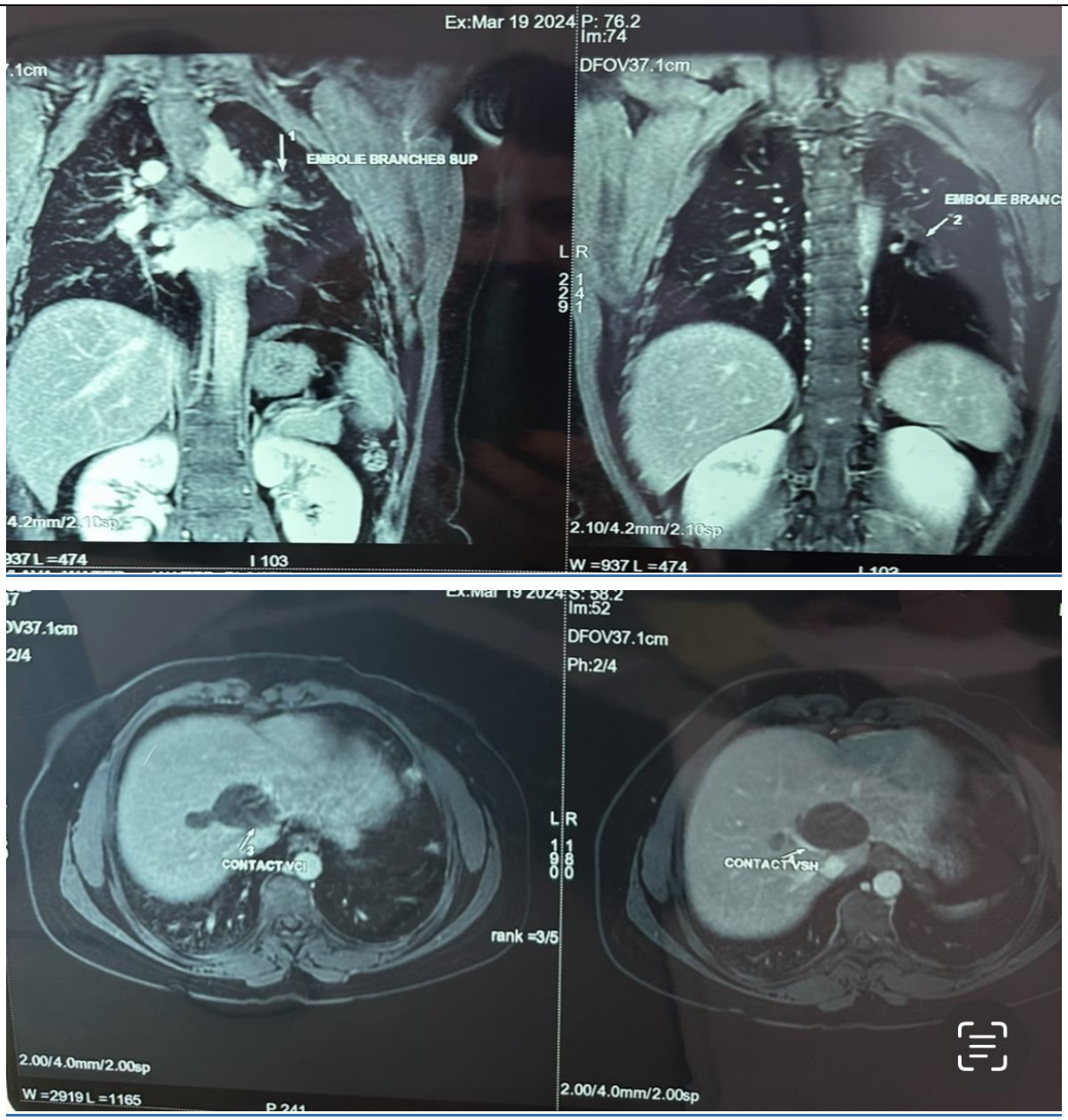

Figure 4(A and B): Angio thoracic MRI revealed left hydatid pulmonary embolism with two contiguous hepatic lesions at the hepatic dome consistent with CE4 classified hydatid cysts.

Discussion

Non-Thrombotic Pulmonary Embolism (NTPE) is characterized by the partial or complete obstruction of the pulmonary circulation due to various non-thrombotic embolic agents. Despite its lower prevalence compared to pulmonary thromboembolism, NTPE is a critical condition that is often underestimated. This is primarily due to the nonspecific nature of its symptoms, which can lead to it being overlooked during the differential diagnosis of chest pain. NTPE can occur due to various causes such as cancers, fat, infectious agents, amniotic fluid,

and foreign materials or gases [3]. The hydatid pulmonary embolism is a type of Non-Thrombotic Pulmonary Embolism (NTPE) that is less common than pulmonary thromboembolism, a frequently encountered cause of morbidity and mortality [4]. It can occur when a hepatic cyst ruptures into the hepatic veins or the inferior vena cava, or directly from a ruptured cyst in the right cardiac chambers, While compression of the inferior vena cava by hydatid cysts is relatively common, the fistulizationor rupture of hydatid liver cysts into the inferior vena cava is an extremely rare and life-threatening occurrence [3]. This condition can lead to the development of hydatid cysts in the pulmonary parenchyma, or, more rarely, in the pulmonary arteries [4]. Surgical and autopsy observations indicate that hydatid cyst embolism is predominantly due to mechanical obstruction caused by vesicles or daughter cysts, rather than by the presence of blood clots or thrombosis [5]. Additionally, hydatid cysts can occasionally be found in the arterial walls [3,4]. Hydatid cysts in the liver's posterior segments (VII, VIII, and I) that are adjacent to the inferior Vena Cava (IVC) commonly lead to IVC rupture. These cysts can compress or encase the IVC, potentially causing partial or complete thrombosis due to vesicle presence in the IVC lumen [5]. In this case, the hydatid pulmonary embolism was likely caused by two main factors. Firstly, during the liver surgery, there might have been accidental damage to the inferior vena cava, allowing daughter cysts to spread systemically. Secondly, the hepatic cyst seemed to be complex, possibly resulting in its spontaneous rupture through the portal routes due to its proximity to the vena cava [5].

For pulmonary artery obstruction, patients may remain asymptomatic, as pulmonary perfusion is maintained via the bronchial arteries. However, excessive growth in the size of these cysts can lead to total obstruction of the pulmonary arteries [6]. Clinical manifestations of hydatid pulmonary embolism are nonspecific, although hemoptysis is the most frequent sign. Otherwise the diagnosis should be based on medical history, clinical manifestations, and imaging results [7]. It is often difficult due to the absence of specific symptoms or symptoms that do not support a pulmonary embolism. For the thoracic imaging may have an important income to guide the diagnosis, especially the helical CT, angiography, and MRI [8]. They can locate the hydatid cysts, study their morphologies, and show their extension to the vascular branches. They may indicate endoluminal defects at the level of the pulmonary artery and/or its branches [9,10]. On CT scan, the complicated intra-arterial embolism appears as a fluid mass density with limited enhancement of the wall after contrast injection [11-15]. The treatment of hydatid pulmonary embolism involves a multidisciplinary approach, including medical, interventional, and surgical modalities. The goals of treatment are to eradicate the parasite, manage symptoms, prevent complications, and reduce the risk of recurrence. Medical treatment is the mainstay of therapy and consists of antiparasitic drugs, such as albendazole has a role in reducing the size of cysts and stopping their development and represents the only therapeutic option in inoperable cases. Antiparasitic treatment is typically continued for several weeks to months, depending on the size and location of the cysts. Surgical intervention may be necessary in cases of massive pulmonary embolism, hemodynamic instability, or cysts that are not amenable to medical or interventional treatment. Surgical options include cystectomy (removal of the cyst), lobectomy

(removal of a lung lobe), or pneumonectomy (removal of an entire lung). Surgery is usually reserved for cases where other treatments have failed or are not feasible. The Pulmonary embolectomy combined with removal of the hepatic component of the cyst remains the traditional surgical treatment requiring cardiopulmonary bypass and clearance via a right atrial incision. Since surgical removal of hepatic echinococcal cysts near hepatic venous structures also risks embolization of hydatid cysts to the pulmonary arteries, certain precautionary measures have been recommended. These include clamping of the inferior vena cava, avoidance of traction on the liver, and cavocaval bypass if necessary. If complete removal of the cysts is possible the prognosis is good, with a low rate of recurrence. Preventive measures such as clamping the inferior vena cava during hepatic cyst resection and avoiding liver traction are crucial. In complex cases, a cavocaval bypass may be employed to maintain blood flow during cyst removal **[12-17]**. Overall, treatment is tailored to each patient's specific condition and requires a multidisciplinary approach for optimal outcomes. Supportive care plays a crucial role with pain management is important essential may require analgesics to alleviate discomfort. Nutritional support is also essential to ensure adequate nutrition and support the immune system. Regular follow-up and monitoring are essential for patients with HPE. Imaging studies, such as chest X-rays or CT scans, may be performed periodically to assess treatment response and detect any complications. Long-term follow-up is necessary to monitor for recurrence and evaluate treatment efficacy.

Conclusion

Hydatid pulmonary embolism is a rare complication of hepatic hydatid cyst. The symptoms are not specific. The present case report highlights the fact that, in adults with a history of hydatid liver cyst presenting with clinical features suggestive of PE, the uncommon location of hydatid cyst in the pulmonary artery should also be considered as a possibility.

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