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Mediastinal extension of amoebic liver abscess: A case report on the rare thoracic complication of *Entamoeba histolytica*

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Abstract:

Amoebic liver abscess is one frequently encountered intra-abdominal infection, caused by *Entamoeba histolytica* and has various abdominal and thoracic life-threatening complications. Herein, describe a case of a 30-year-old female, who suffered from multiple amoebic liver abscesses and presented with massive right-sided pleural effusion. She was managed with recommended antibiotics and pigtail catheter for liver abscess and an intercostal drainage tube for massive pleural effusion. However, postintercostal drainage, her chest X-ray demonstrated a right mediastinal shadow, which was confirmed as an intrathoracic extension of the hepatic liver abscess on computed tomography. An ultrasound-guided pigtail catheter was manipulated and placed at the site of thoracic communication. This led to clinical and radiological improvement, but unfortunately, she developed ventilator-acquired pneumonia and died due to her illness. The case represents an uncommon complication of amoebic liver abscess, which is rarely described and adds more knowledge on the thoracic complexities of this infectious disease.

Keywords:

Amoebic liver abscess, mediastinum, pigtail drainage, pleural effusion, ventilator-associated pneumonia

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Introduction

The most common cause of hepatic abscess in developing and underdeveloped countries is an amoebic liver abscess (ALA). Approximately 1% of asymptomatic intestinal infection cases of *Entamoeba histolytica* can develop ALA due to mucosal invasion by trophozoites.[1] Out of these, 40%-80% individuals present within 2-4 weeks, with symptoms of fever and right upper quadrant pain.[2] The solitary hepatic abscess is the most common imaging finding, but Southeast Asian individuals may have higher chances (about 50%) of large and multiple lesions.[1] Individuals with large size and multiple numbers of ALA have a higher risk of complications, and the most commonly encountered one is rupture. 7%-20% of ALA cases have pleura-pulmonary rupture due to diaphragmatic perforation, which leads to the thoracic extension of abscess disease.[1]

Case Presentation

A 30-year-old female was referred to our emergency department with complaints of abdominal pain and fever for the last 10 days and breathlessness for the last 4 days.

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Abdominal pain was more in the right upper quadrant, continuous, nonradiating, and moderate in severity. The patient was taking antipyretics (paracetamol 650 mg) and drotaverine for her symptoms from a local practitioner, but from the last 4 days, she developed progressive breathlessness, associated with right-sided chest heaviness. The patient denied any chronic illness or past trauma.

At presentation, the patient was febrile at 99.5°F and tachypneic, with a rate of 32/min, and an oxygen saturation of 85% on room air. The oxygen supplement raised her saturation to 91%. Her blood pressure was 114/78 mmHg, and the initial electrocardiogram suggested tachycardia. Chest X-ray revealed a whiteout right-sided chest with clear lung fields on the left-sided [Figure 1]. Ultrasonography (USG) of the chest confirmed massive pleural effusion with underlying lung collapse. An intercostal drain (ICD) was inserted, which drained around 1.2 liters of fluid, but the patient was still tachypneic. Post-ICD chest X-ray revealed expansion of the right-sided lung but unmasked new mediastinal shadow and elevated hemidiaphragm on the same side [Figure 1]. In view of persistent respiratory compromise, she was intubated and put on a mechanical ventilator. Arterial blood gas analysis expressed a pH of 7.47, PaO_2 of 56 mm Hg, PCO_2 of 30 mm Hg, and HCO_2 of 27 mEq/L. The patient was shifted to the intensive care unit and started on intravenous ceftriaxone 1 gr twice a day. In addition, her abdominal USG scan on the same day demonstrated multiple hypoechoic lesions in the right liver lobe, suggestive of abscesses and the largest one measuring 10 cm × 8.5 cm.

The patient's hemoglobin was 12.8 gr/dl, and the total leukocyte count was 23 × 10^9/L with 93% neutrophils. Renal function tests were stable, but liver function test had elevated levels of total bilirubin 3.2 mg/dl, aspartate transaminase 148 IU/L, alanine transaminase 166 IU/L, and alkaline phosphatase 189 IU/L, but low serum albumin 3.1 gr/dL. Pleural fluid analysis revealed exudative fluid with a protein of 3.2 gm/dl, cell count of 190 (85% neutrophils and 15% lymphocytes), and negative gram staining. A USG-guided pigtail catheter was inserted in the largest hepatic abscess, which drained around 800 ml of brownish-red (anchovy sauce) colored thick fluid. Intravenous metronidazole 2.5 gr in three divided doses was added to her ongoing treatment. This led to improvement in her clinical condition and her total leukocyte count reduced to 15 × 10^9/L, but she was still ventilator dependent. Pleural fluid, blood, and urine cultures were negative. Gram staining of the drained fluid was also inconclusive, but her serum IgM serology for *E. histolytica* was positive.

In view of the mediastinal shadow and stable clinical condition, the patient underwent a computed tomography scan of the chest and abdomen on day 5. The imaging represented multiple hypodense abscesses in the right liver lobe, with diaphragmatic rupture and extension into the right-sided mediastinum [Figure 2]. There was also mild intestinal wall edema. Hence, ceftriaxone was changed to piperacillin and tazobactam 4.5 gm intravenous 6 hourly. A cardiothoracic and vascular surgeon's opinion was taken and advised pigtail catheter repositioning instead of a surgical procedure to avoid morbidity and mortality. The catheter was inserted in one particular abscess, which was extending into the right mediastinum. With this, her ventilator dependency decreased and she was planned for weaning off. Unfortunately, on 9th day of intubation, she started developing fever again, with increased oxygen requirement and total leukocyte count (21 × 10^9/L). Her blood and urine cultures were sent and a chest X-ray was repeated. The radiograph revealed a relatively reduced

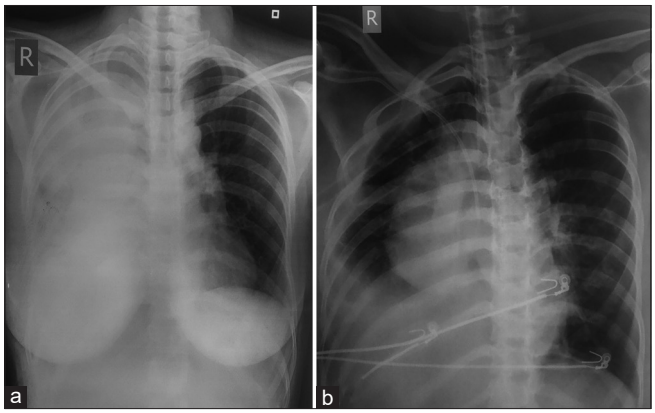

Figure 1: (a) Initial chest X-ray of the patient demonstrating right side white-out lung but clear left-sided chest. (b) Postintercostal drain chest X-ray of the patient demonstrating relatively expanded right-sided lung and mediastinal shadow on the same side

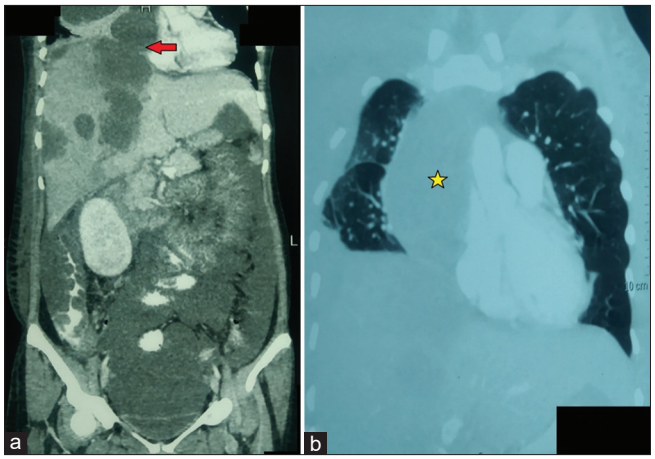

Figure 2: (a) CT of the abdomen demonstrating multiple hepatic hypoechoic lesions on the right side, with diaphragmatic rupture (red arrow) and mediastinal extension. (b) CT of the chest demonstrating right mediastinal disease (yellow star). CT: Computed tomography

mediastinal shadow on the right side, but new patchy infiltration in the left lung field [Figure 3]. Due to fever, raised total leukocyte count, and new lung infiltration, ventilator-associated pneumonia was suspected, and her tracheal aspirate culture was sent. Piperacillin and tazobactam were replaced with colistin 4.5 million units 8 hourly. Despite this, her respiratory compromise became severe and the patient died after 14 days of admission. Postobituary culture of the tracheal aspirate had growth of pan-resistant pseudomonas.

A written consent is present, obtained from the patient's husband. He explained that the patient's identity will not be revealed and the case information will be used for education purposes only.

Discussion

ALA has numerous thoracic complications, largely due to close relations with the diaphragm in superior or posterior locations. Pleuropulmonary complications such as effusion, amebic empyema, lung abscess, and hepatobronchial fistula are common on the right-sided, and pericardial complications such as pericarditis, effusion, and tamponade are frequent in left-sided ALA.[3,4] Our patient suffered from the mediastinal extension of ALA due to diaphragmatic rupture and concurrent massive pleural effusion, which is infrequently described in the literature. One similar case was described by Kouzu *et al*., in which ALA extended to the mediastinum and was resistant to medical therapy and percutaneous drainage.[5] In addition, vascular complications such as inferior vena cava compression, portal vein thrombosis, and embolism to the right atrium or pulmonary vessels may arise due to proximity to ALA and can lead to leg edema, portal hypertension, and Budd-Chiari-like syndrome.[1] Thus, the clinical presentation of ALA largely depends on the presence or absence of associated complications. As seen in our case, pleural effusion leading to breathlessness accompanied the typical presentation of ALA. It is worth noting that small hepatic lesions can go unnoticed for a long time period, and complications bring the patient to the health-care facility.

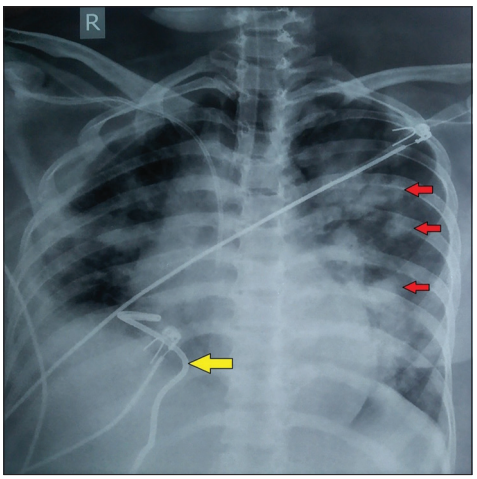

Figure 3: Repeat chest X-ray of the patient demonstrating pig-tail catheter (yellow arrow) with relatively reduced right-sided mediastinal shadow, and new infiltrations in the left lung field (red arrows)

The laboratory investigational picture, including high total leukocyte count, C-reactive protein, and procalcitonin levels, of ALA is similar to other infectious conditions and pyogenic liver abscess, which is one close differential. Low serum albumin level is one consistent finding of ALA, which is seen in most patients and more frequently than in pyogenic liver abscesses.[6] The USG and CT scan are the most commonly used imaging techniques and the former is superior in quantifying the degrees of liquefaction.[1] Similarly, CT scan is better for the detection of small and nonliquified lesions, necrotic versus viable tissue, and associated complications. For specific diagnosis of ALA, antigen-based investigations against *E. histolytica* are used along with imaging modalities.

Metronidazole is used as a drug of choice for ALA, which has a cure rate above 90% and is given for a duration of 10-14 days.[7] Interventional management of ALA is usually reserved for large and nonresponsive lesions and complicated cases. Major modalities include a percutaneous needle or pigtail catheter aspiration and surgical drainage. In general, needle aspiration is used for small lesions (<5 cm), and catheter drain for abscesses above this size with a cure rate of about 100%.[8] Even for cases with complications, catheter drainage is preferred over surgical procedures with a success rate of >97% and less mortality.[9] Recently, a study of ALA patients with complications described catheter drainage as effective management for intraperitoneal and pleuropulmonary ruptures, and as seen in our case, drain insertion to the abscess communicating with mediastinum led to clinical improvement.[9] Thus, it is essential to recognize the exact site of communication for successful catheter placement. Surgical drainage of complicated ALA cases is less commonly utilized these days due to high mortality (up to 50%), associated complications, and longer hospital stay.[10] However, the procedure is considered a last resort for refractory cases as described by Kouzu *et al*.[5]

Conclusion

Having a large spectrum of complications, ALA can have a variable eccentric presentation, and this case narrates a mediastinal extension of hepatic disease. Our case had massive pleural effusion, along with mediastinal

disease, which led to respiratory compromise, ventilator dependency, and a longer hospital stay, resulted in ventilator-associated pneumonia. Intercostal drainage is the mainstay treatment for effusion, and if communication to the abdomen allows, an ultrasound-guided pigtail can be used in such cases to drain the mediastinal abscess.

Author contributions

GJ, JK, and SG: Case presentation, management, data collection, investigations, and writing of the original draft.

YSC and PA: Writing of the original draft including discussion, literature review, conclusion, references, and formatting.

Conflicts of interest

None declared.

Consent to Participate

A written consent is present, duly signed by the husband of the patient. The authors obtained the consent after explaining that no identity will be revealed and the case information, including pictures will be used for education purposes only. He was also explained that journal publication will not contain any material or picture, disclosing her identity. The patient's husband gave positive consent and the authors certify that written consent is present and procured for publication.

Ethical approval

Proper written consent is present, which was obtained from the patient's husband for the use of the data related to this case.

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