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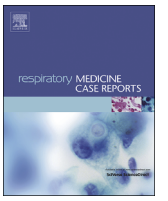

Case Report

An unexpected location of pleural catheter in a hepatic vein: A case report

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ABSTRACT

Pleural catheters are widely used for patients with pleural effusions. Several complications with limited morbidity have been reported.

We report, to our knowledge, the first case of a pleural catheter insertion into the hepatic vein, passed through the inferior vena cava, and the tip reaching the right atrium, which may be reduced using additional imaging during thoracocentesis.

1. Introduction

Indwelling pleural catheters have emerged over the past decade as a highly effective modality for the treatment and management of recurrent pleural effusions [1].Retrospective studies have documented many complications with low morbidity including skin port infection, unintended tube removal, recurrent hemothorax or pneumothorax, and ineffective drainage. More severe complications, such as tube malposition and empyema, have been reported recently. These conditions may be linked to harm to the abdominal or thoracic organs (perforation, laceration, or compression) [2].

As far as we are aware, there are no published case studies discussing the insertion of a pleural catheter during thoracentesis into the hepatic vein.

2. Case presentation

A 68 years old gentleman, non-known food and drug allergy, non-smoker, with no significant past medical history except for stage 4 lung adenocarcinoma diagnosed 1 year ago, relapsing on chemotherapy, for which he was hospitalized 3 weeks ago for a right pleural effusion drained via a small bore chest tube where cytology was positive for malignant cells and chemical pleurodesis by doxycycline 500mg was done. He presented to the hospital with shortness of breath, tachypnea and dry cough since several days increasing progressively, without any associated. Upon presentation, patient was looking ill, anxious and dyspneic. Vitals signs showed blood pressure of 130/80 mmHg, heart rate of 100 beats/minute, afebrile, and desaturation requiring nasal cannula to maintained SpO2 93 %. As for the physical exam there was right side absent air entry mid to lower field on chest auscultation, dullness on percussion and decreased tactile fremitus. On cardiac auscultation, regular s1s2 without audible murmurs, with soft abdomen non distended non tender, no lower limb edema and no other significant features on examination.

Chest X-ray showed right lower lobe opacification, increasing compared to the previous one done after pleurodesis suggestive of pleural effusion (Fig. 1).

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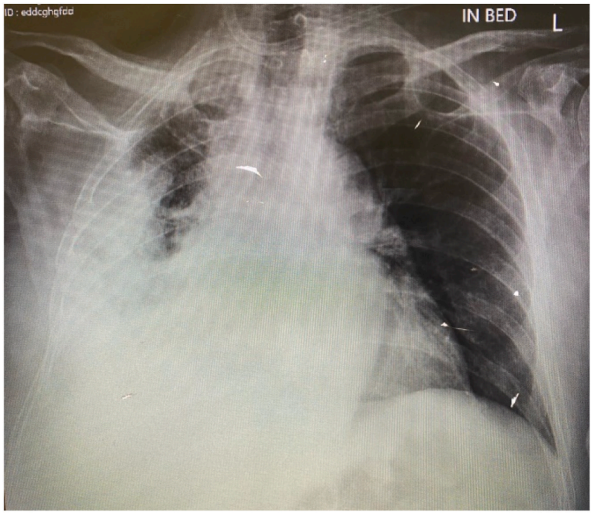

Fig. 1. Chest X-ray showed right lower lobe opacification, suggestive of pleural effusion.

At the same level as the previous one, an 8-French pleural catheter was inserted. Following catheter placement, there was an immediate brisk drainage of bright red bloody fluid. Hemorrhagic fluid had a hematocrit (Hct) of 29 mmol/l, while whole blood had a Hct of 30 mmol/l. Six hours after draining 1 L of pleural fluid, the patient developed tachycardia and transient hypotension, which responded to a 500ml saline bolus. The catheter had been clamped. After the initial transient drop in blood pressure, the patient remained hemodynamically stable and was transferred to the intensive care unit. Cell blood count CBC was repeated and showed a drop of 2 units in the hemoglobin from 10mg/l to 8mg/l. A subsequent computed tomography scan, with three-dimensional reconstruction, showed that the catheter first passed into the hepatic vein, entered through the inferior vena cava, and the tip was wedged just before the right atrium (Fig. 2). Note was made of a small loculated right pleural effusion (successful pleurodesis) with elevation of the diaphragm. Blood transfusion of 1 unit of packed RBCs was given.

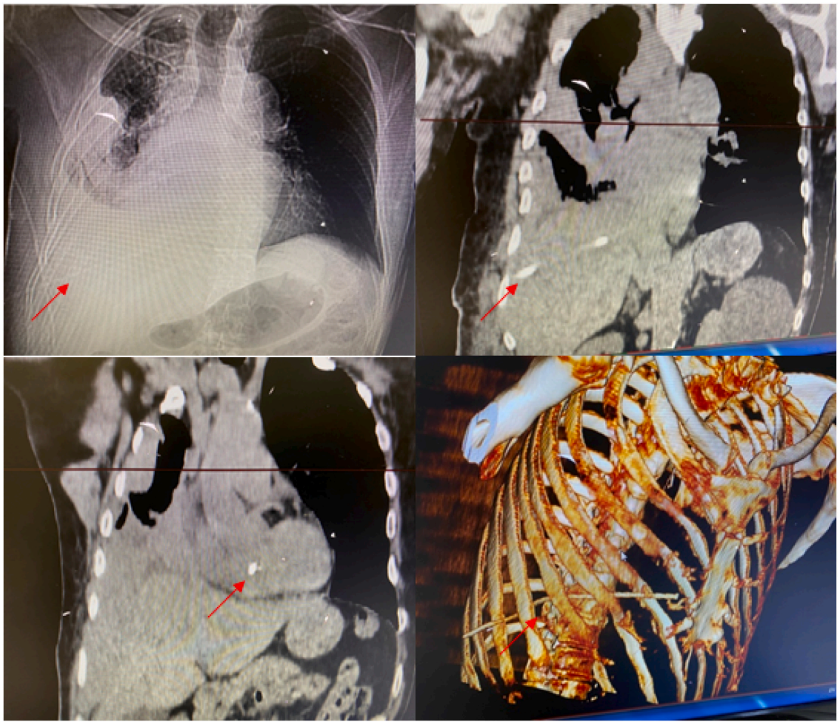

Fig. 2. A CT scan, with three-dimensional reconstruction, revealed the catheter entered into the hepatic vein, passed through the inferior vena cava, and the tip was located just before the right atrium.

After consulting with a thoraco-vascular surgeon, the patient was brought to the operating room for catheter removal. The malpositioned pleural catheter was successfully removed by gently removing it out of the chest with no adverse events and without the need for surgical intervention. An echocardiography was performed before and after the removal of the catheter and no development of pericardial effusion was noted.

The patient was taken back to the intensive care unit shortly after surgery and remained hemodynamically stable with no signs or symptoms of any complication. He was discharged after three days of close monitoring. His further recovery was uneventful.

3. Discussion

It is unknown how common pleural catheter placement into a hepatic vein or other similar iatrogenic injuries is. A thorough review of the literature reveals no case reports of this occurrence; however, there are reports of pleural catheter placement resulting in injury to other smaller vessels (intercostal vessels) [3]. There were no management guidelines because there were no comparable cases in the literature.

Blood drainage, bleeding, respiratory insufficiency, and hemodynamic instability are all clinical manifestations. After insertion, the position of the pleural catheter must be confirmed using a chest radiograph [4].

The use of US guidance with color Doppler allows the physician to determine a more accurate needle insertion, lowering the risk of complications and increasing efficacy [5].

Preoperative planning with imaging studies is crucial, as is intraoperative preparation and coordination between the vascular surgery and anesthesia teams in the event of loss of containment and the need for emergent vein repair. Fortunately, no medical intervention was needed in this particular instance considering the patient's hemodynamics remained stable throughout catheter removal.

4. Conclusion

To summarize, we are the first to highlight an uncommon complication of puncturing a hepatic vein toward the inferior cava vein during thoracentesis, which might be reduced via ultrasound. We emphasize that additional imaging is required if a vascular laceration or hemothorax is suspected. Endovascular management and repair, as well as open repair in certain situations must be planned.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review upon request by the Editor-in-Chief of this journal.

Ethics approval and consent to participate

Ethical approval was not applicable.

Financial disclosure

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Provenance and peer review

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CRediT authorship contribution statement

Zeinab El Mawla: Conceptualization, Project administration, Validation, Visualization, Writing – original draft, Writing – review & editing. **Abdallah Diab:** Conceptualization, Data curation, Validation, Writing – original draft. **Layal Olaywan:** Data curation, Supervision, Validation, Visualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Not applicable.

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