



## Case report

## A chest tube translocating the posterior mediastinum: A strange case of malpositioning without complication or injury

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## A B S T R A C T

Malpositioning of a chest tube is a recognised complication of chest tube insertion. However, cases involving the mediastinum comprise only a fraction of such occurrences, while the complete translocation of the tube through the mediastinum is only noted in three published cases. This case report describes a case of complete translocation of the mediastinum during chest tube insertion to resolve a pneumothorax. It examines the possibility of an occult natural pathway in the posterior mediastinum of some patients based on the ease at which the tube crossed the mediastinum, the immediate resolution of patient symptoms and the absence of injury or complications from the event to the patient.

## 1. Introduction

Malpositioning of a chest tube is the primary cause of problematic chest tube insertion [1,2], 14% of such cases are due to a mediastinal placement [3,4]. We report a case in which the chest tube was passed through the posterior mediastinum without evident pneumothorax or complication. Review of the literature suggests that only three other such cases exist [5]. In two of the cases the tube passed through the anterior mediastinum, with the third report demonstrating the tube passing posteriorly and causing a contralateral pneumothorax, but no mediastinal injury [4].

## 2. Case 1

A 63-year-old female, referred to rapid access clinic for recurrent chest infections, was noted to have a nodule on chest x-ray and computed tomography scan (CT scan) (Fig. 1). A positron emission tomography scan suggested an FDG-avid nodule with no evidence of nodal or other avidity. She was referred for a CT-guided biopsy.

On completion of the biopsy it was recognised that the patient was hypotensive and tachycardic. A significant left-sided pneumothorax had developed. Attempts at aspiration were unsuccessful to resolution and the decision was made to insert a chest tube to resolve the iatrogenic

pneumothorax (Fig. 2).

A 28-French chest tube was placed using the Seldinger technique. It passed without any resistance or excessive bleeding and the patient's clinical symptoms improved immediately. A repeat CT scan confirmed the position of the tube. It was at this point noted that the tube had passed entirely through the posterior mediastinum.

The tube appeared to be functioning and successfully evacuated the pneumothorax – with evident tidal oscillations and lack of ongoing air leak. There was no evidence of bleeding from the tube or at the tube insertion site. Moreover, the patient was conversing and had a complete resolution of her shortness of breath and chest pain.

However, given the precarious position of the chest tube the decision to remove it was deferred until the cardiothoracic service was contacted. Their recommendation was to transfer the patient, sixty miles away, to their centre. The patient had the chest tube removed in the operating room the next day with no evidence of bleeding and no re-accumulation of the left sided pneumothorax. She was subsequently diagnosed with an early-stage adenocarcinoma for which she had a lobectomy.

## 3. Discussion

A chest tube passing through mediastinum is not unprecedented in

Abbreviations: CT, Computed Tomography

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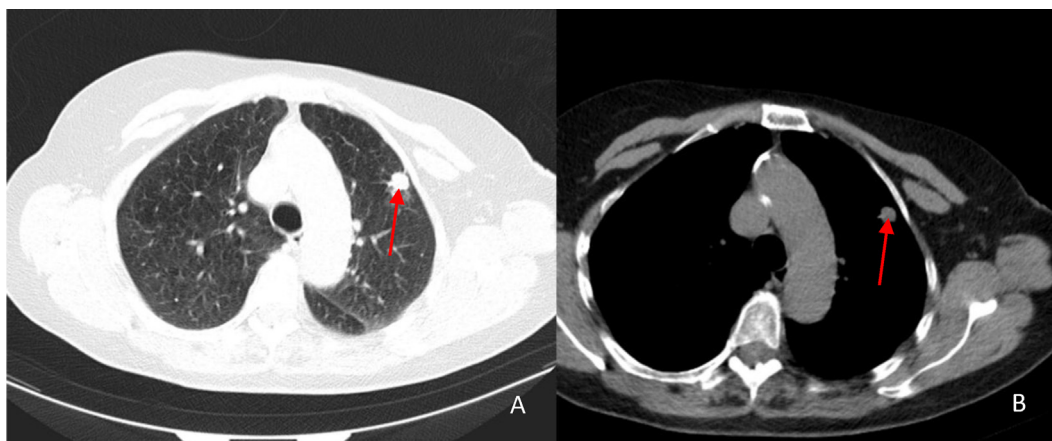


Fig. 1. A-B: A CT Thorax showing a lung nodule in left upper lobe with no apparent nodal involvement.

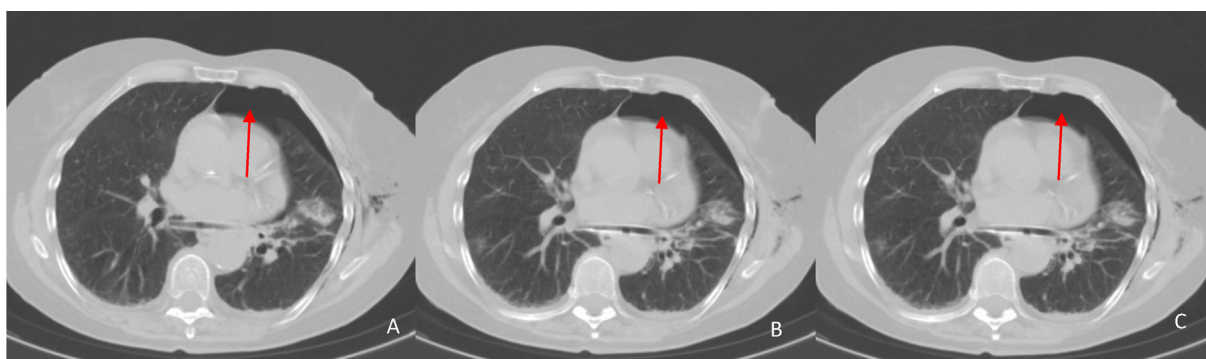


Fig. 2. A-C: Pneumothorax and subcutaneous emphysema post-CT-guided biopsy. Of note, complete absence of pneumothorax on the right side.

the literature. There are multiple reports of left ventricular rupture, cardiac tamponade and aortic dissection [6,7]. However, there are no published reports of a chest tube traversing the full extent of the posterior mediastinum without injuring the mediastinum or contralateral lung.

Malpositioning of a chest tube, without complication, across the anterior mediastinum can be due to an increased retrosternal space, as can be seen on x-ray in patients with emphysema or chronic obstructive pulmonary disease [5,8]. However, this anatomic distortion should not place a patient at higher risk for translocation through the posterior mediastinum. This complication has been reported previously resulting in a right-sided pneumothorax but no obvious mediastinal injury [4]. Given the absence of right-sided pneumothorax, in our case the tube must not have punctured the visceral pleural surface of the right lung despite traversing the entire posterior mediastinum. While it is difficult to explain with certainty, it is possible that in this patient a natural pathway through the posterior mediastinum is present - one only occluded by the two parietal pleural membranes. Otherwise, one reasonably would expect to observe a more significant mediastinal injury or the presence of hematoma. Interestingly, it has been proposed by Wu et al. that the posterior mediastinal space could be used as a possible route to operate through, in order to access the contralateral lung, without any damage to surrounding structures [9]. An interview with the operator revealed that there was little or no resistance during the insertion of the tube. While certainly a rare occurrence, it is possible that this anatomy may be present in other patients - as suggested by the previous case report of posterior placement of the chest tube without mediastinal injury [4].

There are possibly two salient teaching points that can be established from this case.

Firstly, it is beneficial for clinicians to be aware that despite

malposition of a tube across the width of the posterior mediastinum, it does not automatically mandate surgical intervention. Naturally we would recommend the upmost caution, but the clinical assessment of the patient and the lack of mediastinal injury on radiological imaging could indicate that the tube could be removed without the patient experiencing significant mediastinal injury.

Secondly, the ease of the insertion of the tube and the lack of mediastinal injury on radiological scans, together with the resolution of clinical symptoms, all stand to support the suggestion that there may be an occult natural pathway in the posterior mediastinum where the two lungs are only separated by parietal pleura.

#### Summary conflict of interest statement

The authors declare no conflicts of interest.

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#### Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.rmcr.2018.07.005>.

- has drafted the submitted article or revised it critically for important

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