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Case Report

Intrathoracic but extra-pleural chest tube placement; an unusual case of chest tube malposition in the trauma setting

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ABSTRACT

We present the case of a 20-year-old male who was transferred to our Major Trauma Centre following a high-speed motor vehicle rollover. He arrived intubated with a right sided ICC in place. On arrival we elected to replace this ICC due to concerns regarding a superficial position, however 24 h after replacement, a large right sided pneumothorax developed. We suspect that both the pre-hospital ICC, as well as the ICC which we replaced it with, were unusually sited in the intrathoracic but extrapleural position.

Introduction

Approximately 25% of patients presenting with major trauma undergo a tube thoracostomy [1], and extrapleural intercostal catheter (ICC) placement is a recognised complication. The entire tube may be placed outside of the ribs, or the tip of the ICC may be within the pleural space, but with one or more drainage holes placed extrapleurally. However, the intrathoracic, extrapleural position is rarely seen.

We present an unusual case of an intrathoracic but extrapleural tube thoracostomy in a 20-year-old male transferred to us with multi-trauma.

Case

A 20-year-old male patient was transferred to us from a Regional Health Service by Helicopter Emergency Medical Services. He had been involved in a high-speed motor vehicle rollover approximately 12 h prior. On arrival to the Regional Medical Centre, he had a reduced GCS, with multiple suspected injuries. He was intubated and a right sided ICC was placed.

On arrival to our Major Trauma Centre, there was concern that the ICC would need replacing as no swinging or bubbling was noted within the underwater seal drain, and the AP chest radiograph (CXR) revealed the proximal drainage hole of the ICC to be only just inside the ribs (Fig. 1).

We opted to re-site the ICC, and the pre-existing tube was removed. As this drain had only recently been placed, we chose to use the pre-existing thoracostomy site. After prepping and draping the chest, a finger sweep was performed revealing what appeared to be circumferential adhesions, and the lung itself felt firmer than expected on palpation. The new chest tube was then inserted and sited to a depth of 12 cm, after which resistance was felt (Fig. 2).

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The patient was subsequently transferred to theatre for an emergency laparotomy, where a jejunal resection was undertaken. He was then admitted to the intensive care unit for ongoing management. The following day, it was noted that the right sided ICC was not swinging, and a CXR identified a reaccumulated right sided pneumothorax (Fig. 3).

We suspect that the right sided ICC had in fact been positioned between the parietal pleura and chest wall, a complication that could not be seen on CXR. This ICC was removed and a new ICC sited, this time using a different insertion site within the rib space below. The lung re-expanded and this ICC remained in situ for a further 6 days. No further complications were encountered.

Discussion

Although a very rare complication of tube thoracostomy, anecdotal experience from our centre suggests that the extrapleural malposition may be more common in young males, due to the tougher composition of their pleura which can be stripped away from the ribs, opening up this potential space.

When re-siting an ICC which is thought to be malpositioned, consider extrapleural placement if the finger-sweep suggests circumferential adhesions and the lung parenchyma feels firmer than expected; you may be feeling the lung through an extra layer of pleura. Ensure that the parietal pleura is breached using the tip of a curved artery forceps, prior to undertaking a finger-sweep. If this unusual intrathoracic, extrapleural malposition is suspected; a new ICC should be inserted via an alternate site.

A review of the literature suggests that malpositioned tube thoracostomies are rarely identified in this intrathoracic but extrapleural position. Intrafissural and intraparenchymal malpositions are recognised to be the most common [2]. We identified one single-centre German study which assessed ICC position on initial CT and found 4% of initially placed ICCs to be extrapleural [3]. However, it was not clear from the paper if these were intrathoracic.

We also identified one case report of a patient with cystic fibrosis in whom intrathoracic extrapleural ICC malposition was suspected having not been identified for a number of weeks [4]. No case reports were identified in the trauma setting.

Conclusion

This was an unusual case of an intrathoracic but extrapleural tube thoracostomy in a 20-year-old male with multi-trauma. When a malposition is suspected, we suggest consideration of this unusual position if finger sweep suggests circumferential adhesions, and the lung parenchyma feels firmer than expected. If an intrathoracic, extrapleural malposition is suspected; a new ICC should be inserted via an alternate site.

Consent for publication

Written consent gained from the patient.

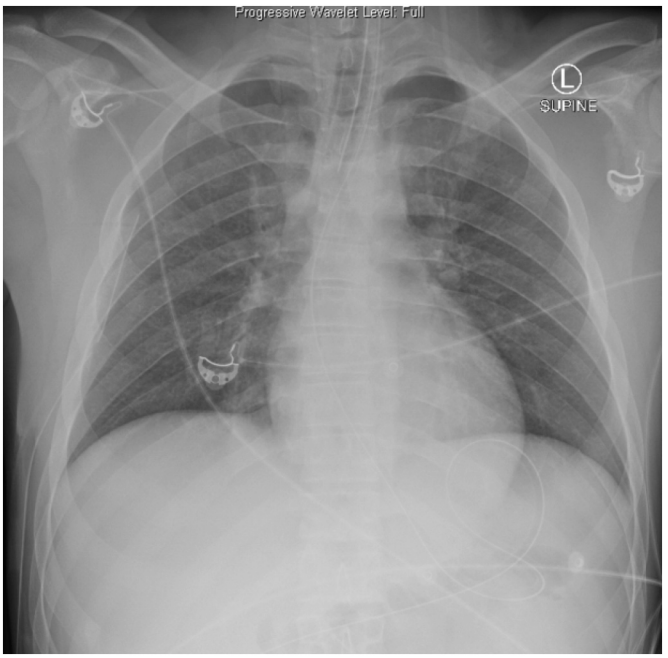

Fig. 1. CXR at time of arrival to our Major Trauma Centre.

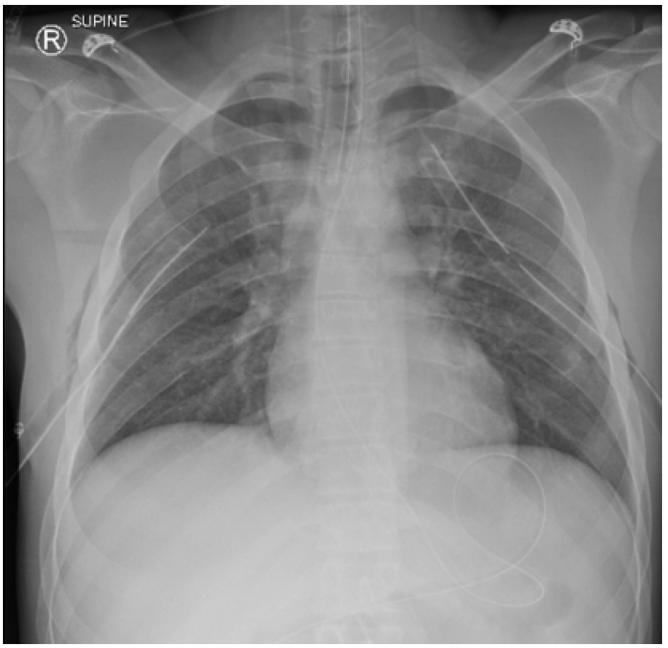

Fig. 2. CXR post right ICC re-insertion, with additional left sided ICC.

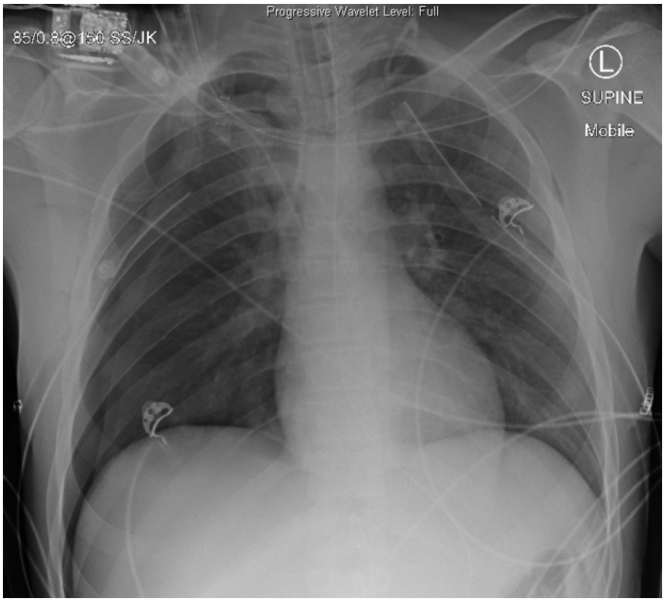

Fig. 3. CXR day 2 post right ICC re-insertion, demonstrating a right sided pneumothorax.

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Declaration of competing interest

None.

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