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# Trauma Case Reports

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## Case Report

# An impressive case of isolated thoracic impalement

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## ABSTRACT

**Case:** A 61-year-old male construction worker was admitted to our Emergency Department due to being impaled in the chest after fall onto the long pole of his cement mixer. He was promptly scanned through the CT then transferred to theatre where unique technique for intubation was utilised prior to performing a Video Assisted Thoracoscopic Surgery exploration and extraction of the foreign object.

**Discussion:** Impalement injuries are classified into Types I or II depending on the direction of movement of the human body in relation to the foreign object. There currently is no consensus on the best management of chest wall injuries involving impalements. Our case utilised Video Assisted Thoracoscopic Surgery as the dominant method of intervention together with highly skilled anaesthetic preparation.

**Conclusion:** The combined expert anaesthetic and surgical approach utilised collectively had a role in ensuring the best possible outcome for the patient.

## Case report

A 61-year-old male construction worker was admitted to our emergency department after falling from the staircase and landing on his back on a long cement mixer which impaled him completely. The metal rod penetrated his lower back, ending inside the left supraclavicular fossa. On arrival, he was alert but hypotensive and tachycardic with borderline hemodynamic stability sufficient for immediate imaging. Computed tomography scan (CT) revealed the metal pole had entered the chest cavity at level of 9th intercostal space, fracturing ribs 9 and 10, penetrating the lung parenchyma and exiting in the thoracic inlet 0.5 cm posterior to the subclavian vessels (Fig. 1). A large haemopneumothorax was also present. The patient was urgently taken to the operating room where a chest drain was immediately inserted as a first step, to decompress the hemopneumothorax and to allow lung re-expansion before inducing anaesthesia. Whilst semi-prone, the patient was intubated with double lumen endotracheal tube, enabling avoidance of any possible manipulation of the metal pole (Fig. 2).

We utilised Video-Assisted Thoracoscopic Surgery (VATS) as the primary approach to explore the pleural cavity (Fig. 3). There was no evidence of active bleeding at either the intercostal site nor in the apical aspect. The long spear had transfixed both upper and lower lobes causing deep parenchymal lacerations. The mixer was slowly retracted and removed from the intrathoracic cavity under direct thoracoscopic vision. Further active bleeding was not observed and only four total lung penetration points were identified. PDS 4.0 sutures were used to repair the small lacerations in standard figure of U technique while the two larger lacerations were repaired with

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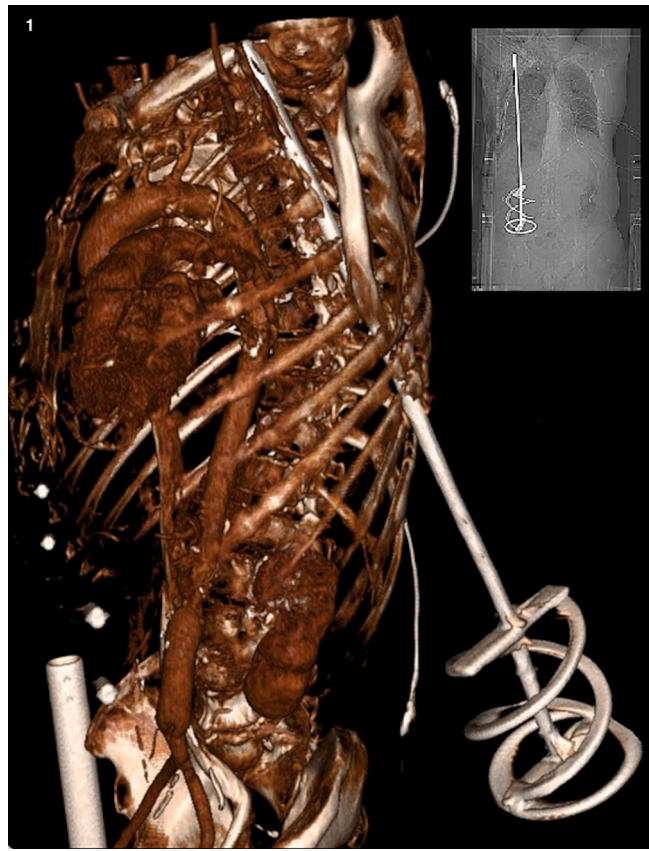


Fig. 1. 3D and 2D CT images showing penetrating insertion and exit point.

PDS 4.0 in continuous sutures. After washing the pleural cavity, haemostasis and pneumostasis was obtained. The patient was discharged home uneventfully after 5 days.

## Discussion

Impalement injuries are classified into Type I and Type II [4]. A moving human body being impaled with a stationary object such as collisions with a protruding object or falling from a height onto a sharp object encompasses Type I [4]. In contrast, stabbings encompass Type II classification as it involves impaling a stationary body [4]. Scant literature in management of impalement injuries can be explained by the overall low prevalence of thoracic impalement injuries [1–3,5,6].

The traditional first line management of thoracic impalement injuries has long been through sternotomy or thoracotomy approach [1]. Although the scarcity of these cases has prevented development of a standard consensus or guideline on the initial surgical strategy [2,3,5,6]. In a limited number of published cases, VATS was chosen over sternotomy or thoracotomy as the surgical approach [7]. In addition to full visualisation of the thoracic cavity, it also enables minimal disruption to the impaled object [8]. Further measures to prevent object manipulation include the use of semi-prone intubation method. Despite literature describing a 35 % reduction in laryngoscopic view, our anaesthetist successfully secured the airway, ensuring the additional success of removing the object with minimal disruption. This technique was only accomplished by an experienced anaesthetist who was confident in the procedure.

Our paper presents a complete VATS approach to a complex thoracic trauma presentation. A prompt tailored and highly skilled multidisciplinary approach was utilised to reduce time to theatre and ensure safe intubation. A stable haemodynamic status supported the surgical choice of a VATS approach. The thoracoscope provided visual superiority compared to the standard thoracotomy approach as full view of the apex and termination point of the pole were obtained.



**Fig. 2.** Patient in the lateral decubitus position for intubation. following drain chest drain insertion

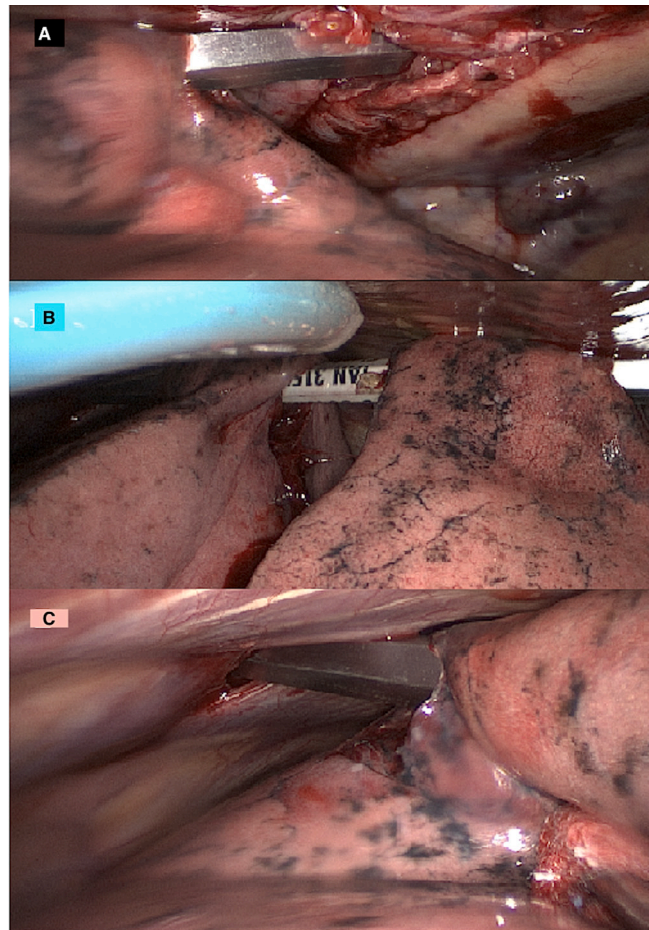


Fig. 3. Video-Thoracoscopic images of impaled upper and lower lobes.

## Conclusion

The combined expert anaesthetic and surgical approach in this case involving early chest drain insertion, lateral decubitus intubation and minimally invasive approach collectively had a role in ensuring the best possible patient outcome.

## Declaration of competing interest

The authors have no conflicts of interest to declare that may inappropriately bias our work. No funding was received for this work.

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