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Case Report

Anaesthesia Section

Unmasking the Silent Bleed: Subclavian Artery Puncture and Mediastinal Haematoma during Minimally Invasive Oesophagectomy

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ABSTRACT

Video-Assisted Thoracoscopic Oesophagectomy (VATS-E) is a minimally invasive procedure increasingly used for managing oesophageal cancer due to its reduced postoperative morbidity and shorter recovery times. However, it is not without risks, particularly in the perioperative management of patients requiring central venous access. Complications associated with central line placement, such as vascular injuries, can lead to significant morbidity, including rare but life-threatening conditions like mediastinal haematomas. This case report presents an unusual complication encountered during VATS-E. During the insertion of a subclavian central venous line, an inadvertent puncture of the subclavian artery occurred, resulting in the formation of a large mediastinal haematoma. The patient exhibited symptoms of haemodynamic instability, including tachycardia and hypotension, which necessitated urgent intervention. Advanced imaging revealed a localised haematoma compressing mediastinal structures. Management of this critical situation required a multidisciplinary approach involving thoracic surgeons, anaesthesiologists, and interventional radiologists. The haematoma was managed conservatively with continuous haemodynamic monitoring while ensuring that no further vascular compromise or compression occurred. The patient recovered without requiring surgical evacuation of the haematoma, highlighting the potential for non-operative management in selected cases. This report underscores the importance of prompt diagnosis, careful assessment, and collaborative management in addressing such rare complications. By sharing this case, we aim to raise awareness of this potential risk and emphasise strategies to mitigate complications during central line placement in patients undergoing oesophagectomy.

Keywords: Blood vessel injuries, Central venous catheterisation, Intraoperative complications, Postoperative care, Vascular system injuries

CASE REPORT

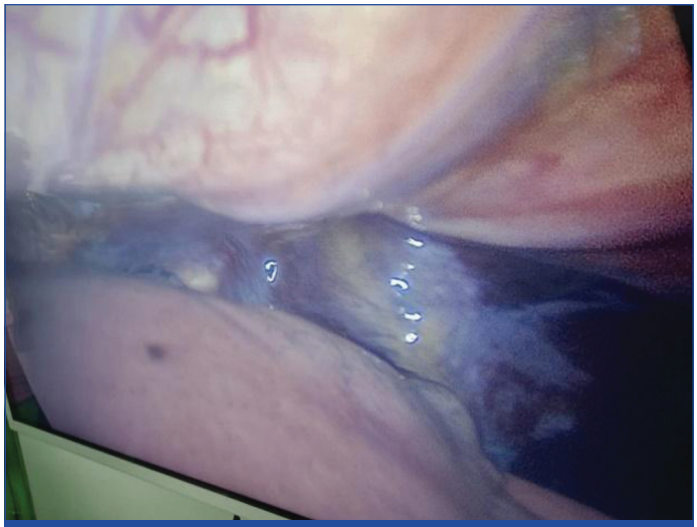
A 36-year-old female case of squamous cell carcinoma of the oesophagus presented with a complaint of dysphagia for one month and was scheduled for video-assisted thoracoscopic surgery for the resection of the tumour and anastomosis. She had no other comorbidities. Comprehensive preoperative investigations were conducted to evaluate the extent of the disease and assess her fitness for surgery.

These investigations included a complete blood count, which showed a haemoglobin level of 12.6 g/dL, a total leukocyte count of 7090 cells/cumm, and a platelet count of 159,000 cells/cumm. The coagulation profile indicated a prothrombin time of 14.1 seconds and an international normalised ratio of 1.04. Consent for anaesthetic management and surgery was obtained the day before the procedure. The patient was premedicated with Tab. Pantoprazole 40 mg and Tab. Alprazolam 0.25 mg.

Upon arrival in the operating theatre, baseline monitors were attached. The patient was induced using Inj. Propofol 2 mg/kg of body weight, Inj. Fentanyl 2 mcg/kg for analgesia, and Inj. Vecuronium 0.1 mg/kg for muscle relaxation. After ventilating for three minutes, a 35 Fr left-sided double lumen tube was used to intubate the trachea. The position of the tube was confirmed using both auscultation and fibreoptic video laryngoscopy methods.

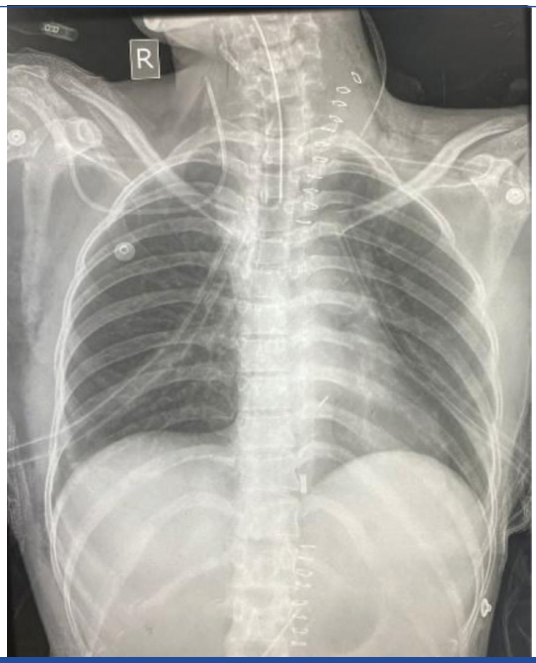
In light of one-lung ventilation, invasive blood pressure monitoring was established for beat-to-beat monitoring and serial blood gas analysis. The surgical team deemed central venous access necessary for perioperative monitoring and interventions. The right subclavian vein was chosen for catheterisation due to its ease of insertion. Catheterisation was attempted via an infraclavicular approach. Soon after the backflow on pricking, the syringe was detached from the needle to insert the guidewire, and a high-pressure pulsatile flow was observed from the needle. The needle was immediately removed. The needle was reinserted a second time under the guidance of real-time ultrasonography, and the central vein was catheterised successfully. Anaesthesia was maintained using a combination of oxygen, nitrous oxide, isoflurane, and intermittent doses of vecuronium. Once the lines were placed, the patient was positioned in the left lateral position, and the right lung was collapsed. An incision was made, and ports were placed.

When dissection began, a mediastinal haematoma was observed [Table/Fig-1]. The primary challenge was the need for further dissection of the pleura to access and resect the oesophagus, especially given the uncertainty surrounding the status of the arterial bleed. The critical question was whether effective haemostasis had been achieved, allowing the surgery to proceed safely, or if the observed cessation of bleeding was due to a tamponade effect, which could mask ongoing arterial bleeding. After monitoring the situation for a few minutes and consulting with the relevant doctors, we proceeded with the dissection. Upon further exploration, we discovered that there was only collected blood in the mediastinum, indicating that active bleeding had ceased [Table/Fig-2]. The rest of the surgery was uneventful. Once the procedure was completed, the patient was shifted to the postoperative ward. A postoperative chest X-ray was performed to rule out any collections or undetected blood trickling, and the results were normal [Table/Fig-3]. The patient remained haemodynamically stable throughout the postoperative period, with no signs of recurrent bleeding or vascular compromise. The patient was gradually transitioned to oral feeding without any issues related to anastomotic healing. Pain was well controlled with oral analgesics, and there were no signs of respiratory distress or infection. After an uneventful recovery, the patient was discharged in stable condition with appropriate postoperative care instructions and scheduled follow-up appointments to monitor long-term outcomes.



[Table/Fig-1]: Mediastinal haematoma being visualised when the thoracoscopic ports were inserted for dissection.

[Table/Fig-2]: Following the dissection of the mediastinum, collected blood was observed oozing out.



[Table/Fig-3]: Postoperative chest X-ray showing normal lung fields.

DISCUSSION

This study reports a rare but significant complication during VATS-E—a mediastinal haematoma resulting from an inadvertent subclavian artery puncture during central venous catheterisation. Despite concerns about active bleeding, the haematoma remained stable intraoperatively and postoperatively, likely due to a tamponade effect. The patient's haemodynamic stability supported a conservative approach, avoiding the need for surgical evacuation. This case highlights two key clinical considerations: the value of intraoperative assessment in managing vascular injuries and the potential for non-operative management in select patients.

Similar to our case, Alon MH described a subclavian artery puncture leading to a mediastinal haematoma that was also managed conservatively due to the patient's stability and lack of ongoing bleeding [1]. In contrast, Kim JH et al., reported a case of arterial injury that required endovascular repair due to persistent bleeding and haemodynamic compromise [2]. These comparisons emphasise that haemodynamic status is a critical factor in deciding between surgical and non-surgical management. In both our case and Alon's case, the tamponade of the haematoma appeared to play a protective role, while Kim's case lacked this containment effect [1].

The initial complication in our case occurred during an unguided subclavian vein catheterisation attempt. Zhou YH et al., found that non-ultrasound-guided catheterisations were significantly associated with an increased risk of arterial puncture, a finding echoed by Tse A et al., who showed that ultrasound guidance reduces the incidence of such mechanical complications [3,4]. Our experience aligns with these findings—the second, ultrasound-guided attempt was successful, while the blind attempt led to the arterial injury. These data support the routine use of real-time ultrasound guidance to prevent iatrogenic vascular injuries during central line placement.

Site selection for central venous access also played a role in this complication. Timsit JF identified the subclavian vein as having a lower infection risk but higher mechanical complication rates compared to other access sites, a trade-off relevant in our case [5]. While subclavian access is often preferred for long-term use and infection prevention, this case reinforces the need to balance those benefits against potential procedural risks, especially in high-stakes surgical settings like VATS-E.

Finally, our case and the supporting literature underline the importance of early recognition and multidisciplinary management in vascular injuries. McGee DC et al., stressed that complications such as arterial puncture, haematoma, and pneumothorax are more common without ultrasound guidance, advocating for its routine use [6]. The current case supports that recommendation and further illustrates that intraoperative decision-making—especially by a team that includes anaesthesiologists, thoracic surgeons, and interventional radiologists—can enable safe, non-operative management of complex vascular complications when patients remain stable.

CONCLUSION(S)

This case underscores the critical importance of using real-time ultrasound guidance during central venous catheterisation to minimise the risk of complications such as inadvertent arterial puncture and mediastinal haematoma. Early recognition of vascular injuries, combined with vigilant intraoperative monitoring and a multidisciplinary approach, was pivotal in achieving a favorable outcome for this patient. The key inference from this study is that most mediastinal haematomas resulting from vascular injuries can be managed conservatively if haemodynamic stability is maintained. However, the potential for life-threatening complications, including ongoing arterial bleeding, necessitates careful assessment and individualised management strategies.

Incorporating advanced imaging techniques and adopting a team-based approach enhances safety and improves outcomes in similar high-risk scenarios. This report highlights the need for further studies to establish standardised protocols for the prevention and management of mediastinal haematomas, particularly during thoracic procedures like video-assisted thoracoscopic surgery.

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