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# HAEMORRHAGIC SHOCK IN A PREGNANT PATIENT AND THE UNSUSPICIOUS SUBCLAVIAN CATHETER

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## ABSTRACT

*Introduction:* Central venous catheterisation (CVC) is a commonly performed procedure in clinical practice. Although usually safe, complications can arise such inadvertent vascular lesion. This report is of a case of left brachiocephalic vascular lesion due to a subclavian catheter, thus raising awareness about this potential complication, which is not always immediately recognised.

*Case report:* We report the case of a 31-year-old healthy woman, 42 weeks pregnant, who presented with complications during an elective caesarean section. The patient experienced haemorrhagic shock due to the incomplete rupture of the left ovarian pedicle, further complicated by the accidental lesion of the left brachiocephalic vein caused by the tip of a right subclavian catheter, aggravated by the late discovery only after extubation. This case highlights the importance of patient selection, proper technique and the careful monitoring pre- and post-procedure.

*Conclusion:* Brachiocephalic vein lesions arising from CVC insertions are rare but significant complications that require timely recognition and intervention.

## KEYWORDS

Central venous catheterisation, brachiocephalic vein

## LEARNING POINTS

- Although uncommon, vascular lesions from central venous catheter insertion can occur so post-procedural monitoring and follow-up are very important.
- Computed tomography angiography is a useful diagnostic tool.
- Many vascular injuries related to central venous catheter insertion can have a delayed presentation.

## INTRODUCTION

Central venous catheterisation (CVC) is cornerstone in the intensive care unit (ICU). The indications include haemodynamic monitoring, intravenous drug therapy, parenteral nutrition, rapid fluid administration and extracorporeal therapy[1]. Subclavian CVC is a valuable procedure in modern day medical practice but is not risk-free, with potential complications such as infection,

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thrombosis, vascular injury, pneumothorax, air embolism and catheter malposition[1].

We would like to underline that vascular injury due to CVC insertion is not always easily recognised, and catheter tip location appears to be a risk factor.

## CASE DESCRIPTION

A 31-year-old, healthy, pregnant woman, 42 weeks in gestation, was admitted to the Obstetrics and Gynaecology department for an elective caesarean section. The patient had an uneventful pregnancy without any significant medical or surgical history. During the surgical procedure, an experienced obstetrician performed a low transverse incision and successfully delivered a healthy baby. Twelve hours postpartum, the patient experienced a sudden onset of severe lower abdominal pain and signs of shock, including a Glasgow coma score of 11, diaphoresis, hypotension (blood pressure 73/46 mmHg), tachycardia (heart rate 123 bpm) and polypnea. Abdominal examination revealed diffuse abdominal tenderness and guarding. Arterial blood gas analysis demonstrated a significant drop in haemoglobin levels (to 5g/dl). An immediate bedside ultrasound disclosed a large amount of free fluid in the pelvis and a haematoma around the left ovary. Immediate resuscitation manoeuvres were initiated, including insertion of a central line into the right subclavian vein and the administration of intravenous fluids, blood products and vasopressors to restore haemodynamic stability. An emergency laparotomy identified an incomplete ruptured left ovarian pedicle, leading to significant intra-abdominal haemorrhage. The surgical team performed a left salpingo-oophorectomy to control bleeding and prevent further complications.

Postoperatively, the patient was transferred to the ICU for monitoring and comprehensive management of any potential complications. She underwent a chest X-ray that ruled out pneumothorax or haemothorax but revealed the CVC tip in close proximity to the vessel wall. The patient's condition steadily improved, and she was subsequently weaned off vasopressor support. Five days post-surgery she was extubated, however soon after extubation she developed chest pain radiating towards the left shoulder blade together with dyspnoea, increasingly laboured breathing followed by desaturation. Given the patient's critical condition, an advanced airway was secured to ensure adequate oxygenation and ventilation. An immediate pulmonary echography excluded pneumothorax and echocardiography, and showed no signs of cardiac tamponade, pressure or volume overload over the right ventricle; cardiac function was good. The patient's telemetry monitoring did not indicate signs of myocardial ischaemia, and this was further confirmed by the results of the twelve-lead electrocardiography. A thoracic computed tomographic angiography was performed, which confirmed the presence of extravasated contrast within the superior mediastinum *(Fig. 1)*, raising the possibility of a vascular injury related to CVC insertion. Considering the complexity of the situation and potential risks involved in catheter removal, the interventional radiology team was consulted and decided to perform a phlebography. This procedure effectively confirmed the presence of contrast extravasation into the mediastinum and the lesion in the left brachiocephalic vein *(Fig. 2)*. The CVC was safely removed by interventional radiology, and no bleeding complications were observed. The patient underwent successful extubation 48 hours following the catheter removal.

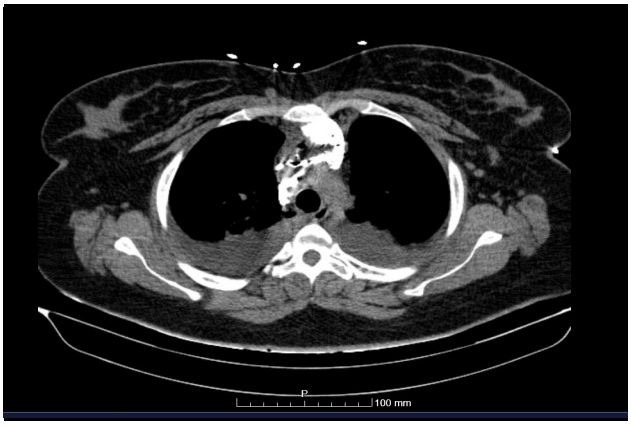



*Figure 1. Contrast medium extravasated into the mediastinum.*



*Figure 2. Phlebography confirming catheter tip perforation of left brachiocephalic vein.*

## DISCUSSION

Central venous line placement is a common procedure undertaken by ICU physicians, anaesthesiologists or emergency room teams. Complications related to the procedure are well documented in literature, but venous rupture and arterial puncture has been reported in less than 1% of cases[2-4]. Beyond instrumentation risk factors, other elements such as large-sized, poor quality and rigid catheters as well as catheters with a free tip are also risk factors for venous perforation[3,4]. In our case, the patient was admitted to ICU for haemorrhagic shock due to partial section of the left ovarian pedicle and underwent an emergent left salpingo-oophorectomy. Prior to the patient's admission to the ICU, a right subclavian CVC had already been inserted. A routine control chest radiography was

performed which appeared normal, but it did reveal that the catheter tip was adjacent to the vessel wall. The lack of common complications, such as pneumothorax, and a seemingly normal chest X-ray led us underestimate the possibility of late complications and to become complacent in post-procedure monitoring. Chest radiography can provide valuable insights into the lungs, heart and surrounding structures. However, it may not always detect minor vascular injuries with clarity. The significance of this case lies in the reminder that sometimes there is a tendency to focus solely on one problem, inadvertently overlooking potential complications in other areas. It serves as a valuable lesson to remain vigilant and comprehensive in assessments. Perforation of the superior vein is a rare occurrence and is now recognised as a complication often linked to this procedure, primarily due to forcefully advancing the dilator. Most individuals experiencing this complication develop symptoms within the initial 24 hours. However, in this case, we cannot entirely dismiss the possibility of a correlation between the catheter tip's location and the vascular rupture, due to the unique presentation. Additionally, the patient's haemodynamic status improved during their hospital stay, and the catheter itself did not exhibit any signs of malfunction or displacement.

This event has prompted us to make significant changes in our CVC protocol. As part of these revisions, it is now highly recommended to position the catheter tip in a central location. By doing this we aim to maximise the safety and effectiveness of the procedure.

## CONCLUSION

This case highlights the importance of effective teamwork, prompt recognition of complications and the ability to adapt management strategies in complex surgical scenarios. It also emphasises the significance of a multidisciplinary approach to ensure the best possible outcome.

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