Arteriovenous fistula formation after central venous catheterisation

Michael Omar,¹ William Kogler,² Christopher Izzo,² Lisa Jones³

¹Internal Medicine, University of Florida College of Medicine - Jacksonville, Jacksonville, Florida, USA

²University of Florida College of Medicine - Jacksonville, Jacksonville, Florida, USA

³Critical Care Medicine, UF Health Jacksonville, Jacksonville, Florida, USA

Correspondence to

Dr Michael Omar,
mike.b.omar@gmail.com

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DESCRIPTION

A 66-year-old woman, in septic shock due to pneumonia, was transferred to the intensive care unit with a central venous catheter in the right internal jugular vein. The catheterisation procedure had been documented as uncomplicated. Serial chest radiographs demonstrated proper radiographic positioning of the central line without crossing of the midline and with the tip located at the junction of the superior vena cava and right atrium. The central venous catheter was removed 2 days later, and approximately 6 hours after removal, the patient developed a dense left-sided hemiparesis. CT with angiography of the head and neck showed a right middle cerebral artery territory infarct with an occlusive thrombus in the first branch of the right middle cerebral artery. Furthermore, an arteriovenous fistula was noted between the right internal jugular vein and the right common carotid artery (figure 1), which was also noted on point-of-care neck ultrasound (figure 2).

Central venous catheterisation is frequently performed without complication, especially with the advent of ultrasound guidance as the standard of care. Yet, a myriad of vascular complications is still possible. Regarding internal jugular vein access in particular, iatrogenic injury to the carotid, vertebral and superior thyroid arteries have been reported.¹ Consequences include acute or delayed atherosclerotic thromboembolism, haematoma formation, pseudoaneurysms, dissections or fistulae.^{2,3}

Figure 1 CT angiography of the neck showing the arteriovenous fistula (arrow) of the right common carotid artery and right internal jugular vein in coronal view.

Figure 2 Point-of-care neck ultrasonography with colour Doppler showing the arteriovenous fistula (arrow) of the right common carotid artery (CC) and right internal jugular vein (IJV).

Traditional management of iatrogenic arterial injury involves immediate removal of instruments and compression to the puncture site.⁴ However, practitioners must be aware that this technique does not always prevent the aforementioned complications from occurring. While arterial dilation or catheterisation dramatically increases the risks,

Patient's perspective

The patient stated, 'it's just sad.' The patient's daughter stated 'We knew she was very sick to start with. It's sad that the (central) line caused all of this. She is a fighter and we will pray that she will live. If she gets better she will come live with us and I will stay home to help her.'

Learning points

- ▶ Iatrogenic arterial injury during central venous catheterisation is not an innocuous complication, and candid documentation should be encouraged.
- ▶ Traditional management by instrument removal and compression may not reliably prevent vascular sequelae.
- ▶ If there is suspected arterial injury during central line placement, consider postponing planned procedures for routine neuro-observation and obtaining neck ultrasonography or even angiography for early detection of life-threatening complications.

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devastating consequences may occur with merely needle injury during the procedure.^{2 3}

In patient with suspected iatrogenic arterial injury, non-invasive investigations such as ultrasonography may provide a rapid yet safe means of detecting arterial complications with the next step being CT or conventional angiography. Additionally, planned procedures should be postponed, and patients should be monitored for thromboembolic phenomena. In cases of large-calibre catheter injury, experts have even recommended that the catheter be left in-situ pending an urgent surgical or endovascular approach for removal and repair.⁵

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