

Inadvertent Carotid Artery Cannulation During Ultrasound Guided Central Venous Catheterization

To the Editor:

A 59-year-old man presented to the emergency department (ED) with fever and altered mental status. His medical history included injection drug use and Hepatitis C. The vital signs were blood pressure 140/90, pulse 120, respirations 32, rectal temperature 38.7°C (101.6°F) and oxygen saturation of 98% on room air. Two attempts at intravenous access were unsuccessful, and internal jugular central venous catheterization was attempted for fluid resuscitation, antibiotic administration, and hemodynamic monitoring.

The patient was placed in Trendelenburg position and the left neck prepped and draped in sterile fashion. The internal jugular vein was visualized just superficial to the carotid artery using a 10-5 MHz linear transducer oriented in the transverse plane. The introducer needle was advanced using real time ultrasound guidance and dark, non-pulsatile blood was aspirated. The ultrasound transducer was removed, the guidewire was advanced without resistance, and a triple lumen catheter was inserted.

The patient's laboratory results showed a WBC of 23.9 with 46% bands, a platelet count of 126, an international normalized ratio of 1.9, a lactic acid of 10.2, creatinine of 1.9, and a troponin of 12.7. A non-contrast computed tomographic scan of the brain demonstrated 2 separate intraparenchymal hemorrhages at the grey white junction in the right frontal lobe and left frontoparietal junction.

Antibiotics were administered without difficulty via the middle port of the catheter. A central venous pressure transduced from the distal port demonstrated an arterial waveform with a pressure of 200/92. Arterial pulsations were visible in the connection tubing. After correction of the patient's elevated INR, the vascular surgery service removed the catheter and applied direct pressure. We observed no complications related to the arterial cannulation, but on day 2 the patient suffered a large territory ischemic stroke on the opposite side of the catheter insertion. After discussion with family, the admitting team discontinued ventilatory support and the patient expired.

Widely recognized as a means of increasing success and decreasing procedural complications during central venous catheterization,^{1,2} real time ultrasound guidance enables visualization of the target vein and the adjacent arterial structures. Carotid artery puncture and inadvertent cannulation has been described during attempts at internal jugular central venous catheterization using the landmark technique.³ This case describes a previously unreported complication of carotid artery cannulation during real time ultrasound guidance for central venous catheterization. Review of the ultrasound images documented in this case revealed 100% overlap of the carotid artery by the internal jugular vein. Given that dark,

non-pulsatile blood was aspirated on the first attempt, we propose that the introducer needle was initially placed in the internal jugular vein, and then inadvertently advanced into the common carotid artery after syringe removal and prior to guidewire insertion. The proximal portion of the catheter may have traversed the internal jugular vein, as the antibiotics were infused without resistance through the middle port without any external signs of infiltration. Previous research has demonstrated the ability to visualize guidewire placement using ultrasound.⁴ Ultrasound visualization of the guidewire prior to dilation and insertion of the catheter may help prevent this previously unreported complication.

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Ultrasonographic Guidance for all Central Venous Catheter Insertions: A “Desirable Practice Alternative,” or the New Standard of Care?

To the Editor:

We commend Leung et al for their randomized prospective study involving 13 physicians who performed 130 internal jugular central line insertions, demonstrating the value of ultrasonography as an adjunct to central line placement.¹ At the same time, we are disappointed by the less than ringing endorsement in the editorial commentary by Sabbaj and Hedges, suggesting that “it is premature to universally accept the technique as the ‘new standard of care.’”²

In fact, the use of ultrasonography at our institution is already considered the “new standard of care” to such an extent that, for ethical reasons, we would not even have been permitted to do this study at our hospital. Shortly after the Agency for Healthcare Research and Quality guidelines were released in