

Identification and correction of guide wire malposition during internal jugular cannulation with ultrasound

Michael B. Stone, MD, RDMS

ABSTRACT

Real-time ultrasound guidance for central venous catheterization increases success and reduces procedural complications. I describe a case in which guide wire resistance was encountered and real-time ultrasound visualization of the guide wire facilitated correction of guide wire malposition. No additional passes of the introducer needle were necessary and the chances of inadvertent carotid artery puncture or pneumothorax were therefore reduced. The technique described here may prove valuable when guide wire resistance is encountered while placing a central venous catheter.

Key words: ultrasound, ultrasonography, guidewire, central venous catheterization

RÉSUMÉ

Le guidage par échographie en temps réel de la mise en place d'un cathéter veineux central augmente les chances de réussite et réduit les complications de l'intervention. Je décris un cas au cours duquel le fil-guide a rencontré une résistance et la visualisation par échographie en temps réel du fil-guide a aidé à en corriger le mauvais positionnement. Aucune passe supplémentaire de l'aiguille introductrice n'a été nécessaire, ce qui a donc réduit les risques de perforation par inadvertance de l'artère carotide ou de pneumothorax. La technique décrite ici peut se révéler utile lorsque le fil-guide rencontre une résistance au cours de la mise en place d'un cathéter veineux central.

Introduction

The use of real-time ultrasound guidance for central venous catheterization is rapidly becoming the standard of care, and is widely recognized as a means of increasing success and reducing procedural complications.¹⁻⁴ Specifically, ultrasound guidance reduces the number of attempts, the incidence of arterial puncture and the time to successful venous catheterization. In the neck, ultrasound guidance enables real-time visualization of the target internal jugular vein and the adjacent carotid artery. I describe a

case in which ultrasound visualization of the guide wire identified malposition of the J-tip and directed subsequent correction using real-time visualization of guide wire advancement. This avoided potential repeat attempts at internal jugular cannulation with the associated potential risk of carotid artery puncture.

Case Report

A 50-year-old man was transferred from a nearby skilled nursing facility to our emergency department (ED) for

From the Division of Emergency Medicine, University of Medicine and Dentistry of New Jersey, Newark, NJ

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evaluation of fever. His past medical history included injection drug use, pneumonia and left hemiparesis secondary to hemorrhagic stroke. The patient was obtunded and unable to provide a meaningful history. On examination, his vital signs were: blood pressure 82/58 mm Hg, pulse 130 beats/min and regular, respirations 22 breaths/min, oral temperature 38.7°C and oxygen saturation 91% on room air. We made 2 unsuccessful attempts at peripheral intravenous access and decided to place an internal jugular central venous catheter for resuscitation, antibiotic administration and hemodynamic monitoring.

The patient was placed in the Trendelenburg position and the left anterior neck was prepped and draped in sterile fashion. We identified the internal jugular vein using a Sonosite Titan (Bothell, WA) with a 10–5 MHz linear array transducer oriented in the transverse plane. After injection of local anesthetic, the internal jugular vein was cannulated on the first attempt using ultrasound guidance. The

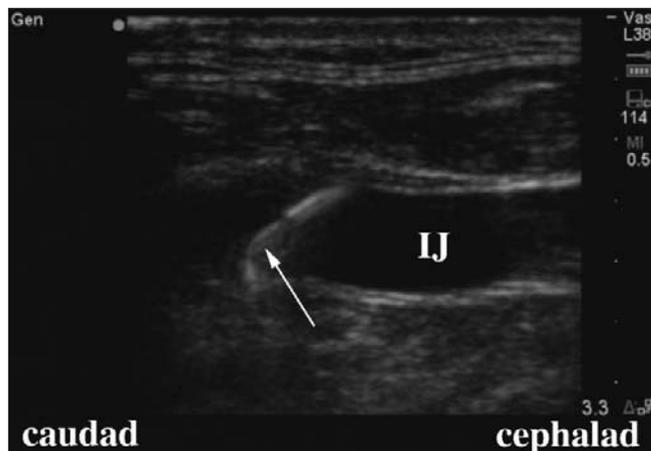


Fig. 1. The guide wire (arrow) is seen indenting the posterior wall of the internal jugular vein (IJ).

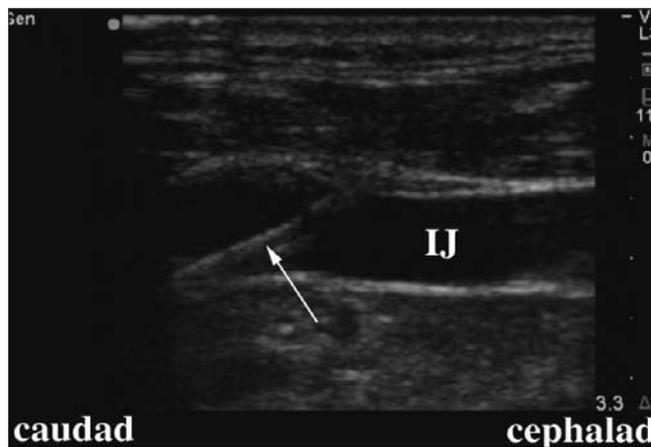


Fig. 2. The guide wire (arrow) is seen advancing caudally into the lumen of the internal jugular vein (IJ).

ultrasound transducer was removed and the physician attempted to introduce the guide wire. Resistance was encountered while attempting to introduce the guide wire and the ultrasound transducer was reapplied in a longitudinal orientation just caudad to the introducer needle.

We visualized the introducer needle entering the internal jugular vein and saw the J-tip of the guide wire indenting the posterior wall of the vein (Fig. 1). During ultrasound visualization, the guide wire was rotated 180 degrees and then easily introduced without resistance. We visualized the guide wire as it advanced caudally into the internal jugular vein (Fig. 2). The remainder of the procedure was completed without incidence using a standard Seldinger technique, and post-procedural radiography confirmed successful catheter placement without evidence of pneumothorax.

This case describes a novel use of real-time ultrasound guidance to direct guide wire advancement during central venous catheterization. The risks of pneumothorax and arterial puncture increase significantly when more than 2 percutaneous punctures are required.⁵ Real-time ultrasound guidance for guide wire advancement, in this patient, facilitated the successful placement of a central venous catheter while obviating the need for additional passes of the introducer needle. This may be a useful technique when resistance to guide wire advancement is encountered.

Competing interests: None declared.

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Correspondence to: Michael B. Stone, Division of Emergency Medicine, University of Medicine and Dentistry of New Jersey, 150 Bergen Street, Newark NJ 07103; drmikestone@gmail.com