

# How Safe Is the Ultrasonographically-Guided Peripheral Internal Jugular Line?

Michael Gottlieb, MD, RDMS\*; Frances M. Russell, MD, RDMS

\*Corresponding Author. E-mail: [MichaelGottliebMD@Gmail.com](mailto:MichaelGottliebMD@Gmail.com), Twitter: @MGottliebMD.

0196-0644/\$-see front matter

Copyright © 2017 by the American College of Emergency Physicians.

<http://dx.doi.org/10.1016/j.annemergmed.2017.08.047>

[Ann Emerg Med. 2017;■:1-6.]

**Editor's Note:** *Emergency physicians must often make decisions about patient management without clear-cut data of sufficient quality to support clinical guidelines or evidence-based reviews. Topics in the Best Available Evidence section must be relevant to emergency physicians, are formally peer reviewed, and must have a sufficient literature base to draw a reasonable conclusion but not such a large literature base that a traditional "evidence-based" review, meta-analysis, or systematic review can be performed.*

## INTRODUCTION

Vascular access is an essential procedure in the emergency department (ED). In patients with difficult intravenous access, alternatives to the traditional blind cannulation should be considered, including cannulation of an external jugular vein, a peripheral vein in the upper or lower extremity with real-time ultrasonographic guidance, or a central vein with ultrasonographic guidance.<sup>1,2</sup> Intraosseous lines and venous cutdowns may also be considered for unstable patients.<sup>3</sup> However, even with ultrasonographic guidance, peripheral venous cannulation may be unsuccessful and central venous cannulation is both time consuming and associated with potential complications, including infection, thrombosis, pneumothorax, and arterial injury.<sup>4-6</sup>

The peripheral internal jugular line is another option for vascular access that was originally described in 2009.<sup>7</sup> This procedure involves placement of a single-lumen peripheral catheter into the internal jugular vein, using real-time ultrasonographic guidance. The peripheral internal jugular may be safe, quickly placed, and obviate the need for central line placement in patients with difficult intravenous access. However, it is important to ensure that this technique is safe and reliable before routine clinical application. The objective of this article is to provide a summary of the current evidence about the efficacy and safety of placing ultrasonographically-guided peripheral internal jugular venous lines.

## SEARCH STRATEGY

A PubMed search from 1946 to June 19, 2017, was performed with the key words "peripheral" and "internal jugular," with no limitations. The search yielded 414 results. Bibliographic references found in all relevant articles were examined to identify additional pertinent literature. Citations were independently reviewed by both authors. Only original, published, primary research articles assessing the safety of ultrasonographically-guided peripheral internal jugular line placement in human beings were included. Isolated case reports without outcomes were excluded. We identified 5 original research articles that directly addressed our study question.

## ARTICLE SUMMARIES

### Zwank<sup>8</sup>

This study assessed the feasibility and safety of the peripheral internal jugular line in 9 patients with difficult intravenous access. The study was conducted at one academic center. Patients were identified by nurses and included in the study if they had difficult intravenous access and needed vascular access for a maximum of 72 hours. Exclusion criteria included patients who needed immediate (emergency) intravenous access or had a contraindication to using the right internal jugular vein for intravenous access. The ultrasonographically-guided procedures were performed by 1 of 4 investigators. Sonographers used a 10-MHz linear transducer to locate the right internal jugular vein in longitudinal or transverse orientation. Patients were placed in the Trendelenburg position, skin was prepped with chlorhexidine solution, a bio-occlusive dressing was placed over the ultrasonographic transducer, and sterile ultrasonographic gel was used. Local anesthesia was injected at the site of insertion before the procedure. An 18-gauge, 6.35-cm catheter (either Spring-Wire Guide Introducer Catheter Assembly [Arrow International, Redding, PA] or B Braun Angiocath [B Braun Medical, Bethlehem, PA]) was inserted until a flash of blood was achieved. At this point, the catheter was advanced over the

needle. Proper placement was confirmed by drawing blood and easily flushing saline solution.

Nine patients were enrolled by the authors, with a mean body mass index (BMI) of 34.4 kg/m<sup>2</sup>. All 9 patients (100%) had successful catheter insertion on the first attempt. It took an average of 5.5 minutes to insert the peripheral internal jugular line. Two catheters (22%) failed within the first 72 hours because of catheter kinking. Both catheter failures occurred with the Arrow Spring-Wire Guide catheters. Patients were followed for 1 year through chart review to assess for catheter-associated complications, defined as deep venous thrombosis, bacteremia, endocarditis, or pneumothorax. No patients had an adverse event at 1 year.

This study had several limitations, including the use of a small convenience sample of patients, unclear training and experience of the operators, and limited discussion of the failed lines with respect to associated line infiltration. Additionally, the follow-up was performed by chart review, with no discussion of how the review was performed. It is possible that some complications were missed with this methodology.

The author suggested that placing a catheter into the internal jugular vein is not significantly different from placing a catheter into any other vein, but that future studies should examine the safety of this procedure before routine application.

#### **Teismann et al<sup>9</sup>**

This study was a prospective case series assessing the feasibility of the peripheral internal jugular catheter in 9 patients with difficult intravenous access. The study was conducted at one academic center over a 1 year period. Patients were included in the study if they needed vascular access and had failed attempts at intravenous access by both nursing staff and a physician. Exclusion criteria included stable patients who were likely to require central line access for central venous pressure monitoring or medication administration. Ultrasonographically-guided peripheral internal jugular lines were placed by 1 of 6 investigators. Two were senior emergency medicine residents, 2 were ultrasonographic fellows, and 2 were attending physicians with expertise in ultrasonographically-guided procedures. Patients were placed in the Trendelenburg position with their heads turned away from the probe. Sonographers used a 10- to 13-MHz linear transducer to locate the internal jugular vein. Sonographers preferred an out-of-plane technique for catheter insertion and an in-plane technique for confirmation. Skin was prepped with chlorhexidine solution, a sterile cover was placed over the ultrasonographic transducer, sterile gel was applied to the

patient's skin, and sonographers used sterile gloves. In awake patients, subcutaneous lidocaine was injected before the procedure at the intended site of catheter insertion. In most patients, an 18-gauge, 6.35-cm Introcan Safety catheter (B Braun Medical, Melsungen, Germany) was inserted. In 2 of the patients who were unstable, a 14-gauge, 5.1-cm catheter was used instead of the 18-gauge catheter. Proper placement was confirmed by aspiration of venous blood and visualization of the catheter in the vein on ultrasonography.

Nine patients were enrolled, with all 9 (100%) having a successful catheter insertion. The peripheral internal jugular line was completed in 2.5 to 7 minutes. No initial complications were identified. Patients were then followed up at 1 week, either in person or by telephone, to assess for adverse events related to catheter insertion. Seven of 9 patients (78%) completed the follow-up and none of them had any complications at 1 week, defined as fever, chills, neck pain, neck stiffness, soft tissue swelling, or pain at the site of catheter entry.

This study was limited by the small convenience sample. Additionally, 8 of 9 peripheral internal jugular lines were removed in the ED, limiting the applicability to lines placed for more prolonged periods. The evaluation of complications was also limited because there was no definition for the initial complications and 1-week follow-up was available for only 7 patients and restricted to symptoms. It is possible that other complications (eg, occult pneumothorax or endocarditis) was missed.

The authors suggested that the peripheral internal jugular line is rapidly performed, well tolerated, and safe. They suggested that this procedure may benefit unstable patients who need immediate access, as well as stable ones with difficult intravenous access. However, they also emphasized that this line is a temporary solution and is not recommended as definitive access.

#### **Butterfield et al<sup>10</sup>**

This was a prospective, observational study of ICU or general medical floor patients with difficult or failed peripheral intravenous access who had a peripheral internal jugular line placed. Difficult access was defined as 2 or more failed attempts at peripheral intravenous line placement by experienced nursing staff. Patients were placed in the Trendelenburg position. Sonographers used a 10- to 13-MHz linear transducer to locate the internal jugular vein. Chlorhexidine solution was used to clean the neck. A sterile probe cover and sterile ultrasonographic gel were used for the ultrasonographic transducer. All patients underwent ultrasonographically-guided placement of an 18-gauge, 6.35-cm angiocatheter (Surflo catheters; Terumo, Somerset,

Download English Version:

<https://daneshyari.com/en/article/8718086>

Download Persian Version:

<https://daneshyari.com/article/8718086>

[Daneshyari.com](https://daneshyari.com)