

Anesthesiology 2007; 107:357

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Ultrasound Guidance for Peripheral Venous Access

To the Editor:—I read the letter by Dr. Stone with keen interest.¹ I have three concerns about the technique the author describes.

First, the author defines two attempts as a criterion for labeling difficult venous access, which may not be true. This is subjective, because the procedure may be performed by junior staff or there may be a bias effect because the operator knows that if two attempts fail, an ultrasound-guided technique will be used. Therefore, I question the validity of this study.

Second, a spring wire guide/catheter over needle assembly, used for arterial catheterization in place of ordinary venous catheterization, is expensive. An ordinary venous catheter is much less expensive as compared with a venous catheter along with an arterial catheterization set. In extreme cases, it may be acceptable to waste one arterial line set, but it may not be a good economical, evidence-based technique.

Third, for this technique you need another person for assistance, which is not usually available in the day surgery theater. Therefore, the

technique would not be very practical in difficult venous access management.

I think the author did not test the technique in just the population in which it could be useful: those with recognized difficult venous access. Until the technique is tested in that population, I do not think it will gain acceptance in our anesthetic practice.

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1. Stone BA: Ultrasound guidance for peripheral venous access: A simplified Seldinger technique. *ANESTHESIOLOGY* 2007; 106:195

(Accepted for publication April 23, 2007.)

Anesthesiology 2007; 107:357

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In Reply:—Thank you for your interest in ultrasound-guided peripheral venous access. My intent in reporting this series¹ was to demonstrate to anesthesiologists that ultrasound-guided peripheral venous access using a simplified Seldinger technique has a good success rate and is not time-consuming. The simplified Seldinger approach facilitates the use of the longer catheters that the deeper veins may require but does not require the gown, large drape, and extra table required by a standard Seldinger technique.

I agree that defining difficult venous access is subjective. Costantino *et al.*² defined difficult intravenous access as failure with at least three attempts. His study of emergency department patients with difficult intravenous access demonstrated that ultrasound-guided intravenous catheter insertion (when compared with further standard approach) increased success rates, required less time, and increased patient satisfaction. I find, in most cases, when the surface veins are difficult to see and feel, the deeper veins of the antecubital fossa and upper arm remain large and easy to cannulate with ultrasound guidance. Even in patients with a history of intravenous drug abuse, the basilic vein is usually accessible and is not thrombosed. I believe the success I demonstrated was not exaggerated by the use of a more liberal definition of difficult intravenous access.

I can further define the cost of ultrasound-guided peripheral venous access using a simplified Seldinger technique. The technique requires the 20-gauge, 10.8-cm arterial catheterization set (FA-0420; Arrow International, Reading, PA) costing \$11.24 and the occlusive dressing to cover the ultrasound probe (Tegaderm 10 × 12 cm; 3M, St. Paul, MN) costing \$0.71. The cost of the ultrasound gel is negligible. The ultrasound unit was purchased previously for regional anesthesia and therefore did not add to the cost of the procedure. Our standard safety intravenous catheter (ProtectIV Plus-W 20-gauge 1¼-inch; Medex Inc., Carlsbad, CA) costs \$1.77. The added cost of the ultrasound-guided

technique is therefore \$10.38. One must weigh this cost against the cost of continuing a standard approach: additional intravenous catheters, increased time to cannulation, and increased patient discomfort. Different practitioners will likely have different thresholds for changing to an alternative insertion site (leg, external jugular, central vein) or technique (ultrasound) based on the specifics of the patient and the type of surgery.

I agree that assistance may be hard to find in a busy ambulatory surgery center. I have been able to perform the procedure alone in many cases. If the needle tip is well visualized in a vein, one can drop the ultrasound probe to advance the integral wire. If the wire advances easily, it is likely in the vein, and the catheter should advance easily. If the wire does not advance easily, the ultrasound should be used again to place the needle tip into the vein.

I believe the ultrasound-guided technique has been demonstrated by others to improve success rates in patients with difficult intravenous access. I believe the simplified Seldinger technique I describe facilitates cannulation of the deeper veins at a relatively low cost, in a time-efficient manner and usually by a single practitioner.

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2. Costantino TG, Parikh AK, Satz WA, Fojtik JP: Ultrasonography-guided peripheral intravenous access *versus* traditional approaches in patients with difficult venous access. *Ann Emerg Med* 2005; 46:456–61

(Accepted for publication April 23, 2007.)