The Journal of Emergency Medicine, Vol. ■, No. ■, pp. 1–7, 2016

0736-4679/$ - see front matter

http://dx.doi.org/10.1016/j.jemermed.2016.07.001

Brief Report

SAFETY AND EFFICACY OF THE "EASY INTERNAL JUGULAR (IJ)": AN APPROACH TO DIFFICULT INTRAVENOUS ACCESS

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□ **Abstract—Background: The easy internal jugular (Easy IJ) technique involves placement of a single-lumen catheter in the internal jugular vein using ultrasound guidance. This technique is used in patients who do not have suitable peripheral or external jugular venous access. The efficacy and safety of this procedure are unknown. Objective: We aimed to estimate efficacy and safety parameters for the Easy IJ when used in emergency department (ED) settings. Methods: We conducted a prospective study of the Easy IJ in stable ED patients with severe intravenous access difficulty. The study was conducted simultaneously at two academic EDs and a community university-affiliated ED. Patients were selected for failure of alternative access, hemodynamic stability, and ability to increase the IJ diameter with the Valsalva maneuver. Emergency physicians prepped the skin and inserted an 18-gauge, 4.8-cm catheter using a limited sterile technique. We collected the following data: patient body mass index, age, procedure time, pain score, initial success, loss of patency, occurrence of pneumothorax, infection, or arterial puncture. Results: We recorded 83 attempts in 74 patients, with a median age of 44 years and a median body mass index of 27 kg/m^2. The initial success rate was 88%, with a mean procedure time of 4.4 min (95% confidence interval 3.8–4.9). The average pain score was 3.9 out of 10 (95% confidence interval 3.4–4.5). Ten of 73 successful lines (14%) lost patency. There were no cases of pneumothorax, arterial puncture, or line infection. Conclusion: The Easy IJ was inserted successfully in 88% of cases, with a mean time of 4.4 min. Loss of patency, the only complication, occurred in 14% of cases.** © **2016 Elsevier Inc. All rights reserved.**

□ **Keywords—administration, intravenous; catheterization; catheterization, central; jugular veins; phlebotomy**

INTRODUCTION

Intravenous (IV) catheter access is of vital importance in emergency medical care. The management of most medical emergencies involves an IV line for the administration of medications, fluids, blood products, or intravenous contrast. Over the years, solutions to difficult IV access have evolved from venous cut-down and landmark-based central venous access to intraosseous access, ultrasound-guided central and peripheral line placement, and vein transillumination (1–4). Difficulty in establishing IV access contributes to emergency department (ED) duration of stay by diverting personnel from other activities. In one study, the median delay to IV access in patients who required a physician to complete the procedure was 120 min (5).

The use of ultrasound guidance has assisted IV line placement in many patients with poor options for

Abstract presented at the Society for Academic Emergency Medicine Annual Meeting, New Orleans, Louisiana, May 10–13, 2016.

Reprints are not available from the authors.

Received: 16 May 2016; Final submission received: 28 May 2016;
Accepted: 19 July 2016

traditional landmark-guided insertion (6). When a patient has no suitable vein—as confirmed with ultrasound in the upper extremities or by inspection and palpation of the external jugular veins—the alternatives to vascular access are limited to intraosseous lines and central venous catheters. Intraosseous lines are preferred in the resuscitation of unstable patients but are seldom used in stable patients who are in need of IV access. Therefore, the only current alternative for stable patients is central venous access, which requires elaborate sterile draping of the patient and often the assistance of a second operator. In addition, central venous catheters are expensive and time-consuming to place and have the potential for many adverse effects not typically associated with peripheral access, such as systemic infection, deep vein thrombosis, and cardiac dysrhythmia.

Another option for IV access was described in 2009 (7). It involves placement of a single-lumen angiocatheter (typically used for peripheral IV access), under ultrasound guidance, into the internal jugular (IJ) vein (7–10). Termed the "Easy IJ," this procedure is performed with limited sterile technique (i.e., a gown, sterile gloves, and drapes are not required). From a risk perspective, the Easy IJ is fundamentally similar to other methods of access that are routinely used. It shares features with peripheral ultrasound-guided access, external jugular venous catheterization, and central venous access. Since its original description, there have been three published series, totaling 37 patients, but the safety and efficacy of the procedure remain undetermined (8–10). The purpose of this study was to estimate the safety and efficacy parameters for this technique when used for difficult IV access in an ED setting.

METHODS

Design

In this multicenter, noncomparative trial, we enrolled ED patients who required IV access but in whom attempts to establish that access had failed through either peripheral or external jugular veins, including attempts using ultrasound guidance. Other inclusion criteria included the ability to dilate the IJ with the Valsalva maneuver—an important part of the procedure—and the ability to sign written consent. Exclusion criteria were hemodynamic instability (i.e., heart rate >150 beats/min or mean arterial pressure <60 mm Hg), untreated pneumothorax, or the clinical need for a triple-lumen venous catheter. The institutional review board at each hospital approved the protocol.

Setting

Participating hospitals included a residency-affiliated community hospital and two tertiary care urban academic medical centers in different states.

Study Procedure

The Easy IJ procedure was performed by physician operators with a minimum of 5 previous successful IJ vein catheterizations using the Seldinger technique and 5 previous successful peripheral ultrasound-guided vein catheterizations. Operators reviewed a one-page procedure description, which included instructions on gathering equipment (Figure 1), patient positioning, sterile procedures (e.g., prepare skin, bio-occlusive on probe, and sterile lube dripped onto probe), and having the patient perform the Valsalva maneuver. The procedure uses an 18-gauge 4.8-cm catheter-over-needle device that is typically used for ultrasound-guided peripheral IV catheterization. The sterile procedures were designed to enhance procedures typically used for peripheral catheters. Needle direction was at a 45° angle with the skin and directed toward the ultrasound image of the IJ vein. We posted informational materials in the ED featuring the photographs shown in Figure 2. Each operator also received brief oral instructions from one of the co-investigators.

Treating physicians could order a radiograph or computed tomography scan of the chest at their discretion to rule out pneumothorax after the procedure. The admitting service was informed that the line was intended for 24-h use only, mainly because of concern about the potential for line infection. We chose a 24-h recommended limit because this was a line placed in a central vein, using sterile techniques that were less elaborate than the accepted gowning and draping. Beyond 24 h, the Easy IJ could be left in, if the physician and patient preferred its retention over inserting another IV line.

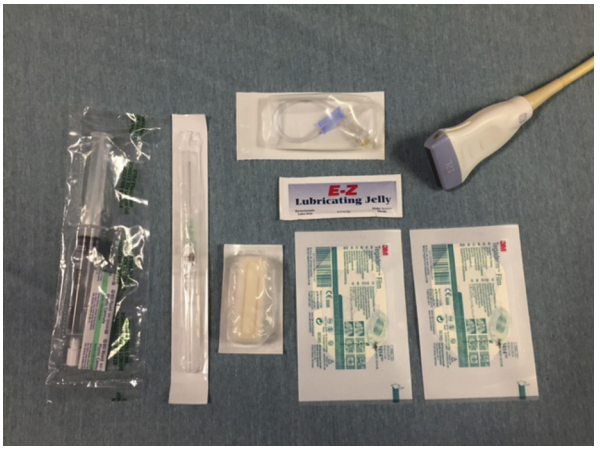

Figure 1. Materials needed for insertion of an internal jugular (IJ) vein catheter (the Easy IJ technique) and step-by-step instructions. The technique requires an ultrasound machine with a high-frequency linear transducer, chlorhexidine, a 4.8-cm, 18-gauge single-lumen catheter, two bio-occlusive adherent dressings, sterile ultrasound gel media, a loop catheter extension, and a saline flush.