

Background

Availability of a venous access for administering drugs and fluids in critically ill patients is a cornerstone of modern Emergency Medicine. It is often difficult to find a proper large bore peripheral catheter in patients experiencing hypotension due to dehydration, septic shock and/or trauma. Elder patients often offer a poor peripheral venous supply, independently from their hemodynamic conditions, but still need frequent administration of IV therapy (e.g. antibiotics). In these situations, usually, the placement of a central venous catheter, either by incannulation of internal jugular, subclavian or femoral vein is needed. Such procedures are time consuming, need to be executed by experienced providers and are prone to provoke well-known and potentially serious adverse events (e.g. pneumothorax, arrhythmias, vascular damage). The attempt to obtain vascular access by placement of a peripheral venous catheter under ultrasonographic guide has been sometimes performed in clinical practice, but only a few case reports are presented in literature.

Since 2007, in our Emergency Medicine ward, 30 peripheral venous catheters in internal jugular vein have been set in patients not eligible for classical central venous catheterization due to severe comorbidity or as emergency access for administering palliative drugs.

Despite an easy placement and absence of complications, insufficient length of the classical PVC (45mm) led to frequent early displacement.

Patients & Methods

We projected and patented a brand new centrally-inserted peripheral catheter, available in 80mm, 70mm and 60mm length, 14/16/17/18 Gauge diameter, hyperreflectant to ultrasound, provided with fixing fins and tap for multiple administration of drugs.

The device obtained approval by Hospital's Committee for Medical Devices and was distributed to 3 Emergency Medicine wards, 2 Anaesthesiology and Intensive care units and 1 Internal Medicine ward, and placed at patient's bed under ultrasound guidance by attending and resident physicians.

Data have been collected by convenience sampling from August 1st 2015 to September 30th, 2015.



Results

We totally treated 45 patients, 27 females and 18 males, mean age was 77 years (SD 14,8 years; median 83 years). 39 (86,7%) patients had the device placed due to insufficient peripheral venous supply for needed therapy; 5 (11%) patients needed infusion of inotropes or TPN, 1 (2%) patient had the device placed for his/her preference. Mean time needed to complete procedure was 305 seconds (5,5 minutes; SD 207 sec). Procedure resulted successfully completed at 1st attempt in 68% of patients, at 2nd attempt in 25% and 3rd attempt in just 6,5% of patients.

Complications at <24 hours occurred in 2(4,4%) patients, consisting in 1 non airway-threatening hematoma and 1 atrial tachyarrhythmia. No iatrogenic pneumothorax were reported.

Late (>24h) complications presented in 2(4,4%) patients, consisting in device occlusion.

In addition, the device was utilized by anaesthesiologists in 42 more patients, as a bridge or an alternative to final PV incannulation. Data on these patients are still under investigation.

Mean insertion time (s)	Adverse events at 24h	Adverse events >24h	First attempt insertion	Second attempt insertion	Third attempt insertion
305	2	2	68%	25%	6,5%

Main results

	PNX	Vessel damage	Vessel Trombosis	Neck Hematomas	Arrhythmias	Occlusion
Total adverse events	0	0	0	1	1	2

Discussion & perspectives

The sample size is still small in order to obtain a reliable statistical analysis, even if the device application is going on satisfactorily since the results are extremely encouraging. In our experience, the application of the device in Emergency Medicine and Anaesthesiology seems interesting for following reasons: the easy technique of application, the absence of serious adverse events for patients, the possibility to set the device at bed's patient and the cheapness of the device. In conclusion, the device appears to be safe for the patients, efficient, time convenient and easy to place.

References: Stein J, George B, River G, Hebig A, McDermott D. Ultrasonographically guided peripheral intravenous cannulation in emergency department patients with difficult intravenous access: a randomized trial. *Ann Emerg Med* 2009;54:33–40; Nathan A. Teismann, Ronessa S Night, The ultrasound guided peripheral IJ: internal jugular vein catheterization using a standard intravenous catheter *Journ Emerg Med* 2013; 44:150-4; Leung J, Duffy M, Finckh A. Real-time ultrasonographically-guided internal jugular vein catheterization in the emergency department increases success rates and reduces complications: a randomized, prospective study. *Ann Emerg Med* 2006;48:540–7