

- [4] de Paiva EF, Padilha Rde Q, Sgobero JK, Ganem F, Cardoso LF. Disseminating cardiopulmonary resuscitation training by distributing 9,200 personal manikins. *Acad Emerg Med* 2014;21(8):886–91. <http://dx.doi.org/10.1111/acem.12423>.
- [5] Isbye DL, Rasmussen LS, Ringsted C, Lippert FK. Disseminating cardiopulmonary resuscitation training by distributing 35,000 personal manikins among school children. *Circulation* 2007;116(12):1380–5.

Which intravascular access method to choose during cardiopulmonary resuscitation?*



To the Editor,

We read with great interest the paper by Cho et al [1] describing needle guides for venous catheter insertion during chest compressions. They use needle guides during ultrasound-guided central venous catheterization (CVC) with and without chest compressions on manikin. Catheterization was performed by anesthesiologists staff.

The current European Resuscitation Council as well as American Heart Association guidelines for cardiopulmonary resuscitation (CPR) emphasize the importance of minimalizing chest compression interruptions to maximize perfusion pressure. Those guidelines also suggest that medical personnel staff should be able to perform endotracheal intubation and obtain intravascular access without interrupting chest compressions.

Peripheral intravenous (IV) access is the most commonly used route for drug delivery during CPR. This applies both to Emergency Department as well as Emergency Medical Service personnel. However, IV access during cardiopulmonary resuscitation can be difficult even for experienced rescuers, and the success rate for establishing peripheral IV access after cardiac arrest and difficult intravenous administration is variable and ranges broadly between 30 and 75% in adults patients and between 18% and 65% in pediatric population [2]. Some studies have shown that peripheral IV access times can range from 2 to 49 minutes [3].

Central venous catheterization is of course an alternative to peripheral IV or intraosseous (IO) access; however, it requires the interruption of CPR in the majority of cases and may be associated with the risk for the patient, especially in emergency settings. Medical complication rates for traditional CVC are reported to be around 15% to 20%, including arterial puncture, malposition, hematoma, pneumothorax, or venous thrombosis [4]. Ultrasound-guided CVC increases success rates and reduces the number of attempts and complications associated with CVC, however, as studies show requires a much longer time of application than IO access [5]. Leidel et al. showed that, IO access is more efficacious with a higher success rate on first attempt and a lower procedure time compared to landmark-based CVC for in-hospital adult patients under CPR [5]. The use of IO access during CPR may indicate that IO access is an established rapid, safe, and effective alternative method for drug delivery during CPR [6]. Moreover, in a study by Johnson, there was no difference in return of spontaneous circulation between the IO and IV groups; besides, there was no significant difference in time to maximum concentration of vasopressin administered by IO and IV access [7].

Lee et al [8] in a nonrandomized study compared the IO route and central venous catheter insertion by medical emergency team in medical emergencies in hospital setting. In the IO route, they observed shorter time to perform the procedure, fewer attempts to obtain IO route, and a lower complication rate compared to CVC.

In summary, the above findings provide evidence that the use of IO access during CPR has high clinical importance and are consistent with current European Resuscitation Council and American Heart Association guidelines.

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References

- [1] Cho T, Komazawa N, Haba M, Fujiwara S, Mihara R, Minami T. Needle guides for venous catheter insertion during chest compressions: A crossover simulation trial. *Am J Emerg Med* 2016;34:989–92.
- [2] 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(1):33–40. <http://dx.doi.org/10.1016/j.annemergmed.2008.07.048>.
- [3] Reades R, Studnek JR, Vandeventer S, Garrett J. Intraosseous versus intravenous vascular access during out-of-hospital cardiac arrest: a randomized controlled trial. *Ann Emerg Med* 2011;58(6):509–16. <http://dx.doi.org/10.1016/j.annemergmed.2011.07.020>.
- [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(5):540–7.
- [5] Leidel BA, Kirchoff C, Bogner V, Braunstein V, Biberthaler P, Kanz KG. Comparison of intraosseous versus central venous vascular access in adults under resuscitation in the emergency department with inaccessible peripheral veins. *Resuscitation* 2012;83(1):40–5. <http://dx.doi.org/10.1016/j.resuscitation.2011.08.017>.
- [6] Kurowski A, Timler D, Evrin T, Szarpak Ł. Comparison of 3 different intraosseous access devices for adult during resuscitation. randomized crossover manikin study. *Am J Emerg Med* 2014;32(12):1490–3. <http://dx.doi.org/10.1016/j.ajem.2014.09.007>.
- [7] Johnson D, Giles K, Acuna A, Saenz C, Bentley M, Budinich C. Effects of tibial intraosseous and intravenous administration of vasopressin on kinetics and survival in cardiac arrest. *Am J Emerg Med* 2015;34:429–32.
- [8] Lee PM, Lee C, Rattner P, Wu X, Gershengorn H, Acquah S. Intraosseous versus central venous catheter utilization and performance during inpatient medical emergencies. *Crit Care Med* 2015;43:1233–8.

Knowledge, attitude, and practices of paramedics regarding optic nerve sheath diameter ultrasonography



To the Editor,

We read with great interest an article published in The American Journal of Emergency Medicine by Komut et al titled “Bedside sonographic measurement of optic nerve sheath diameter as a predictor of intracranial pressure in Emergency Department” [1]. We congratulate the authors for great work on how important medical problem, which is the prediction of increased intracranial pressure (IIP). Research conducted by Komut et al confirms the results of research carried out by us. In our Emergency Department, ultrasonography is also used to evaluate optic nerve sheath (ONS). Confirmation of IIP is most often performed using computed tomography or magnetic resonance imaging. However, these methods require time and are associated with additional costs of assistive patient exposure to ionizing radiation. It is worth noticing that ultrasound is more and more widely used in emergency medicine, ranging from

Table 1

The obtained knowledge scores about optic nerve sheath ultrasonography by participants before and after education

Parameter	Before education	After education	P value
Level of knowledge	1.5 [1-1.7]	6.5 [5.0-8.5]	<.001
Attitudes			
1: Strongly disagree	-	-	.016
2: Disagree	5 (21.7%)	-	
3: Neither agree nor disagree	11 (47.8%)	3 (13.1%)	
4: Agree	5 (21.7%)	7 (30.4%)	
5: Strongly agree	2 (8.8%)	13 (56.5%)	

Data reported as absolute and relative frequency (%) or median and interquartile range.

Focused Assessment with Sonography in Trauma examination [2], or confirm the correct position of the endotracheal tube during intubation [3]. The application of ultrasound examination of the ONS for confirmation of IIP offers several advantages. First of all it is portable, rapid, noninvasive, low cost, and widely available [4,5]. Furthermore, it can be used both in the Emergency Department as well as in Emergency Medical Services.

Therefore, we decided to conduct a study on knowledge, attitudes, and skills audit of ONS ultrasonography among paramedics, as persons who have direct contact with the patient trauma at the accident scene.

After written informed consent, 23 paramedics volunteered for this open controlled trial. None of the study participants had experience in performing ONS ultrasound. Before the study, all participants received a questionnaire about their knowledge and attitudes regarding ultrasound. Level of knowledge was assessed in a 10-point scale ("1", inability to perform examination; 1"0", the ability to perform examination), and the attitude towards the ONS ultrasound was evaluated in a 5-point scale (the ONS ultrasonography is useful in emergency medicine "1, strongly disagree; 2, disagree; 3, neither agree nor disagree; 4, agree; 5, strongly agree). After completing the questionnaire, all participants completed a 60-minute training session led by an anesthesiologist with extensive experience in focused ultrasonography, including an introduction to the ultrasonography and ONS ultrasonography. Then participants practiced on themselves. During the examination a linear 6 MHz probe was used. Practice section was held until the participants felt comfortable during the test. Then, during an appropriate study, participants performed ONS ultrasonography. The correctness of ONS examination, as well as the correct interpretation of the ONS diameter, was evaluated by the instructor.

Twenty-three paramedics (9 female; 39.3%) were enrolled. All participants worked in Emergency Medical Service teams in Poland. Mean age was 31.5 ± 8.5 years, and mean work experience was 6.9 ± 4.5 years.

The correctness of the implementation of the study was observed in 91.3% of cases. The correctness of the interpretation of the ONS thickness was observed in 69.6% of cases. The results of the level of knowledge and attitudes towards ONS ultrasonography both before and after the course are presented in Table 1.

In summary, ours results indicate that paramedics are able to perform with high-efficiency ONS ultrasonography examination after a short training. Ultrasound measurement of ONS appears to be a rapid and promising bedside tool for identification of IIP in a prehospital setting.

The authors have no conflict of interests to disclose.

We would like to thank all paramedics providers for their participation in our trial.

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References

- [1] Komut E, Kozacı N, Sönmez BM, Yılmaz F, Komut S, Yıldırım ZN, et al. Bedside sonographic measurement of optic nerve sheath diameter as a predictor of intracranial pressure in Emergency Department. *Am J Emerg Med* 2016;34:963–7.
- [2] Bhoi S, Sinha TP, Ramchandani R, Kurrey L, Galwankar S. To determine the accuracy of focused assessment with sonography for trauma done by nonradiologists and its comparative analysis with radiologists in emergency department of a level 1 trauma center of India. *J Emerg Trauma Shock* 2013;6(1):42–6. <http://dx.doi.org/10.4103/0974-2700.106324>.
- [3] Truszeński Z, Samarin S, Czyżewski L, Evrin T, Szarpak L. Are paramedics able to confirm endotracheal tube placement using ultrasonography? Preliminary data. *Am J Emerg Med* 2016;34:923–4.
- [4] Doniger SJ. Bedside emergency cardiac ultrasound in children. *J Emerg Trauma Shock* 2010;3(3):282–91. <http://dx.doi.org/10.4103/0974-2700.66535>.
- [5] Atkinson P, Boyle A, Robinson S, Campbell-Hewson G. Should ultrasound guidance be used for central venous catheterisation in the emergency department? *Emerg Med J* 2005;22(3):158–64. <http://dx.doi.org/10.1136/emj.2003.011288>.

Are paramedics able to perform endotracheal intubation with access to the patient through the back seat of the car? Randomized crossover manikin study[☆]



To the Editor,

Patients with trauma present unique airway management concerns. Conventional oral intubation with manual in-line stabilization (MILS) is still the most effective approach for early control of the airway in trauma [1]. However, there are situations in which access to the patient is difficult and direct viewing of the airways is impossible [2,3]. Such a situation might be encountered when a patient requires intubation when trapped in a vehicle [4]. In such cases, alternative methods of endotracheal intubation can be used, including videolaryngoscopy or video tubes, ie, the ETView VivaSight-SL (ETView Ltd., Misgav, Israel).

The aim of the study was to evaluate the VivaSight single lumen endotracheal tube (ETView) and the Macintosh laryngoscope (MAC) for intubation of a patient trapped in a motor vehicle. The trial is a continuation of studies undertaken by Truszeński et al [5].

The Institutional Review Board at International Institute of Rescue Research and Education approved this study. IRB number was 12.2015.08.32. Forty-five paramedics were asked to perform advanced

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