

©Borgis

Andrzej Bielski<sup>1</sup>, Togay Evrin<sup>2</sup>, Waclaw Gawel<sup>3</sup>, Karolina Kosiacka<sup>4</sup>, \*Lukasz Szarpak<sup>1,5</sup>

## The knowledge and attitude of last year medical students towards supraglottic airway devices

### Wiedza i postawy studentów medycyny na temat nadgłośniowych urządzeń do wentylacji

<sup>1</sup>Polish Society of Disaster Medicine, Warsaw, Poland<sup>2</sup>Department of Emergency Medicine, Ufuk University, Ankara, Turkey; Medical Faculty, Dr Ridvan Ege Education and Research Hospital, Ankara, Turkey<sup>3</sup>Student's Scientific Association of Children's Diabetology, Medical University of Silesia, Poland<sup>4</sup>Emergency Medicine Student Scientific Circle, Department of Emergency Medicine, Medical University of Warsaw, Poland<sup>5</sup>Lazarski University, Warsaw, Poland

#### Keywords

supraglottic airway devices, airway management, attitudes, emergency medicine

#### Słowa kluczowe

nadgłośniowe urządzenia do wentylacji, zabezpieczenie dróg oddechowych, postawy, medycyna ratunkowa

#### Conflict of interest

#### Konflikt interesów

None

Brak konfliktu interesów

#### Summary

**Introduction.** The protection of airway patency during cardiopulmonary resuscitation and the implementation of optimal ventilation is a key element in the field of advanced resuscitation. Due to the fact that endotracheal intubation is the golden standard of airway management during resuscitation, due to the possibility of numerous complications, it should be performed only by experienced persons. An alternative for people without experience in endotracheal intubation may be vomer devices for ventilation.

**Aim.** The aim of the study was to evaluate knowledge and attitudes of the last year medical students towards the use of supraglottic airway devices.

**Material and methods.** The study was performed with the use of the authorial questionnaire. The study included 82 medical students in their last year of studies. The questionnaire included both questions regarding the use of supraglottic airway devices and knowledge of resuscitation guidelines, as well as attitudes towards the use of this way of maintaining the airway patency during cardiopulmonary resuscitation. The study protocol was approved by the Institutional Review Board of the Polish Society of Disaster Medicine (Approval number: 31/05/2017.IRB).

**Results.** 63.4% of people participated in theoretical training regarding supraglottic airway devices, while 52.4% of them had participated in practical training regarding the SADs. 81.7% of participants would use a supraglottic ventilation device as a method of maintaining the airway patency during cardiopulmonary resuscitation of an adult, while 71.9% of them would use it in case of pediatric patients with cardiac arrest. 47.5% of people think that SADs allow for asynchronous cardiopulmonary resuscitation, while 52.5% of people, despite confirming the correct placement of the device, would still follow a standard protocol for resuscitation: 30 chest compressions to 2 rescue breaths.

**Conclusions.** It is necessary to propagate the use of supraglottic airway devices as viable alternative to the endotracheal intubation as a method of maintaining the airway patency.

#### Streszczenie

**Wstęp.** Zabezpieczenie drożności dróg oddechowych podczas resuscytacji krążeniowo-oddechowej i wdrożenie optymalnej wentylacji stanowią kluczowy element w zakresie zaawansowanych zabiegów resuscytacyjnych. Jako że intubacja dotchawicza jest złotym standardem zabezpieczenia dróg oddechowych podczas resuscytacji, z uwagi na możliwość licznych powikłań powinna ona być wykonywana tylko przez doświadczone osoby. Alternatywą dla osób nieposiadających doświadczenia w zakresie intubacji dotchawiczej mogą być nadgłośniowe urządzenia do wentylacji.

**Cel pracy.** Celem badania była ocena wiedzy i postaw studentów ostatniego roku medycyny wobec stosowania nadgłośniowych urządzeń do wentylacji.

**Materiał i metody.** Badanie zostało przeprowadzone w oparciu o autorski kwestionariusz ankiety. W badaniu udział wzięło 82 studentów ostatniego roku medycyny. Kwe-

stionariusz ankiety obejmował zarówno pytania z zakresu wiedzy dotyczącej stosowania nadgłośniowych urządzeń do wentylacji i znajomości wytycznych resuscytacji, jak również postaw wobec wykorzystania tej formy zabezpieczenia drożności dróg oddechowych podczas resuscytacji krążeniowo-oddechowej. Protokół badania został zaakceptowany przez Radę Programową Polskiego Towarzystwa Medycyny Katastrof (Nr: 31.05.2017.IRB).

**Wyniki.** 63,4% respondentów uczestniczyło w zajęciach teoretycznych dotyczących nadgłośniowych urządzeń do wentylacji, zaś 52,4% odbyło szkolenie praktyczne w zakresie SADs. 81,7% osób zastosowałoby nadgłośniowe urządzenie do wentylacji jako metodę zabezpieczenia drożności dróg oddechowych podczas resuscytacji krążeniowo-oddechowej osoby dorosłej, zaś 71,9% u pacjentów pediatrycznych podczas zatrzymania krążenia. 47,5% badanych uważa, iż SADs pozwala na prowadzenie asynchronicznej resuscytacji krążeniowo-oddechowej, zaś 52,5% pomimo potwierdzenia słuszności wprowadzenia urządzenia stosowałoby standardową metodę prowadzenia resuscytacji: 30 uciśnięć klatki piersiowej do 2 oddechów ratowniczych.

**Wnioski.** Niezbędne jest propagowanie stosowania nadgłośniowych urządzeń do wentylacji jako alternatywnej w stosunku do intubacji dotchawiczej metody zabezpieczenia drożności dróg oddechowych.

#### Address/adres:

\*Łukasz Szarpak  
Uczelnia Łazarskiego w Warszawie  
ul. Świeradowska 43, 02-662 Warszawa  
tel. +48 500-186-225  
lukasz.szarpak@gmail.com

## INTRODUCTION

The maintenance of airway patency is a key element during emergency procedures, especially in patients with cardiac arrest. Both the European Resuscitation Council (1) and the American Heart Association (2) guidelines for resuscitation indicate that one of the main factors determining the quality of cardiopulmonary resuscitation is minimization of breaks during chest compressions. A study by Ewy et al. (3) indicates the first 7-8 chest compressions following the break are ineffective, however a break in chest compressions is needed to allow for ventilation when using a face mask with a self-expanding bag. It is important therefore to maintain the airway patency using the device that allows for an asynchronous resuscitation as quick as possible. We can achieve this with the endotracheal intubation or with the use of supraglottic airway devices (SADs) (4). Endotracheal intubation is the gold standard for maintaining the airway patency, however when performed by a less experienced person may prolong the time of the procedure and result in many complications, ranging from breaking a tooth, causing soft tissue damage and bleeding and even leading to bursting of the trachea and mediastinal pneumothorax (5-7). Supraglottic airway devices may be a viable alternative to this method of maintaining airway patency and they are more and more often used both in the emergency medicine, pre-hospital care as well as in the operating theatre.

## AIM

The aim of the study was to evaluate knowledge and attitudes of the last year medical students towards the use of supraglottic airway devices.

## MATERIAL AND METHODS

The study was conducted from January till March 2017. The study included 82 last year medical students who participated in the mandatory emergency medicine course organized by the Department of Emergency Medicine at the Medical University of Warsaw. The study included only physicians who had work experience of less than one year.

The study protocol was approved by the Institutional Review Board of the Polish Society of Disaster Medicine (Approval number: 31/05/2017.IRB). The study was performed with the use of the authorial questionnaire. The questionnaire included questions regarding both the knowledge and attitudes towards the use of supraglottic airway devices in various clinical settings.

The statistical analysis was performed with the use of Statistica 12.0 EN (StatSoft, Tulusa, OK, USA) statistical software. The data is presented as a number and percent.

## RESULTS

The study included 82 last year medical students (39 female, 47.5%). Among the study participants all of them had attended both theoretical and practical training regarding endotracheal intubation with the use of direct laryngoscopy. 63.4% of participants participated in theoretical training regarding supraglottic airway devices, while 52.4% of them had participated in practical training regarding the SADs.

81.7% of participants would use a supraglottic ventilation device as a method of maintaining the airway patency during cardiopulmonary resuscitation of an adult, while 71.9% of them would use it in case of pediatric patients with cardiac arrest. 47.5% of people think that SADs allow for asynchronous cardiopulmonary resuscitation, while 52.5% of people, despite confirming the correct placement of the device, would still follow a standard protocol for resuscitation: 30 chest compressions to 2 rescue breaths.

Among participants, 91.4% of them declared that they had a knowledge regarding resuscitation guidelines published in 2015, and 12.2% of them knew about the updated guidelines published in November 2017.

## DISCUSSION

Among the most important abilities that the medical personnel should be able to perform is the ability to maintain the airway patency. While the effectiveness of endotracheal intubation in emergency medicine is insufficient (8-10), the use of supraglottic airway devices allows for a significant reduction of the time it takes

to maintain airway patency as well as it causes fewer traumas to the patient's airways. Another aspect in favor of the use of supraglottic airway devices over endotracheal intubation may be the fact that the learning curve for endotracheal intubation requires execution of more than 50 endotracheal intubations, while for SADs the learning curve is significantly lower and is limited to performing just a few attempts of airways maintenance (11, 12).

According to the resuscitation guidelines published in 2015, the golden standard of maintaining the airway patency during cardiopulmonary resuscitation – especially for adults – was endotracheal intubation, however, the updated resuscitation guidelines published in November last year (13, 14) allowed for the use of supraglottic airway devices during uninterrupted chest compression. The supraglottic airway devices do not require visualization of the glottis, and therefore they can be inserted blindly, which significantly eases the maintenance of airway patency with this method when compared to a standard endotracheal intubation. Numerous studies indicate that supraglottic airway devices are easy to apply during cardiopulmonary resuscitation alone (15-17) as well as in traumatic patients e.g. those stuck in the crashed vehicles, where both the access to airways and achieving the proper position for endotracheal intubation is sometimes impossible. Also, supraglottic airway

devices such as laryngeal masks (18-20), iGEL mask (15, 21, 22), or EasyTube are used during short surgical procedures (23-25) more often. Numerous studies indicate that supraglottic airway devices can be used for respiratory protection in pediatric patients (26-29), which is underlined by the fact that producers produce these devices in a wide range of sizes, e.g. iGEL mask which the smallest version is dedicated for patients weighing from 2 to 5 kg.

The history of the use of supraglottic airway devices goes back to the 1980s. However, as revealed by the analysis of collected research material, the alternative methods of maintaining the airway patency are not conducted on all medical universities. Therefore, it seems necessary to implement obligatory training regarding the maintaining of airway patency with the SADs, even more so since apart from few selected specialties (anesthesiology, emergency medicine or paramedics), most medical personnel do not have and will not obtain the experience necessary to allow for efficient endotracheal intubation.

## CONCLUSIONS

It is necessary to propagate the use of supraglottic airway devices as viable alternative to the endotracheal intubation as a method of maintaining the airway patency.

## BIBLIOGRAPHY

- Soar J, Nolan JP, Böttiger BW et al.: Adult advanced life support section Collaborators. European Resuscitation Council Guidelines for Resuscitation 2015: Section 3. Adult advanced life support. *Resuscitation* 2015; 95: 100-147.
- Link MS, Berkow LC, Kudenchuk PJ et al.: Part 7: Adult Advanced Cardiovascular Life Support: 2015 American Heart Association Guidelines Update for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation* 2015; 132 (18 suppl. 2): S444-464.
- Ewy GA, Zuercher M, Hilwig RW et al.: Improved neurological outcome with continuous chest compressions compared with 30:2 compressions-to-ventilations cardiopulmonary resuscitation in a realistic swine model of out-of-hospital cardiac arrest. *Circulation* 2007; 116(22): 2525-2530.
- Gordon J, Cooper RM, Parotto M: Supraglottic airway devices: indications, contraindications and management. *Minerva Anesthesiol* 2018; 84(3): 389-397.
- Cooper JD: Tracheal Injuries Complicating Prolonged Intubation and Tracheostomy. *Thorac Surg Clin* 2018; 28(2): 139-144.
- Beiderlinden M, Adamzik M, Peters J: Conservative treatment of tracheal injuries. *Anesth Analg* 2005; 100(1): 210-214.
- Cierniak M, Sobczak R, Timler D et al.: The degree of intubation difficulties and the frequency of complications in obese patients at the Hospital Emergency Department and the Intensive Care Unit: Case-control study. *Medicine (Baltimore)* 2016; 95(52): e5777.
- Bhattacharjee S, Maitra S, Baidya DK: A comparison between video laryngoscopy and direct laryngoscopy for endotracheal intubation in the emergency department: A meta-analysis of randomized controlled trials. *J Clin Anesth* 2018; 47: 21-26.
- Szarpak L, Karczewska K, Czyzewski L et al.: Airtraq Laryngoscope Versus the Conventional Macintosh Laryngoscope During Pediatric Intubation Performed by Nurses: A Randomized Crossover Manikin Study With Three Airway Scenarios. *Pediatr Emerg Care* 2017; 33(11): 735-739.
- Bielski K, Smereka J, Ladny JR et al.: A comparison of the Macintosh laryngoscope and blind intubation via I-gel in intubating an entrapped patient: A randomized crossover manikin study. *Am J Emerg Med* 2017; 35(5): 787-789.
- Steinmann D, Ahne T, Heringhaus C et al.: Comparison of airway management techniques for different access in a simulated motor vehicle entrapment scenario. *Eur J Emerg Med* 2016; 23(4): 279-285.
- Cinar O, Cevik E, Yildirim AO et al.: Comparison of GlideScope video laryngoscope and intubating laryngeal mask airway with direct laryngoscopy for endotracheal intubation. *Eur J Emerg Med* 2011; 18(2): 117-120.
- Perkins GD, Olasveengen TM, Maconochie I et al.: European Resuscitation Council: European Resuscitation Council Guidelines for Resuscitation: 2017 update. *Resuscitation* 2018; 123: 43-50.
- Kleinman ME, Goldberger ZD, Rea T et al.: 2017 American Heart Association Focused Update on Adult Basic Life Support and Cardiopulmonary Resuscitation Quality: An Update to the American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation* 2018; 137(1): e7-e13.
- Gabbott DA, Beringer R: The iGEL supraglottic airway: a potential role for resuscitation? *Resuscitation* 2007; 73(1): 161-162.
- Szarpak L, Truszcwski Z, Vitale J et al.: Exchange of supraglottic airways for endotracheal tube using the Eschmann Introducer during simulated child resuscitation: A randomized study comparing 4 devices. *Medicine (Baltimore)* 2017; 96(26): e7177.
- An J, Nam SB, Lee JS et al.: Comparison of the i-gel and other supraglottic airways in adult manikin studies: Systematic review and meta-analysis. *Medicine (Baltimore)* 2017; 96(1): e5801.
- Kurowski A, Hryniewicki T, Czyzewski L et al.: Simulation of blind tracheal intubation during pediatric cardiopulmonary resuscitation. *Am J Respir Crit Care Med* 2014; 190(11): 1315.
- Szarpak L, Kurowski A, Truszcwski Z et al.: Comparison of 4 supraglottic devices used by paramedics during simulated CPR: a randomized controlled crossover trial. *Am J Emerg Med* 2015; 33(8): 1084-1088.
- Szarpak L: Comparison of blind intubation through the I-gel and the Air-Q™ by novice physicians during cardiopulmonary resuscitation: A randomized, crossover, manikin trial. *Am J Emerg Med* 2017; 35(3): 509-510.
- Evrin T, Madziala M: iGEL vs laryngeal tube for airway management during a normal airway scenario. *Am J Emerg Med* 2018. pii: S0735-6757(18)30165-7.
- Larkin C, King B, D'Agapeyeff A et al.: iGel supraglottic airway use during hospital cardiopulmonary resuscitation. *Resuscitation* 2012; 83(6): e141.
- Robak O, Vaida S, Somri M et al.: Inter-center comparison of EasyTube and endotracheal tube during general anesthesia in minor elective surgery. *PLoS One* 2017; 12(6): e0178756.
- Sanfilippo F, Chiarenza F, Maybauer DM et al.: The Easytube for airway management: a systematic review of clinical and simulation studies. *J Clin Anesth* 2016; 31: 215-222.
- Robak O, Vaida S, Gaitini L et al.: EasyTube during general anesthesia for minor surgery: A randomized, controlled trial. *Medicine (Baltimore)* 2017; 96(25): e7195.

26. Kulnig J, Füreder L, Harrison N et al.: Performance and skill retention of five supraglottic airway devices for the pediatric difficult airway in a manikin. *Eur J Pediatr* 2018; 177(6): 871-878.
27. Hansen ML, Lin A, Eriksson C et al.: CARES surveillance group: A comparison of pediatric airway management techniques during out-of-hospital cardiac arrest using the CARES database. *Resuscitation* 2017; 120: 51-56.
28. Huang AS, Hajduk J, Jagannathan N: Advances in supraglottic airway devices for the management of difficult airways in children. *Expert Rev Med Devices* 2016; 13(2): 157-169.
29. Kleine-Bruegggeney M, Gottfried A, Nabecker S et al.: Pediatric supraglottic airway devices in clinical practice: A prospective observational study. *BMC Anesthesiol* 2017; 17(1): 119.

received/otrzymano: 2.03.2018  
accepted/zaakceptowano: 26.03.2018