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American Journal of Emergency Medicine

journal homepage: www.elsevier.com/locate/ajemThe American Journal of
Emergency Medicine

Vie scope® laryngoscope versus Macintosh laryngoscope with personal protective equipment during intubation of COVID-19 resuscitation patient

Dear Editor,

Airway management is a key element of resuscitation procedures. However, due to the current COVID-19 pandemic, medical personnel should complete medical procedures wearing full personal protective equipment (PPE) for aerosol-generating procedures (AGP) [1]. PPE-AGP should be used especially during cardiopulmonary resuscitation, including airway management [2]. Emergency intubation using direct laryngoscopy carries a significant risk of failure. As many authors indicate, the effectiveness of the first intubation attempt with a Macintosh laryngoscope is from 57.6% to 89.9% [3,4]. The use of PPE-AGP may reduce the efficiency of medical procedures and prolong their duration [5,6]. Intubation methods alternative to Macintosh laryngoscope may be a suitable solution. An example of a new type of laryngoscope is Vie Scope® (Adroit Surgical, Oklahoma City, USA), which is a self-contained, battery-powered, disposable scope that takes advantage of a closed circular tube with a beveled end to visualize the vocal cords (Fig. 1). The light is transmitted through the sidewall of the tube from end to end as well as within the lumen of the tube. The intubation procedure using Vie Scope® should be based on the following steps – the intubator should: (1) insert scope and identify glottis opening between vocal cords, (2) pass the bougie under direct vision between the vocal cords into the trachea, (3) remove the scope leave the bougie in place, (4) pass the endotracheal tube over the bougie into the trachea, (5) remove the bougie, (6) ventilate.

The aim of this study was to evaluate intubation performance by paramedics wearing PPE-AGP using Macintosh laryngoscope and Vie Scope® laryngoscope under simulated resuscitation of COVID-19 patient.

The study was designed as a prospective randomized crossover simulation trial. The study protocol was approved by the Institutional Review Board of the Polish Society of Disaster Medicine (No. 15.11.2019. IRB). 42 working paramedics took part in the study. Voluntary informed consent was obtained from each participant. None of the participants had previous experience with the Vie Scope® laryngoscope. Before the examination, the participants took part in the presentation of the laryngoscope and the method of correct intubation using it. The study participants then attended a 20-minute practical training course during which they performed endotracheal intubation using Vie Scope® under normal airway conditions. During the target study, paramedics dressed in full PPE-AGP were to perform endotracheal intubation with continuous chest compression. Endotracheal intubation was performed using Macintosh laryngoscope (MAC; blade no.3) as well as with Vie

Scope® laryngoscope (VSC). The advanced SimMan 3G adult patient simulator (Stavanger, Norway) was used to simulate a patient requiring endotracheal intubation. A standard intubation guide was used for MAC and a bougie guide for VSC. Each participant had a maximum of 3 attempts to intubate using each device. Both the order of participants and intubation methods were random. A detailed randomization procedure is presented in Supplementary Fig. 1. The data were blinded for the team interpreting the results. The results were analyzed using the statistical package STATISTICA 13.3EN (Tibco Inc., USA) or Review Manager 5.4EN (Cochrane Collaboration, Oxford, UK). Group differences in dichotomous data are expressed as odds ratios (ORs) and group differences in continuous data as mean differences (MDs), both with 95% confidence intervals (CIs). The fixed-effect model was used to pool the results.

Duration of intubation when one attempt needed between distinct intubation methods varied and amounted to 44 (IQR; 40.5–53)sec. For MAC and 28.5 (IQR; 25–38.5)sec. For VSC (MD = 15.30; 95%CI: 13.69, 16.91; $p < 0.001$). Median overall intubation time with MAC was 47 s (IQR; 41.5–95.5) and was statistically significantly longer than with VSC – 29 s. (IQR; 25–39; MD = 27.30; 95%CI: 22.43, 32.17; $p < 0.001$). First attempt success rate with MAC was 50.0% vs. 92.9% for VSC (MD = 0.08; 95%CI: 0.02, 0.29; $p < 0.001$), and overall success rate was 90.5 vs. 100% respectively (MD = 0.10; 95%CI: 0.01, 1.93; $p = 0.13$). The ease of intubation is based on the VAS scale (0 – „easy procedure” to „10” – difficult procedure) varied and amounted to 5 (IQR, 4–8) vs. 2 (IQR; 2–5) points (MD = 2.75; 95%CI: 2.34, 3.16; $p < 0.001$).

In conclusion, under the conditions of intubation performed by paramedics wearing PPE-AGP with continuous chest compression, the results of the study indicate higher efficiency of intubation with Vie Scope® compared to Macintosh laryngoscope in terms of both the efficiency of the first intubation attempt and the time of the procedure. Further studies are required to confirm the results.

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ajem.2020.08.085>.

Declaration of Competing Interest

None.

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Fig. 1. Intubation using Vie Scope laryngoscope

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8 July 2020

Available online xxx

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