Available online at www.sciencedirect.com

Resuscitation

journal homepage: www.elsevier.com/locate/resuscitation

Letter to the Editor

Capnography as instrument for airway management during basic instrumental CPR manoeuvers

Sir,

There is still controversy today about the superiority of advanced versus basic airway management during CPR maneuvers. This uncertainty was announced in the most recent ILCOR guidelines, and it seems to be corroborated by a recent randomized trial comparing survival and neurological recovery from CPR in patients treated with bag-valve-mask (BVM) versus orotracheal intubation.[1] Although the possibility of using capnography within BVM or extraglottic devices has been indicated by the European Resuscitation Council,[2] it seems not to be common practice at the moment. In order to better understand the current state of the use of capnography with BVM ventilation during CPR, we have conducted a systematic review across various databases using the search: (capnography [MeSH]) AND (Cardiopulmonary resuscitation [MeSH]).

Unfortunately, in our research, we only found 2 observational articles correlating capnography values with the results of CPR (Fig. 1): one in adults[3] and another in newborns.[4] Both of them use qualitative devices in order to assess the quality of ventilation, recovery of spontaneous circulation, increase of heart rate in newborns or find a correlation between the values with survival after CPR. On the one hand, Nakatani et al.[3] showed that in adults ventilated with BVM, there was a correlation between superior levels of capnometry detection and ROSC in 15% of patients in the group with CO2 values <0,5% (<4 mmHg) and in 43% of patients who presented values >2% (>15 mmHg). On the other hand, in the newborn study, the early detection of an increase of capnometry occurred 10–20 s before an increase in heart rate was recorded by the electrocardiogram monitoring.

In the literature review, there seems to be a small gap in the use of capnography during instrumental basic resuscitation. We did not find any high-quality randomized clinical trials comparing the capnography values obtained by basic versus advanced life support airway management nor regarding their use to improve the quality of maneuvers. Preliminary findings suggest that with capnography monitoring during BVM ventilation we can achieve and quantify the increased effectiveness of resuscitative efforts.

Mask ventilation is difficult and requires good training or experience. In order to quantify the quality of ventilation with BVM, a good methodology could be to assess the ventilation within the capnography monitoring with a scale, as has been proposed by Lim and Nielsen[5] in the context of anesthesia. They establish a 4-level scale of ventilation quality based on the values obtained and the capnogram shape during capnography monitoring. It is interesting to note that in two decades no one else has done a study using quantitative capnography values to compare the difference between BVM ventilation and other advanced airway devices such as extraglottic devices in adults. We have just started a cluster-

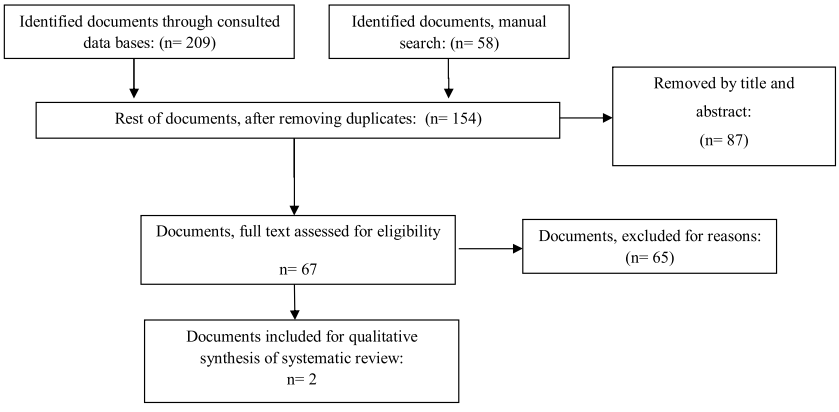

Fig. 1 – Flow-chart of information, according to the review stages.

randomized trial comparing capnography values in BVM ventilation with the Laryngeal Mask airway I-Gel® at SAMU 061 in the Balearic Islands in order to present some evidence about what happens.

Funding statement

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of interest

No conflict of interest has been declared by the authors.

Acknowledgements

We would like to thank the SATSE Research Cabinet of the Balearic Islands for their support with reviewing the bibliographical search.

REFERENCES

1. Jabre P, Penaloza A, Pinero D, et al. Effect of bag-mask ventilation vs endotracheal intubation during cardiopulmonary resuscitation on neurological outcome after out-of-hospital cardiorespiratory arrest a randomized clinical trial. JAMA 2018;319:779–87.
2. Soar J, Nolan JP, Böttiger BW, et al. European resuscitation council guidelines for resuscitation 2015: section 3. Adult advanced life support. Resuscitation 2015;95:100–47. . [Cited 2015 October 25]. Available from: http://www.sciencedirect.com/science/article/pii/S0300957215003287.
3. Nakatani K, Yukioka H, Fujimori M, et al. Utility of colorimetric end-tidal carbon dioxide detector for monitoring during prehospital cardiopulmonary resuscitation. Am J Emerg Med 1999;17:203–6. . 4p. Available from: http://pesquisa.bvsalud.org/portal/resource/es/mdl-10102328.
4. Blank D, Rich W, Leone T, Garey D, Finer N. Pedi-cap color change precedes a significant increase in heart rate during neonatal resuscitation. Resuscitation 2014;85:1568–72. . [Cited 2018 March 13]. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25236763.
5. Lim KS, Nielsen JR. Objective description of mask ventilation. Br J Anaesth 2016;117:828–9, doi:http://dx.doi.org/10.1093/bja/aew368 Available from:.

Francisco José Cereceda-Sánchez*
Emergency Medical Service 061, Balearic Islands, C/. Illes Balears s/n., Palma de Mallorca, CP: 07014 Spain

Jesús Molina-Mula
University of Balearic Islands, Ctra. de Valldemossa, km 7.5, Islas Baleares, Palma, Spain

* Corresponding author at: C/. Trafalgar 3, Manacor, CP: 07500, Balearic Islands, Spain.
E-mail addresses: fjcereceda@061balears.es (F. Cereceda-Sánchez) jesus.molina@uib.es (J. Molina-Mula).

Received 31 January 2019

http://dx.doi.org/10.1016/j.resuscitation.2019.03.007