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COMMENTARY

Laryngeal mask airway and the enigma of anatomical sizing

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The laryngeal mask airway (LMA, Teleflex Medical®, Westmead, Ireland) is a device that has proved itself over the last 30 years in a large group of patients undergoing diagnostic procedures or interventional surgery. Laryngeal mask airways (LMAs) and more in general supraglottic airway devices or broadly defined as extraglottic airway devices (EADs), are safe and effective airway devices: designed with a specific purpose, being utilized to provide adequate gas exchange and prevent airway obstruction during general anesthesia without the use of an endotracheal tube. EADs are useful as primary (first airway), secondary (rescue of a difficult airway) and tertiary (as conduit for scopes) tools in airway management [1, 2].

While the use of an EAD involves a standardized sizing based on manufactured recommendations, the device sizing has been a long-time font of academic research and arguments [3, 4]. Two of the co-authors (DC, TVZ) of this editorial had the chance to work on such debated topic in their PhD-dissertations ('Selection of the proper LMA size: gender or weight based?' UniCampus, LUCBM, Rome, Italy, 1999 and 'Improvements towards safer extraglottic airway devices. University of Maastricht, The Netherlands, 2015). It does result that such issue may be common across several other EADs. Moreover, the correct sizing and recognition of factors influencing the effective and safe use of an LMA or EADs, seems critical in normal but even more in difficult airways [5].

It turns out that common anatomical factors and measurement, typically and readily available to be assessed, are differently associated with laryngeal anatomy distances and dimensions [6, 7] As well, the design of LMA was based on a generalized cast acquired in few subjects (cadavers): while it is true that subsequent studies used radiological information and clinical usage has confirmed the effectiveness of the LMA design, yet limitations of MRI and CT scan are well known [8–10].

In this issue of the Journal of Clinical Monitoring Zhue et al. [11] published an interesting study presenting a new method for the size-selection of the Classic LMA. In 74 patients before the induction of general anesthesia, the authors measured the linear distance between the cricoid cartilage and the mentum (C-M distance). The C-M distance reflects the length of the pharyngeal cavity and therefore, the CM-based size selection of the LMA provided a better airway seal and higher success rate of the first insertions than the weight-based method. This study confirms the hypothesis that the external neck landmarks are more useful in the LMA size selection than the weight-based method [6, 7, 12] Why only the LMA-Classic was studied and whether other EADs may be following the same rule remains a speculation, yet some of the reasons can be assumed in the considerations to follow.

In a recent study it was showed that the external neck measurements overestimate the internal measurements which can also be assessed by the ultrasound (US) exam [6, 10, 12]. The US proved to visualize the thyroid and arytenoid cartilages in control conditions and after the placement of the LMA [13, 14]. Likewise, such findings have been confirmed in a pediatric population as well: this is quite important especially in consideration of the view-changes from the traditional anatomy differences assumed and taught over previous years between adult and pediatric patients [15]. Indeed, US was able to detect the malposition of the LMA.

Based on Zhu et al. report [11], we are eager to assume that traditional strategies to use weight (considered as ideal body weight respective to height group) has proved effective (performing with adequate safety margins). Yet, other strategies may offer more accurate sizing and fitting of the LMA (maybe other EADs as well): such methods may result

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particularly and possibly better, when the values are outside normal ranges (extreme weights or ages).

It is also legitimate to think that when considering the variety of devices' design, as much as they can equally perform, has made researcher willing to look into other ways of estimating best-fit sizing and possibly even assigning different devices based on such anatomical landmarks. Additional thoughts about the study underscore a limitation and pertain the use of neuromuscular blockade: so the results might not be extrapolated to patients undergoing spontaneous respiration because hypothetically the hypopharyngeal muscle tension may affect LMA positioning. Another consideration pertains the CM distance: while it is indeed important, it does not differentiate between a patient with a large (obstructive) tongue and a patient with a normal size tongue. It is the space behind the tongue—distance back size of the tongue till the posterior pharyngeal wall—that may be important to be able to successfully insert the EAD behind the tongue into the hypopharynx.

In summary, Zhu et al. add another important evidence to support the use of US: a bedside, point of care examination potentially could finally offers an objective tool to size the best selection method for an EAD. Whether this will solve the issue of correct EADs sizing still needs to be proven in further studies.

Compliance with ethical standards

Conflict of interest All authors declare that they have no conflict of interest.

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