Correspondence

Comparing i-gel and Ambu AuraOnce laryngeal mask airway in pediatric patients

To the Editor

With great interest we read the recent article by Alzahem et al[1] comparing performance of i-gel and Ambu AuraOnce laryngeal mask airway (Ambu AO LMA) in deeply anesthetized and ventilated infants and children. They showed that oropharyngeal leak pressure (OPLP) was higher with the i-gel than with the Ambu AO LMA, but the Ambu AO LMA had a statistical tendency towards easier insertion and less manipulation. Other than the limitations described in the discussion; however, we note that several issues of this study were not well addressed.

First, this study was carried out in pediatric patients aged 0-14 years and the authors did not specify the size choices of 2 studied devices. Thus, it was unclear whether the sizes of 2 studied devices were comparable. In manufacturers' descriptions, the recommended sizes of 2 studied devices are based on body weights and the recommended ranges of body weights for size 2 or more devices are somewhat different; i-gel: size 1.0 for <5 kg, size 1.5 for 5-9.9 kg, size 2 for 10-24.9 kg, size 2.5 for 25-34.9 kg, size 3 for 35-50 kg; Ambu AO LMA: size 1.0 for <5 kg, size 1.5 for 5-9.9 kg, size 2 for 10-19.9 kg, size 2.5 for 20-29.9 kg, size 3 for 30-50 kg.[2] We are concerned that the improper size choice of 2 studied devices would have contributed to their findings.

Second, before device insertion, all patients received inhalational induction with 8% sevoflurane in 100% oxygen at flow of 8 L per minute through a circle system. We noted that there were 2 cases of desaturation in the i-gel group, despite average effective airway time was only 14.0 seconds. Unfortunately, the authors did not provide any possible reason for this problem. We believe that avoiding the relevant risk factors of desaturation is useful for others who would like to try airway management with the i-gel.

Third, in method, the authors described that children were followed up by phone the next day regarding complications such as dysphonia, dysphagia, cough, or stridor, as reported by their parents. However, the readers were not provided these results. In fact, postoperative complications associated with device use are of value for performance comparison.[3]

Finally, during the OPLP measurement, the airway pressure was not allowed to exceed 25-30 cm H_2O. It is generally recommended that the OPLP of supraglottic airway device should be determined by setting the pop-off valve to limit airway pressure to a fixed value.[4] Because average OPLP difference between i-gel and Ambu AO LMA is only 2.5 cm H_2O, we can not exclude the possibility that a designed 5 cm H_2O range of the airway pressure had confused the interpretation of their findings. Furthermore, the OPLP measurement was taken in deeply anesthetized and ventilated children, their results may be not extrapolated to spontaneously breathing and less deeply anesthetized children.

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Reply from the Author

We are thankful to Prof. Fu-Shan Xue et al for their interest in our study and thoughtful comments. They have raised some queries and we are happy to present our clarifications as follows:

1) Our study was carried out in children aged 0-14 years and we inserted either i-gel or Ambu AO supraglottic device (SGD). Regarding SGD size selection, our choice was centered on manufacturers' recommendation which is based on weight of the patients. Prof. Fu-Shan Xue and colleagues have presented a weight based selection of these SGDs and also furnished it with a reference; however, we would like to clarify that their chosen range is not according to the approvals of the manufacturers of these SGDs. The actual manufacturers' recommendations are as follows: i-gel: size 1.0 for 2-5 kg, size 1.5 for 5-12 kg, size 2 for 10-25 kg, size 2.5 for 25-35 kg, size 3 for 35-50 kg;[5]Ambu AO LMA: size 1.0 for <5 kg, size 1.5 for 5-10 kg, size 2 for 10-20 kg, size 2.5 for 20-30 kg, size 3 for 30-50 kg.[6] Our size selection was not "improper" as we strictly followed guidelines of the manufactures mentioned above. In this study, we compared performance of both SGDs by dividing our patients in 3 groups (wt <5kg, between 5-10 kg and >10 kg) irrespective of the size of the SGD used. We believe that the difference in the performance of both SGDs is based on their morphological differences which is even evident on gross eye examination (size and shape of the cup, type of material used, shape of the tip and ventilating tube, and the type of sealing mechanism, and so forth)

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and the impact of these SGDs on the airway. For further clarification regarding the contribution of these morphological differences on the performances of these SGDs and their impact on delicate pediatric airway, we would like to refer our respected colleagues to a novel study carried out by our research group in which we have compared and quantified the spatial relationship of both types of SGDs using three dimensional MRI measurements.[7]

2) All of our patients received inhalational induction of anesthesia with 8% sevoflurane in 100% oxygen and 2 patients in i-gel group developed desaturation despite the fact that successful airway time was only 14 seconds. We would like to refer them to Table 3 of our study[1] that shows that there were 2 cases of desaturation in i-gel group (wt <5 kg) and in those patients the SGD was successfully placed in first attempt which explains that these incidences of desaturation did not happen at the time of induction of anesthesia. Furthermore, we would like to add that all of these desaturation episodes occurred during maintenance phase of anesthesia and in the discussion section of our article (on page 487, right column, last paragraph), we have already mentioned that despite fixation of i-gel (following the guidelines of the manufacturer), it tended to slide out of the mouth, probably due to straight ventilating tube and needed to be pushed in to maintain a clear airway. The most probable reason in our opinion is ergonomics of the ventilating tube of the i-gel (as mentioned in the discussion section of our manuscript which is furnished with a figure also).

3) All parents of patients were contacted by telephone next day and all reported no adverse events such as dysphonia, dysphagia, cough, or stridor. We strongly feel that it was enough information to be described in the text as there was no adverse effect in any case. We should avoid unnecessary information due to limitation of word count and space in scientific journals.

4) Finally, regarding oropharyngeal leak pressure (OPLP) measurements, Prof. Fu-Shan Xue and colleagues have asked us that why we adjusted APL valve in the range of 25-30 cm H_2O and did not keep it at a fixed value. Our reply in this regards is that we deliberately adopted a 2-step measurement protocol for finding OPLP in our patients due to inclusion of neonates (with weight <5 kg) in our research. As the previous data regarding OPLP in this age group was limited (at the time of writing the protocol of our study) and previous research had shown OPLP to be below 25 cm H_2O[8,9] in pediatric patients, our methodology was that in the first step we fixed APL valve at 25 cm H_2O and in majority of our patients OPLP value was achieved even before reaching this arbitrary limit. However, if there was no leakage of gases at 25 cm H_2O, we adjusted the APL valve to a higher value of 30 cm H_2O to get an exact figure of OPLP for that patient. Furthermore, if there was no leakage of gases even at 30 cm H_2O, OPLP was recorded as 30 cm H_2O and no further test was done above this value in order to avoid barotrauma. This is our explanation regarding mentioning a range of 25-30 cm H_2O in our text. In our opinion, this technique is not likely to affect the results of OPLP as we raised APL valve to 30 cm H_2O if desired.

We are again thankful to our colleagues for their enquiries and are hopeful that our reply will satisfy them. We welcome any further correspondence by our respected colleagues.

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