Difficult tracheal intubation

Editor—We read with interest the article by Malik and colleagues. In their randomized, controlled study, the authors reported the superiority of two videolaryngoscopes over the conventional intubation technique in a population of patients showing predictors of difficult tracheal intubation. Interestingly, they demonstrated in their comparative trial that the intubation difficulty scale (IDS) score was higher in the Macintosh group than in the videolaryngoscope groups, but paradoxically, tracheal intubation time was shorter with the conventional tracheal intubation technique. The IDS was based on the concept that the longer tracheal intubation manoeuvres took, the higher the IDS. The IDS is calculated as the sum of seven variables, and it appears that the greatest weight is attributed to the Cormack and Lehane grade on direct laryngoscopy, as it was a major factor affecting duration of difficult tracheal intubation. This suggests that IDS must correlate with tracheal intubation duration. By showing an inverse relationship between IDS and difficult tracheal intubation duration, Malik and colleagues have demonstrated that IDS may be inappropriate for comparing difficult tracheal intubation with indirect glottic visualization systems or a conventional technique. The Cormack and Lehane grade of view has been validated as a marker of difficult tracheal intubation when a Macintosh laryngoscope is used for direct laryngoscopy. On the other hand, indirect glottic visualization systems in most cases give a good view of the glottis (Cormack and Lehane grade I and II), and difficulties in tracheal intubation do not rely on glottic view quality, but rather on tube manipulations. In our experience, the duration of these manipulations almost always exceed that of the delay of optimal glottis exposure. Then, the Cormack and Lehane grade of laryngoscopy and the IDS are probably of less relevance in comparing indirect glottis viewing systems with the conventional intubation technique and may not be an appropriate measurement tool. IDS has already been used in a comparison between the Airtraq laryngoscope and a conventional tracheal intubation technique. The authors have demonstrated in morbidly obese patients that tracheal intubation was of shorter duration and easier with the Airtraq than with the Macintosh laryngoscope, resulting in a median IDS=0 with the Airtraq, which is similar to that found in this study for the two videolaryngoscopes. These results suggest that IDS is probably not discriminating to measure tracheal intubation difficulties when indirect glottis visualization systems are compared. We believe that there is now enough evidence to support development and validation of a specific score adapted to indirect glottic viewing systems.

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Editor—We welcome the opportunity to respond to the issues raised by Combes and Dhonneur with regard to the use of the IDS score in our recent study. As they state, we found that the IDS score was significantly higher in patients at increased risk for difficult laryngoscopy who underwent tracheal intubation with the Macintosh laryngoscope compared with those intubated with either the Pentax AWS or Glidescope devices. They then make the point that the use of the IDS score to measure the difficulty of tracheal intubation with indirect laryngoscopes may be ‘inappropriate’ on the basis that the differences seen in the IDS score were not seen with regard to the duration of tracheal intubation attempts. We reject this assertion for a number of reasons. First, the duration of tracheal intubation attempts was not longer with the indirect laryngoscopes than with the Macintosh laryngoscope. As stated in the study, there were no significant differences between the devices with regard to the duration of tracheal intubation attempts. More importantly, the assumption that shorter duration of tracheal intubation attempts translates directly into reduced difficulty is an oversimplification. Although this may hold true when comparing different tracheal intubations with the same device, it is incorrect to assume that is the case when comparing tracheal intubations with different devices. For example, it is entirely possible that a tracheal intubation may be more difficult to perform with the Macintosh, and even result in patient injury, but take less time to perform than a tracheal intubation with an indirect laryngoscope. Furthermore, in our study, the IDS score findings correlated well with other indices of device difficulty, such as user-rated visual analogue scale scoring for difficulty of laryngoscopy, haemodynamic stimulation, and success of tracheal intubation attempts, attesting to the internal consistency of our findings regarding the IDS score. Although the IDS score was originally developed in patients undergoing direct laryngoscopy, it has proven a reliable, quantitative measure of tracheal intubation difficulty when used with indirect laryngoscopes, in several studies to date carried out by our group. The strength of the IDS scoring system is that it incorporates seven separate variables that each contribute...
to intubation difficulty, and therefore captures indices of difficulty common to both direct and indirect laryngoscopes. While the heaviest weight is given to the Cormack and Lehane grade, this appears reasonable, as reduced glottic view is a significant contributor to difficult laryngoscopy with both direct and indirect laryngoscopes. However, as stated in the original study, glottic exposure alone is an incomplete reflection of the degree of tracheal intubation difficulty and the authors allocated a maximum of three points to the Cormack and Lehane score, meaning that the contribution of this variable to the overall score is ‘moderate and quickly saturated’. This is borne out by the findings from our current study. It can be seen from Table 1, indicating the breakdown of IDS scores for each component, that the scores for the Macintosh were higher than those for the Glidescope and Pentax AWS® for each of the seven components of the IDS score. These findings demonstrate that the differences in IDS score were not simply due to differences in the component pertaining to the Cormack and Lehane grade obtained at laryngoscopy, but rather were spread across several of the variables used to calculate the IDS score.

Combes and Dhonneur also make the point that an alternative to the IDS score should be developed and validated for use with indirect laryngoscopes. A scoring system for difficulty of tracheal intubation, validated for use with both direct and indirect laryngoscopes, would indeed be welcome. However, any such scoring system will have to perform at least as well as the IDS score, which has been in widespread use for more than 10 yr, and will have to function equally well for both direct and indirect laryngoscopes, if it is to make a useful contribution to the field.

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Pharmacokinetic models for propofol: defining and illuminating the devil in the detail

Editor—We congratulate Absalom and colleagues on their effort to address this complex topic and trying to explain the problems, controversies, and differences that come with the current commercial target-controlled infusion (TCI) devices. There have been surprisingly few published papers about the differences between the pharmacokinetic models since they were introduced in so-called open TCI systems several years ago. However, there is clearly confusion among anaesthetists since the introduction of multiple models for the delivery of propofol by TCI. That such confusion exists is confirmed by a recent paper and editorial. We feel that this current article only partially resolves this confusion and leaves other important points unaddressed. In the text, the authors suggest that the pumps compensate for the erroneous calculation of the lean body mass (LBM) for obese people by offering ‘a pragmatic solution’, fixing the LBM to the maximum while allowing the weight and length to increase (Fig. 7 in original article). We are unable to confirm this statement using the latest software version in commercially available infusion pumps. Dependent on the height of the patient, the maximum weight is simply limited to the maximum LBM. Therefore, the graph in Figure 7 should be changed as illustrated in Figure 1. Note

Table 1 Components of IDS score for each device tested

<table>
<thead>
<tr>
<th>Component</th>
<th>Macintosh</th>
<th>AWS®</th>
<th>Glidescope</th>
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<tbody>
<tr>
<td>Number of attempts &gt;1</td>
<td>0.48 (0.96)</td>
<td>0.24 (0.43)</td>
<td>0.16 (0.47)</td>
</tr>
<tr>
<td>Number of operators &gt;1</td>
<td>0.16 (0.37)</td>
<td>0 (0)</td>
<td>0.04 (0.2)</td>
</tr>
<tr>
<td>Number of alternative techniques</td>
<td>0.28 (0.67)</td>
<td>0 (0)</td>
<td>0.04 (0.2)</td>
</tr>
<tr>
<td>Cormack and Lehane Grade 1</td>
<td>1.32 (0.75)</td>
<td>0 (0)</td>
<td>0.08 (0.3)</td>
</tr>
<tr>
<td>Lifting force required</td>
<td>0.92 (0.28)</td>
<td>0.32 (0.48)</td>
<td>0.2 (0.4)</td>
</tr>
<tr>
<td>Laryngeal pressure</td>
<td>0.8 (0.4)</td>
<td>0.28 (0.46)</td>
<td>0.16 (0.37)</td>
</tr>
<tr>
<td>Vocal cord mobility</td>
<td>0.4 (0.5)</td>
<td>0.4 (0.5)</td>
<td>0.04 (0.5)</td>
</tr>
<tr>
<td>Overall IDS score</td>
<td>4.36 (2.8)</td>
<td>0.92 (1.15)</td>
<td>0.84 (1.49)</td>
</tr>
</tbody>
</table>

6 Maharaj CH, O’Crinnin D, Curley G, Harte BH, Laffey JG. Comparison of tracheal intubation using the Airtraq or the Macintosh laryngoscope in routine airway management: a randomised, controlled clinical trial. Anaesthesia 2006; 61: 1093–9

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