Evaluation of a new laryngoscope according to preparation time

Sir,
The new laryngoscopes require unique preparation processes from those of the conventional Macintosh laryngoscope. Therefore, we measured the time required to prepare the various types of laryngoscopes.

Subjects comprised 30 operating room nurses. The preparation time, until actual intubation was measured for the Macintosh, McGrath™ MAC, Pentax AWS, and Airtraq laryngoscopes.

With the Macintosh and McGrath™ laryngoscopes, we measured the time it took to assemble the laryngoscope body, to apply lubricant gel to the tip of the intubation tube, and to insert the stylet into the tube. With the AWS, after attaching the blade to the body, we measured the time taken to apply the lubricant gel to the intubation tube and mount the tube in the blade gutter. With the Airtraq, we measured the amount of time it took to apply the lubricant gel to the intubation tube and mount the tube in the body gutter.

For statistical analysis, after examining the normal probability distribution using a Chi-squared test for adequate fit, comparisons were made between the groups using the two-tailed Mann–Whitney U-test. P < 0.05 was considered statistically significant.

Results

The median preparation time required until intubation was 13.44 s (interquartile 11.53–15.93) for the Macintosh laryngoscope, 12.93 s (11.77–14.67) for McGrath™ MAC, 29.36 s (20.76–32.04) for Pentax AWS, and 12.71 s (9.46–17.19) for Airtraq. The results showed that the preparation time was significantly longer for the Pentax AWS than for the Macintosh laryngoscope, the McGrath™ MAC, and the Airtraq. (P < 0.01) [Figure 1]. No further significant differences or correlations could be made between the scopes with the data obtained in this study (the Macintosh vs. the McGrath MAC P > 0.43, the Macintosh vs. the Airtraq P > 0.40).

Discussion

Our results definitively showed that the Pentax AWS took significantly more time to prepare until intubation than the Macintosh laryngoscope. When performing intubation using...
the Pentax AWS, a separate, disposable attachment called a PBlade opens up the larynx first. Next, an intubation tube needs to be fitted to a lateral groove on this PBlade, which can be challenging. This may be because the lateral groove is shallow, making it easy for the tube to disconnect when one attempts to fit it to the groove. Further time is lost when taking measures to ensure that the tip of the tube remains uncontaminated. This extended preparation time appears to be a drawback of the Pentax AWS, which could limit its use in emergency situations. However, because most reports indicate the utility of the Pentax AWS, we believe that this drawback needs to be resolved. In departments where emergency intubation is frequently performed, it could be useful to mount the PBlade to the main unit of the Pentax AWS in advance. More importantly, medical staff who prepare equipment for intubation should be regularly educated and trained to minimize the preparation time.

No significant differences were noted between the Macintosh laryngoscope and the Airtraq, whose structure is similar to that of the Pentax AWS. This could be because the Airtraq does not require assembly and the intubation tube is very easy to mount as the lateral groove is deep. Previously, we reported that the deep lateral groove of the Airtraq made it easy to mount the tube during emergencies.\(^1\) There are several features of the Airtraq that differ from those of the Pentax AWS. The anti-fog feature of the Airtraq tip lens takes seconds or tens of seconds to come into operation after the power has been turned on, but we did not measure the time required for this anti-fog feature to function in the present study. This useful feature takes time in the case of the Airtraq and the power must be switched on immediately when preparing the Airtraq in case of emergency.

We observed no significant differences between the McGRATH™ MAC and the Macintosh laryngoscope. This could be due to extremely simple assembly and similar intubation preparation procedures, which could be favorable to staff unfamiliar with intubation preparation.

This study had a number of limitations. First, this research targeted 30 operating room nurses, but statistically, 30 people are too few. Second, the subjects were relatively experienced operating room nurses. Different results may have been obtained if individuals had been medical staff inexperienced in preparation and intubation. Pentax AWS preparation was time-consuming even for experienced operating room nurses, and untrained staff would have taken substantially longer to set up the Pentax AWS. The third limitation was this study was only a simulation, and the results were not a measurement of actual emergency situations. It is likely that actions that are time-consuming during a simulation would be even more time-consuming in actual practice. Going forward, clinical studies pertaining to these issues need to be considered, i.e., preparation measurements would need to be performed in actual clinical sites. The fourth limitation was that in an emergency when tracheal intubation of a patient is only seconds late, we cannot know how that patient’s condition will change. The fifth limitation was that measurements were not performed in a crossover manner. As the individuals were operating room nurses well-experienced in intubation preparation for each of the laryngoscopes, we did not investigate the potential learning curves in this study. Going forward, these methods should be repeated by subjects who are not well-experienced.

Conclusions

The preparation time for intubation was longer for the Pentax AWS, one of the new intubation devices, than for the conventional Macintosh laryngoscope. Despite the time challenge, the Pentax AWS is a useful intubation device\(^2\) and emergency staff need to make an effort to become more skilled in using and handling this device to reduce intubation preparation time and validate the use of this device.

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Conflicts of interest
There are no conflicts of interest.

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Ultrasound as a guide to reposition a misdirected central venous catheter

Sir,

Central venous cannulation is a routine procedure done for a variety of indications. It is associated with several complications, misdirection of catheter being one of them. Catheter misdirection has an incidence of 1% to >60%.

Misdirected catheters are usually withdrawn and repositioned over a guidewire.

We report a case of misdirection of a central venous catheter inserted into the right internal jugular vein (IJV) into the right subclavian vein and its subsequent management.

A 45-year-old male patient with a diagnosis of acute myeloid leukemia was referred to our department for central venous catheterization for chemotherapy. A 7 French, triple-lumen catheter was placed in the right IJV under ultrasound guidance and fixed at 13 cm at the skin. A postprocedure chest radiograph showed the catheter to be misdirected into the ipsilateral subclavian vein [Figure 1].

To reposition, an ultrasound probe was placed in the right infraclavicular region and the subclavian vein was identified along the long axis. 5 mL of saline was rapidly injected into the distal port of the catheter, and microbubbles due to turbulence (swirl sign) were noted within the subclavian vein [Figure 2]. A guidewire was inserted into the central venous catheter and was subsequently identified entering the subclavian vein. The catheter and guidewire were then withdrawn. The ultrasound probe was then placed over the right IJV along the long axis and the guidewire further withdrawn until the J tip was visualized within the vein. The probe was again placed in the infraclavicular region as before. The guidewire was gently reinserted up to 20 cm mark at the skin. As the guidewire was not identified entering the right subclavian vein, the catheter was inserted over the guidewire. Rapid saline flush did not result in swirl sign in the subclavian vein.

A postprocedure chest radiograph revealed the catheter tip corresponding to the lower half of the superior vena cava (SVC) [Figure 3].

The correct positioning of the catheter tip in the SVC is necessary for central venous pressure monitoring and for the longevity of the catheter. Misdirection of central venous catheter is commonly reported with subclavian vein cannulation but only rarely with right IJV cannulation. This is likely because of the right IJV entering the SVC in a straight course. The Anesthesiologists Task Force recommends the routine use of ultrasound in cannulation of the IJV and a

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