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ABSTRACT

Objective: To evaluate the performance of the Airtraq optical laryngoscope for tracheal intubation by novice laryngoscopists, compared with that of the Macintosh laryngoscope.

Methods: Under supervision by staff anaesthetists, non-anaesthesia physicians performed tracheal intubation using either the Airtraq optical laryngoscope (n = 100) or the Macintosh laryngoscope (n = 100). The time required for airway instrumentation, the number of attempts until successful intubation and erroneous oesophageal intubation were investigated.

Results: The time to secure the airway was shorter with the Airtraq optical laryngoscope than with the Macintosh laryngoscope (p<0.001). The number of attempts until successful intubation was smaller with the Airtraq optical laryngoscope than with the Macintosh laryngoscope (p<0.001). Erroneous oesophageal intubation was less with the Airtraq optical laryngoscope than with the Macintosh laryngoscope (p<0.01).

Conclusion: The Airtraq optical laryngoscope reduces the time to secure the airway and the incidence of failed tracheal intubation by novice laryngoscopists.

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The Airtraq optical laryngoscope (Prodol, Vizcaya, Spain; fig 1) is a new, single-use rigid video laryngoscope, which provides a high-grade, indirect close proximity view of the glottis without aligning the oral, pharyngeal and laryngeal axes.1-3 The proximal viewfinder of the scope reflects an image transferred from the distal tip of an oropharyngeal airway-shaped blade through a series of lenses, prisms and mirrors. This disposable plastic device, costing €50, has a battery-powered light source and heating system designed to prevent misting of the mirrors. In addition, the Airtraq device has a guiding channel that directs the tracheal tube through the glottis, and hence it may facilitate tracheal tube insertion once the glottis has been aligned with the centre of the laryngeal inlet on the view field. Both the magnified image of the vocal cords and the built-in guiding channel of the tracheal tube may be advantageous, especially to those physicians who only perform tracheal intubation occasionally. We conducted a randomised study to compare the performance of the Airtraq optical laryngoscope with that of the conventional Macintosh laryngoscope when used by novice laryngoscopists.

METHODS

After approval of the study by the local ethics committee, written informed consent was obtained from surgical patients. Patients with a history of previous difficult intubation and those with cervical spine fracture or cervical spine instability were excluded. In all, 43 non-anaesthesia novice physicians receiving anaesthesia training (median period 6 weeks, range 1–36 weeks) in performing tracheal intubation using the Airtraq optical laryngoscope equipped with an external monitor display9 (n = 100) or the Macintosh laryngoscope (n = 100). The allocation to the two groups was randomly assigned using numbers drawn from a random numbers table. The non-anaesthesia novice physicians received a short demonstration of the Airtraq device and were allowed five to six practice intubations using a Laedal airway management trainer (Laedal Medical, Japan) before using the new device clinically.

Patients were comparable with respect to age (Airtraq, 57 years (SD 16) vs Macintosh, 56 years (SD 15)), weight (58 kg (SD 11) vs 60 kg (SD 12)) and height (158 cm (SD 8) vs 159 cm (SD 11)). A staff anaesthetist supervised each laryngoscopy and an independent observer recorded the duration of tracheal intubation attempts using a stopwatch. The time to secure the airway was defined as the time from interruption of intermittent positive pressure ventilation to connecting the endotracheal tube to an anaesthesia circuit. When the first intubation attempt failed, the patient’s lungs were ventilated again with 100% oxygen via bag–mask ventilation to avoid oxygen desaturation and the duration of the subsequent attempt was added to the time required to secure the airway.

Correct placement of the tracheal tube was confirmed by the appearance of the end-tidal carbon dioxide trace on the monitor screen. The incorrect tube placement was identified immediately and tracheal intubation was subsequently established successfully. The time required for instrumentation, the number of attempts until successful endotracheal intubation and erroneous oesophageal intubation were recorded for each patient. Data were analysed appropriately using Student’s t test, Mann–Whitney U test and χ² test. A value of p<0.05 was considered significant.

RESULTS

The time to secure the airway was significantly shorter with the Airtraq than with the Macintosh laryngoscope (table 1). The number of attempts until successful intubation was smaller with the Airtraq optical laryngoscope than with the Macintosh laryngoscope (fig 2). Erroneous intubation of the oesophagus occurred less with the Airtraq optical laryngoscope than with the Macintosh laryngoscope (table 1).
DISCUSSION

The Airtraq optical laryngoscope provided superior intubation conditions for personnel training in airway management, resulting in less time to secure the airway, a smaller number of attempts until successful intubation and less incidence of erroneous oesophageal intubation. The most widely accepted method for tracheal intubation is currently direct laryngoscopy using the Macintosh laryngoscope. This technique requires both a line of sight view to the larynx and steerage of the tracheal tube and is acknowledged to be a difficult skill for occasional users to master. In this respect, the Airtraq has an oropharyngeal airway-shaped blade and a guiding channel for tracheal tube placement, and therefore the device appears to require less operator skill. Tracheal intubation using the Airtraq device, compared with the Macintosh laryngoscope, may be advantageous for medical personnel who perform tracheal intubation infrequently, particularly in emergencies outside of the operating theatre. Both the close proximity view of the glottis and the guide channel for tracheal tube placement contribute to the less frequent incidence of failed tracheal intubation in this group of users.

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REFERENCES


