

Tracheal intubation by non-anaesthetist physicians using the Airway Scope

Yoshihiro Hirabayashi, Norimasa Seo

Objective: To evaluate the performance of the Airway Scope for tracheal intubation by non-anaesthetist physicians.

Methods: Under supervision by staff anaesthetists, non-anaesthesia residents performed tracheal intubation using either the Airway Scope (n=100) or Macintosh laryngoscope (n=100). The time required for airway instrumentation and the success rate at first attempt were investigated.

Results: The time to secure the airway was shorter with the Airway Scope than with the Macintosh laryngoscope ($p<0.001$). The success rate at first attempt was higher with the Airway Scope than with the Macintosh laryngoscope ($p<0.001$).

Conclusion: The Airway Scope may reduce the time to secure the airway and the incidence of failed tracheal intubation in novice laryngoscopists.

Tracheal intubation is a lifesaving procedure used in many clinical situations. Failed tracheal intubation is sometimes serious, especially in emergencies. Direct laryngoscopy using the Macintosh laryngoscope is the most widely used technique for tracheal intubation. However, this technique is acknowledged to be a difficult skill for occasional users to master.¹ Evidence from the literature indicates that the incidence of inaccurate intubation can be unacceptably high in such users.^{2,3} Thus, any device that could reduce the incidence of failed, inaccurate or erroneous intubation deserves attention.

The Airway Scope (Pentax, Tokyo, Japan) is a new, rigid laryngoscope for tracheal intubation, providing a non-line-of sight view of the airway.⁴⁻⁶ It has a built-in 2.4 inch monitor screen that displays an image from a charge-coupled device attached to the tip of the scope. A single-use blade protects the camera unit from oral contamination and accepts a tracheal tube with an outside diameter between 8.5–11 mm. Once the target signal shown on the monitor is aligned with the glottis opening, pushing the tracheal tube along with the tube guide allows it to pass through the vocal cords. We conducted a randomised study to compare the performance of the Airway Scope with that of the Macintosh laryngoscope when used by non-anaesthetist physicians.

METHODS

After ethics committee approval, written informed consent was obtained from surgical patients. Patients with a history of previous difficult intubation, or patients with cervical spine fracture or cervical spine instability, were excluded. In all, 26 non-anaesthesia residents with a median clinical training period of 5 weeks (range 1–24 weeks) performed tracheal intubation using either the Airway Scope (n=100) or Macintosh laryngoscope (n=100). The allocation to two groups was randomly assigned using numbers drawn from a

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random numbers table generated by a personal computer. Patients were comparable with respect to age, weight and height. A staff anaesthetist supervised each laryngoscopy and an independent observer recorded the duration of tracheal intubation attempts. When the first intubation attempt failed, the patient's lungs were ventilated again with 100% oxygen via bag-mask ventilation, and the duration of the subsequent attempt was added to the time to secure the airway. The incorrect tube placement was identified immediately and tracheal intubation was successfully established. We investigated the time required for airway instrumentation and the success rate at first attempt. Data were analysed appropriately using Student's t test, Mann-Whitney U test or Yates' corrected χ^2 test. A value of $p<0.05$ was considered significant.

RESULTS

Table 1 shows the differences in tracheal intubation procedure using the Airway Scope and Macintosh laryngoscope. The time to secure the airway was shorter with the Airway Scope than with the Macintosh laryngoscope. The success rate at first attempt was higher with the Airway Scope than with the Macintosh laryngoscope. No oesophageal intubation was experienced using the Airway Scope approach.

DISCUSSION

The Airway Scope appears to require less operator skill. The high-resolution image with the wide-angle view and the target signal shown on the monitor are helpful for operators. The unobstructed view of the glottis is easily secured through a non-line-of sight view even with novice personnel. Other individuals apart from the operator can verify the tracheal intubation. The Airway Scope is advantageous for non-anaesthetist physicians who are required to perform tracheal intubation only infrequently outside the operating room in emergency situations. The Airway Scope may reduce the time to secure the airway and the incidence of failed tracheal intubation in this group of users.

Table 1 Differences in tracheal intubation procedure using the Airway Scope and Macintosh laryngoscope by non-anaesthesia residents

	Airway Scope	Macintosh laryngoscope
Time to intubation (s)	41 (19)*	69 (41)*
Attempts until successful intubation (1/2/3 times)	97/3/0†	69/27/4†
Erroneous intubation of the oesophagus	0‡	8‡

*Mean (SD), $p<0.001$ (Student's t test).

†Number of cases, $p<0.001$ (Mann-Whitney U test).

‡Number of cases, $p<0.05$ (Yates' corrected χ^2 test).

Authors' affiliations

Yoshihiro Hirabayashi, Norimasa Seo, Department of Anesthesiology and Critical Care Medicine, Jichi Medical University, Tochigi, Japan

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Correspondence to: Dr Yoshihiro Hirabayashi, Department of Anesthesiology and Critical Care Medicine, Jichi Medical University, 3311-1 Yakushiiji, Shimotsuke-shi, Tochigi, 329-0498, Japan; yhira@jichi.ac.jp

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