

THE MANAGEMENT OF DIFFICULT DIRECT LARYNGOSCOPY AND INTUBATION IN A FIELD HOSPITAL: AN ALTERNATIVE TO FIBROPTIC ENDOSCOPY

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Abstract

Fibreoptic endoscopy and intubation continues to be recommended in guidelines for the management of difficult airways. Since fibrescopes are unavailable within United Kingdom field hospitals, an alternative is needed. The Airtraq optical laryngoscope is a versatile, inexpensive, single-use option, which could readily fill this void. It is easy to use and provides a full view of the glottis when direct laryngoscopy has failed. Its introduction will reinforce existing difficult airway equipment and simplify the management of 'can ventilate - can't intubate' patients.

Introduction

Difficulty or failure to intubate the trachea is an important cause of morbidity and mortality in the operative and emergency settings (1). Difficult direct laryngoscopy and difficult intubation have a similar incidence at 1.5% - 8.5% of general anaesthetics (2). Using airway assessment tests and clinical criteria, difficulty with airway management may be anticipated (3). However, patient factors, observer variability and experience contribute to poor reliability estimates in some bed-side tests (4). Consequently, unanticipated difficult tracheal intubation continues to occur with a low but consistent incidence. Guidelines for the management of the difficult airway in adult patients have been published and fibreoptic tracheal intubation, in experienced hands, continues to be a recommended approach for dealing with many types of difficult intubation (5). Within deployed United Kingdom field hospitals, fibrescopes are not available, which restricts the effectiveness of military anaesthetists to deal with unanticipated difficult laryngoscopies and intubations.

The purpose of this article was to identify an alternative device to the fibroscope, which could consistently deal with anticipated and unanticipated difficult laryngoscopies and intubations and occupy the current void. Is the Airtraq laryngoscope (Prodol Meditec SA., Vizcaya, Spain), the ideal product, which will enable military anaesthetists to easily manage the 'can ventilate - can't intubate' patient? Should the Airtraq be made available within field hospitals at the earliest opportunity?

The Airtraq Laryngoscope

The Airtraq is an anatomically shaped optical laryngoscope, (Fig. 1) which has been developed for the management of difficult and normal tracheal intubations (6-8). Its design provides a view of the glottis without the need to align the oral, pharyngeal and

laryngeal axes. The Airtraq consists of a blade that has two parallel conduits: the optical and guiding channels. A low temperature battery operated light is present at the tip of the blade. The optical channel contains a high definition optics system, which transmits the image to the proximal viewfinder using a combination of lenses and prisms, rather than fibreoptic technology. An anti-fog system is built into the distal end of the optical channel. The viewfinder allows visualisation of the tip of the tracheal tube, the glottis and surrounding structures (Fig 2). The tracheal tube is placed in the right-sided guiding channel, which holds the tracheal tube and guides it through the vocal cords. Standard tracheal tubes between sizes 6.0 mm to 8.5 mm from any manufacturer may be used in the corresponding Airtraq (Table 1).



Figure 1. The Airtraq optical laryngoscope with a tracheal tube located in the guiding channel.



Figure 2. The view of the glottis and surrounding structures as seen through the Airtraq optical channel.

Size	Colour	Tube size	Inter-dental gap
Regular	Blue	7.0 – 8.5 mm	18 mm
Small	Green	6.0 – 7.5 mm	16 mm

Table 1. Selecting the appropriate size tube and Airtraq.

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Airtraq Intubation Method

An appropriate sized and lubricated tracheal tube is loaded into the guiding channel of the corresponding Airtraq. Holding the device in the left hand with the light turned on, the blade of the Airtraq must be inserted into the midline of the mouth, over the tongue and the tip positioned in the vallecula (Fig. 3). In adults an interdental gap of 18 mm is sufficient for a size 3 Airtraq to be easily inserted. The view of the glottis is optimised by lifting the blade in the vallecula, which elevates the epiglottis and by moving the Airtraq to either the left or right. Only then should the tracheal tube be passed through the vocal cords, and the laryngoscope removed from the airway.

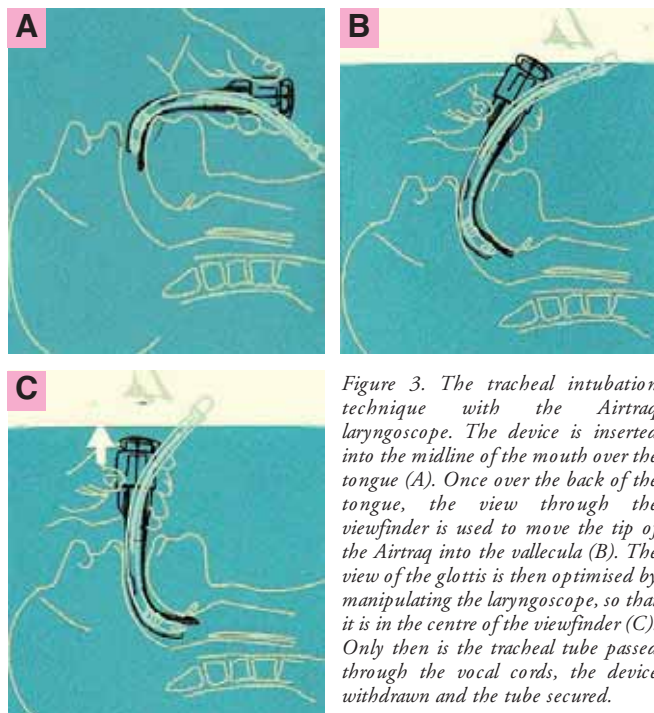


Figure 3. The tracheal intubation technique with the Airtraq laryngoscope. The device is inserted into the midline of the mouth over the tongue (A). Once over the back of the tongue, the view through the viewfinder is used to move the tip of the Airtraq into the vallecula (B). The view of the glottis is then optimised by manipulating the laryngoscope, so that it is in the centre of the viewfinder (C). Only then is the tracheal tube passed through the vocal cords, the device withdrawn and the tube secured.

Discussion

It is unlikely that fibrescopes will be made available within our field hospitals in the near future. They are expensive, insufficiently robust for military use and without specialised equipment to clean, decontaminate and pressure test, they are logistically difficult to maintain. However, there is an urgent need for a cost effective intubating device that offers many of the advantages of a fibrescope. Although the various video laryngoscopes (e.g. Pentax-AWS/PBLADE and the Glidescope®) and rigid endoscopes (e.g. Bonfils) have many favourable features they are universally expensive, whereas the Airtraq is inexpensive.

With the exception of the fibrescope, the range of specialised intubation equipment which is currently available in field hospitals reflects NHS best practice. However, when faced with a Cormack and Lehane grade III or IV view, despite optimal direct laryngoscopy and the aid of adjuncts, the subsequent attempt at tracheal intubation remains a blind procedure (9). The insertion of a tracheal tube using the intubating laryngeal mask airway (ILMA) is similarly a blind procedure. Intubation with the Airtraq is rarely blind, as an indirect image of all the glottis is achieved regardless of the Cormack and Lehane grade on direct laryngoscopy (7).

We are not suggesting that the Airtraq replaces the existing equipment, but the military anaesthetist needs a supplementary device beyond what is currently available to manage difficult laryngoscopy and intubation. Manikin and patient studies have shown that the Airtraq is easy to use and has a short learning

curve, which is unrelated to previous airway management experience (8, 10).

Following cervical spine immobilisation, the view on direct laryngoscopy and tracheal intubation is rarely easy. Since the Airtraq does not require a line of sight from the incisors to the vocal cords, intubation should be performed with the head and neck in the neutral position. Hyperextension of the cervical spine is therefore avoided (6). The Airtraq could also improve and simplify tracheal intubation in the pre-hospital environment. A recent manikin based study has shown that intubation at floor level was significantly easier and faster with the Airtraq than the Macintosh laryngoscope (11). During entrapment when access to the top of the head is restricted and alignment of airway axes is not possible, the Airtraq laryngoscope could facilitate intubation from the front.

As a disposable single-use device, there is no risk of contracting variant Creutzfeldt-Jakob disease and other blood-borne diseases from the Airtraq, which exists with reusable instruments like the McCoy laryngoscope (12). There are no reports of injury following use of the Airtraq laryngoscope.

A potential limitation of the Airtraq would be contamination of the distal optical channel, following haemorrhage into the airway. However, suctioning the pharynx prior to inserting the Airtraq should remove blood and airway secretions. To date, there is no published data evaluating use of the Airtraq in airway trauma or following rapid sequence induction. Whilst the Airtraq cannot function as a supraglottic airway, through which oxygenation and ventilation can be maintained, the ease with which it facilitates tracheal intubation, strongly supports it establishing a role in the management plan for all types of difficult laryngoscopies and intubations. It is the solution to the 'can ventilate - can't intubate' patient that military anaesthetists have been waiting for.

The Airtraq laryngoscope should immediately be introduced into United Kingdom field hospital modules as an 'alternative laryngoscope', given its ease of use and advantages over direct laryngoscopy. However, as with all new devices and techniques, it is prudent for clinicians to first become familiar and competent with the Airtraq within a controlled environment and in patients with normal airways.

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CORRECTIONS

Williams K, Izard R. Epidemic of non-freezing cold injury in the British Army. *JR Army Med Corps* 2007; 152(2): 143

Reference 1 of the above Letter to the Editor was printed incorrectly. The correct reference is given below.

Imray CHF, Oakley EHN. Cold still kills: Cold related illnesses in military practice: freezing and non-freezing cold injury. *J R Army Med Corps* 2005; 151 (4) 218-22

Sharm-Datta S, Hill G. Improvised equipment for skeletal traction on operations. *J R Army Med Corps* 2007; 153 (2): 144

The first authors name was reproduced incorrectly and the correct details are included below

Dharm-Datta S, Hill G. Improvised equipment for skeletal traction on operations. *J R Army Med Corps* 2007; 153(2): 144

In the Triservice Surgical Meeting Abstracts published in June's edition of the Journal, the introduction incorrectly described the winner of the poster competition as Capt (now Major) Scott; it should have read Capt (now Major) Edwards.