A survey of nasotracheal intubating skills among Advanced Trauma Life Support course graduates

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SUMMARY

The American College of Surgeons' Advanced Trauma Life Support procedure teaches that blind nasotracheal intubation should be performed in the presence of a suspected or proven cervical spine injury in an unconscious but breathing patient who requires an artificial airway. We studied a group of non-anaesthetically trained graduates of the Advanced Trauma Life Support course and examined their skill in performing blind nasal intubations. Only six in 90 attempts were successful. We conclude that, in British hospitals, blind nasotracheal intubation should not be recommended as the first line management in securing the airway of patients with suspected or proven cervical spine injury. Alternative techniques such as bag-and-mask ventilation with cricoid pressure or a laryngeal mask airway with cricoid pressure should be adopted until oral intubation with in-line traction is performed. (Br. J. Anaesth. 1994; 72: 195–197)

KEY WORDS

A working party from the Royal College of Surgeons of England reported in 1988 that the management of trauma patients that reach hospital in this country is suboptimal [1]. The Advanced Trauma Life Support (ATLS) course was started in the United States in 1978 in response to the experiences of an American surgeon at a community hospital in Nebraska. The course teaches a didactic system of management aimed at the care of trauma patients in the early period after injury—referred to as the "golden hour" [2]. Since 1988, ATLS courses have been established in the U.K. and our centre now holds five courses each year, teaching 90 doctors. Attendance at these courses has been encouraged by the Royal College of Surgeons of England. Although it is planned that the handbook which accompanies the course will, in the future, contain suggestions from a British ATLS working party, at present it is an exact replica of the one used in the U.S.A.

The method taught for management of the airway in the trauma patient has been criticized recently [3, 4]. Students are taught that, in the breathing but unconscious patient with either proven or suspected cervical spine injury, intubation should be performed using a blind nasotracheal technique. After three failed attempts at intubation, each attempt lasting the equivalent of a breath-hold, orotracheal intubation with in-line cervical stabilization or a surgical airway should be established. The students are required to practise this skill on a mannikin.

We investigated the skills of a group of non-anaesthetically trained ATLS graduates from mainly surgical specialties within our hospital.

METHODS

After obtaining Ethics Committee approval, we studied the ability of 15 ATLS graduates to intubate nasally a group of ASA I patients who presented for routine dental surgery for which a nasotracheal tube was required. Each patient gave informed consent and agreed to the application of cervical spine stabilization when they were asleep. None of the patients received premedication, and after an i.v. cannula had been inserted they were given a dose of thiopentone sufficient to obtund the eyelash reflex and anaesthesia was deepened gradually with a mixture of 70% nitrous oxide in oxygen and increasing concentrations of isofluorane. When the patient was asleep, the cervical spine was stabilized by placing a sand bag on each side of the head and neck and securing them together with adhesive tape across the forehead. A vasoconstrictor was applied to the inside of each nostril. Monitoring consisted of ECG, pulse oximetry and non-invasive arterial pressure.

The ATLS graduate was asked the size of tracheal tube they thought appropriate for each patient and was given either a 6.5-mm or 7.5-mm Portex tracheal tube, depending on the gender of the patient. Portex tubes were used as these are available in the accident and emergency department. Additional intubating experience was recorded. When the supervising anaesthetist had achieved an adequate depth of anaesthesia, the gas mixture breathed by the patient was changed to 5% isoflurane in oxygen. After 2 min of breathing this mixture, the mask and Guedel airway (if used) were removed and the ATLS graduate was allowed 30 s (a standard time
equivalent to a breath-hold) to intubate the trachea and to say if they thought the nasotracheal tube was in the correct position. Correct placement was verified by capnography, visualization and auscultation. If it was positioned correctly, anaesthesia was maintained with a standard gas mixture. If, however, it was positioned incorrectly, it was removed and the anaesthetist administered 5% isoflurane in oxygen, via a face mask. Each ATLS graduate was allowed six attempts at nasal intubation and the number of successful attempts recorded. A maximum of three attempts was allowed in any one patient. The occurrence of trauma or neck movement was noted.

RESULTS

Thirty-three patients were recruited to the study and a total of 90 attempts at intubation were performed by 15 ATLS graduates. The courses attended were spread over a 3-yr period and the grade of graduate ranged from senior registrar to senior house officer. There were six successful intubations, five of which were thought to be placed correctly by the ATLS graduate. Of the 84 unsuccessful attempts, three were thought to be in the trachea when the oesophagus had been intubated. Only one graduate expressed any confidence in his/her ability with the technique and this derived from additional intubating experience as an intensive care registrar. This person (the only one in the group with such experience) was successful in two of six attempts. The other successes came from different individuals without any additional intubating experience, each of whom had one success in six attempts. An appropriate size of tracheal tube was selected on 88 occasions, although only one graduate (with additional intubating experience) was able to ask for the tube by diameter, as opposed to selecting it by sight. Epistaxis occurred in 56 (62%) attempts and the neck was moved in five attempts (6%).

DISCUSSION

Nasal intubation was first reported in 1902, but it was in 1930 that the technique of blind nasotracheal intubation was popularized by Magill. It is a technique learned only by practice [5] yet, on the ATLS course, proficiency is determined by the ability to intubate a mannikin successfully on only one occasion. Supervision of the attempts may be by an ATLS provider who is not trained in anaesthesia. The occurrence of neck movement during intubation (6%) is alarming in a technique advocated for use in an ATLS provider. Of the 84 unsuccessful attempts, three were thought to be in the trachea when the oesophagus had been intubated. Only one graduate expressed any confidence in his/her ability with the technique and this derived from additional intubating experience as an intensive care registrar. This person (the only one in the group with such experience) was successful in two of six attempts. The other successes came from different individuals without any additional intubating experience, each of whom had one success in six attempts. An appropriate size of tracheal tube was selected on 88 occasions, although only one graduate (with additional intubating experience) was able to ask for the tube by diameter, as opposed to selecting it by sight. Epistaxis occurred in 56 (62%) attempts and the neck was moved in five attempts (6%).

and cervical stabilization was not used. In describing nasotracheal intubation as an easily mastered psychomotor skill with a low complication rate, Danzl and Thomas reported a success rate of 92% in emergency room patients requiring nasal intubation [7]. The physicians examined had at least 3 months' experience in emergency medicine, but the time taken to intubate and incidence of hypoxia were not recorded; again, cervical stabilization was not performed.

Our study suggests that blind nasotracheal intubation by ATLS-trained doctors in spontaneously breathing patients with cervical neck stabilization should not be recommended. What are the alternatives? Although the aim of the ATLS course is to enable "horizontal transmission" of responsibility such that all members of the trauma team can perform each other's task, that of airway management would be better performed by a "vertical transmission" of responsibility to an anaesthetist, if available. The options available to the anaesthetist are bag-and-mask ventilation, insertion of a laryngeal mask airway, blind nasal intubation, orotracheal intubation with in-line cervical stabilization, fibroptic nasal intubation or creation of a surgical airway.

In a retrospective study of patients with unstable cervical spine fractures, in 29 of 94 patients the trachea was intubated orally with in-line neck stabilization [8]. There were no neurological complications in any patient. The Maryland Institute for Emergency Medicine reported that the safe and efficient management of the airway in patients who presented with suspected or actual spinal cord injury had been achieved by oral intubation in more than 600 patients per year between 1983 and 1988 [9]. They advocated the use of cricoid pressure and mask ventilation in the hypoxaemic trauma patient immediately on presentation in the emergency department and before formal intubation. Other studies have shown no change in neurological status in groups of 17 [10] and 31 patients [11] who underwent oral intubation with in-line cervical stabilization.

Recently, the use of the laryngeal mask airway (LMA) has been advocated as an alternative measure to maintain the airway in emergency trauma patients with cervical injuries [12]. It has been shown that the LMA can be inserted more rapidly, more gently and more reliably than a tracheal tube when the cervical spine is immobilized. Although it does not protect the lungs from soiling, it enables oxygenation in the event of failed tracheal intubation, and this may prevent secondary neurological damage, with minimal movement of neck structures.

In conclusion, we feel that the adoption of the airway management procedures advocated by the Committee on Trauma of the American College of Surgeons (a committee which does not include an anaesthetist) by British trauma teams should be reviewed. The technique of blind nasal intubation in a patient with cervical spine stabilization is difficult to master and taught inadequately on the ATLS courses. Alternatives such as bag-and-mask ventilation with cricoid pressure or an LMA with cricoid pressure should be used until a doctor more
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skilled in airway management arrives. The doctor can then decide, in the light of his/her own experience, what is the most appropriate method of airway control.

REFERENCES