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CLINICAL PAPER

Use of the intubating laryngeal mask airway in emergency pre-hospital difficult intubation☆

Eric Tentillier[a,*], Claire Heydenreich[a], Anne-Marie Cros[b], Valérie Schmitt[a], Jean-Michel Dindart[a], Michel Thicoïpé[a]

[a] *SAMU 33, Department of Emergency SAMU-SMUR, Pellegrin Hospital, 33076 Bordeaux Cedex, France*
[b] *Department of Anaesthesiology — IV, Pellegrin Hospital, 33076 Bordeaux Cedex, France*

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Trauma

Summary
Aim of the study: While several techniques are used for the management of difficult intubation (DI) in planned conditions in the operating theatre, they are not always suitable or usable in pre-hospital emergencies. We decided to assess the intubating laryngeal mask airway (ILMA) after failure of tracheal intubation (TI) under direct laryngoscopy.
Material and methods: After emergency physicians of the mobile intensive care unit were trained (theory and training on manikin) in using the ILMA (Fastrach™), prospective data were collected after each use from March 2002 to December 2005. Data included patient's age, clinical status, number of direct laryngoscopies before using ILMA, Cormack and Lehane grade, subjective and objective evaluation of ease of ILMA insertion and TI (analogue scale from 1 to 10, attempts required, failure rate).
Results: Over 46 months, the ILMA was used 45 times (24: cardio-respiratory arrest, 21: anaesthesia with rapid sequence induction). Median age was 59 years [range 20—86]. The number of direct laryngoscopy attempts was 3 [0—4] (76% Cormack 4). The success of ILMA insertion and TI were 96 and 91%, respectively.
Conclusion: Emergency physicians were satisfied with using the ILMA. It allowed TI in 91% of cases of DI. The ILMA can be recommended to be included in the algorithm of DI in pre-hospital emergencies after initial training.

Introduction

Rapid airway management in ill or comatose patients is a priority in pre-hospital emergency medicine. In most cases tracheal intubation (TI) is performed with the standard technique i.e. directly with a Macintosh laryngoscope. However, in some patients tracheal intubation can be difficult or impossible to manage even after external laryngeal manip-

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* Corresponding author. Tel.: +33 556796009; fax: +33 556799819.
E-mail address: eric.tentillier@chu-bordeaux.fr (E. Tentillier).

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ulation and use of a stylet or a gum elastic bougie. The incidence of difficult intubation (DI) varies from 4 to 11% in pre-hospital emergencies when TI is performed by emergency physicians and from 0.4 to 4% in the operating room (OR).[1–5] In emergency situations, the main aim is to maintain oxygenation and ensure efficient ventilation because airway control and ventilation support influence patient outcome.[6]

The intubating laryngeal mask airway (ILMA) was designed to perform blind tracheal intubation. It can be placed quickly, provides adequate ventilation, and can be used as a conduit for tracheal intubation.[7–9] In the OR, insertion success rate is close to 100% and intubation success rate is higher than 90% whether DI is predicted or not.[10–12] Some case reports on successful use of the ILMA in pre-hospital emergency medicine have been published.[13] After the approval of the clinical research committee of our institution and the approval of the emergency physicians of our pre-hospital medical unit (SMUR), we modified our difficult airway algorithm to incorporate the ILMA. The aim of this prospective observational study was to assess this algorithm and to evaluate the use of ILMA as a rescue technique in pre-hospital emergency medicine.

Material and methods

Our mobile intensive care unit is composed of a senior emergency physician, a nurse anaesthesiologist and a vehicle driver. TI is always performed by or under the control of an emergency physician, who has more than 3 years of inhospital and pre-hospital emergency medicine experience and performs about 25 intubations per year, after training on a manikin and in the OR. The new algorithm (Figure 1) was presented to the emergency physicians of the mobile intensive care unit and received approval from all of them. They were trained to use the ILMA. Ten successful intubations on a manikin were required for every physician before beginning the evaluation of ILMA in the management of emergency DI in the field. This prospective observational study lasted from March 2002 to December 2005. During intubation, patients were monitored continuously by electrocardiogram, pulse oximetry (SpO_2), non-invasive arterial pressure and capnography. Before intubation patients were preoxygenated by mask with 100% oxygen for 3 min. A rapid sequence induction with etomidate and succinylcholine was performed in patients with cardiac activity according to the recommendations of the French Society of Anaesthesia and Intensive care.[14] If TI failed, another attempt was recommended after either improvement of the sniffing position or use of a BURP manoeuvre or change of a Macintosh blade for a larger size. If TI failed again, ILMA was used routinely in every patient. If blind intubation through the ILMA failed, patients were ventilated with the ILMA. If ILMA insertion failed, patients were ventilated by face mask. If that failed, a cricothyroidotomy was performed. A form was filled in including the patient's age, clinical status and reason for intubation such as cardiorespiratory arrest, coma or respiratory distress. Anaesthetic protocol, predictive signs of DI (short neck, restricted mouth opening, estimated thyromental distance and obesity, facial trauma, Cormack and Lehane score) and number of intubation attempts were also noted. Correct insertion of ILMA was defined as efficient ventilation of the patient, with no resistance and easy expiration. Successful TI with ILMA was assessed by capnography, and endobronchial intubation was checked by auscultation. The number of insertion and intubation attempts was noted. Ease of insertion and intubation were evaluated on a scale ranging from 1 (impossible) to 10 (very easy). Incidents and difficulties were reported by means of open-ended questions. Results are expressed as absolute values (percentages) or median values [range].

Results

Over the study period, 2082 patients were intubated, 45 of them with the ILMA. Eighteen emergency physicians partic-

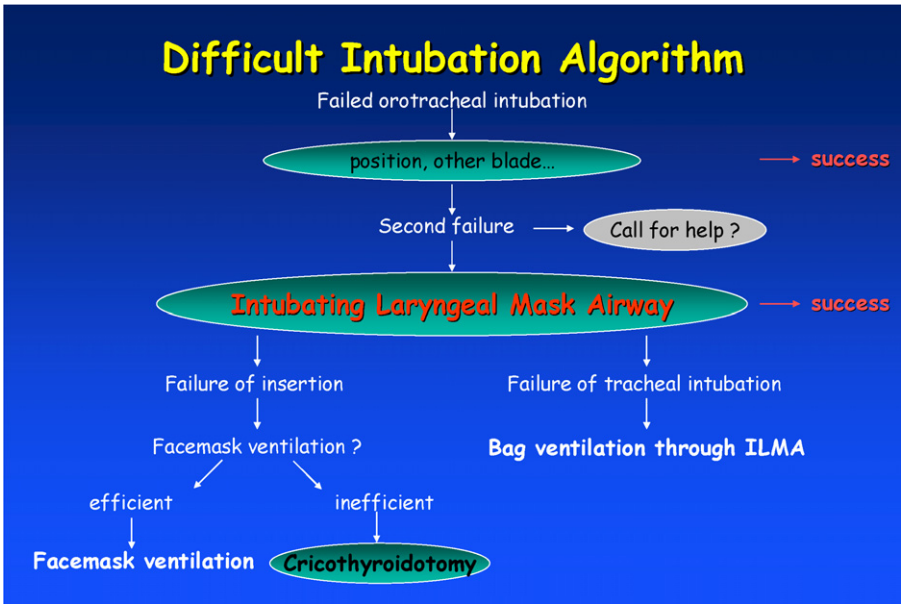

Figure 1 Algorithm for difficult intubation management in mobile intensive care unit.