



Clinical Communications: Adults



RETROGRADE INTUBATION WITH AN EXTRAGLOTTIC DEVICE IN PLACE

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Abstract—Background: The intubating laryngeal mask airway (ILMA) is an extraglottic device with a high rate of successful ventilation and oxygenation. Most modern airway algorithms suggest using an extraglottic device as the first-line rescue technique for a failed airway in emergency airway management. Eventually, a more secure airway is needed if the extraglottic temporizing device is working well. Retrograde intubation is a surgical airway management technique that is effective but relatively slow, making it most useful when ventilation can be maintained during the procedure. **Case Report:** We report 2 cases of difficult emergency airway management with an ILMA used initially and retrograde intubation later used to establish a more secure airway. **Why Should an Emergency Physician Be Aware of This?:** Retrograde intubation can be performed with an LMA in place for complicated airway management. © 2015 Elsevier Inc.

Keywords—airway; retrograde intubation; intubating laryngeal mask

INTRODUCTION

The intubating laryngeal mask airway (ILMA) is an extraglottic airway device that is an important tool for airway management in the emergency department (ED) because its versatility enables it to be used both as a standard ventilatory device and as a rescue device after failed rapid sequence intubation (1–10). The ILMA is blindly placed in the oropharynx and is wedged into the laryngopharynx

to achieve ventilation. It can be placed with little difficulty even by an inexperienced user, and previous reports have documented successful use of the ILMA in the ED (1–3,9,11). Multiple reports indicate that ILMA can be properly placed to achieve satisfactory ventilation on the first attempt in >95% of cases, making it a useful temporizing device after a failed airway attempt during emergency airway management (12–15). Most modern airway algorithms suggest using an extraglottic device as the first-line rescue technique for a failed airway in emergency airway management.

Because ILMA is a short-term solution to the problem of decreased ventilation, a more permanent airway must eventually be established. In addition to working as a ventilatory device, the ILMA also possesses an epiglottic-elevating bar to place the epiglottis in an anterior position to enable the device to be used as a conduit for endotracheal intubation. The standard method for this process is blind anterograde intubation of an endotracheal tube (ETT) through the ILMA (11). If blind intubation is unsuccessful, a bronchoscope can be used through the ILMA to place the ETT.

In retrograde intubation, a needle is used to puncture the trachea at the level of the cricothyroid membrane. Aspiration of air from the trachea is used to confirm that the needle has punctured the trachea before proceeding with retrograde placement of a guidewire which is passed up and out of the mouth (16). After placement of the guidewire, an obturator is placed anterograde over the guidewire, and an ETT is placed over the

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obturator through either a blind method or with fiber optic assistance (16). The vocal cords in the larynx do not need to be seen in retrograde intubation because the use of a guidewire helps to ensure that the ETT remains in the midline of the pharynx and is placed anteriorly into the trachea (17).

CASE REPORTS

Case 1: Airway Trauma

A 24-year-old man presented to the ED after he was struck with a piece of lumber in an assault. Paramedics found him sitting on a curb; his face was bleeding and he was in respiratory distress. During ambulance transport, he had increasing stridor and respiratory distress with worsening subcutaneous emphysema in his neck. Upon arrival in the ED, he was unable to talk but was able to follow commands. He was spitting large quantities of blood but appeared to be keeping his airway clear. He smelled of alcohol and was agitated.

The patient was a well-developed man who was lying on his right side, supported by his elbow, and he was in severe respiratory distress, spitting and coughing but effectively clearing his airway. His vital signs were as follows: temperature, 36.9°C; blood pressure, 117/59 mm Hg; heart rate, 91 beats/min; respiratory rate, 28 breaths/min; oxygen saturation 99% with 15 L of oxygen by face mask. Examination of his mouth revealed bleeding, with numerous avulsed teeth and several large lacerations in the posterior pharynx. His neck featured subcutaneous emphysema and ecchymosis anteriorly extending into the upper aspect of the chest. He was tachypneic, with severe inspiratory stridor, and moderately decreased breath sounds on the right. He had a large contusion on his anterior chest in the midline. The remainder of his physical examination was normal.

Attention immediately turned to his airway. Rapid sequence induction for endotracheal intubation was initiated with intravenous etomidate 20 mg and intravenous succinylcholine 150 mg. During induction, the patient's neck was prepped for a possible cricothyrotomy. A single initial attempt at intubation was made complicated by a large amount of blood in the airway and obscured landmarks in the posterior pharynx because of several lacerations near the base of the tongue and multiple actively bleeding avulsed teeth. The patient was noted to have declining oxygen saturation; the decision was made to place an ILMA in order to quickly ventilate the patient. Adequate oxygenation and ventilation were achieved with the ILMA and plans were made to further secure the airway. Because the patient was achieving adequate ventilation with ILMA, the decision was made to attempt to place an ETT with the ILMA in place.

An initial attempt at passing an ETT through the ILMA was abandoned after the tube met resistance. There was a high degree of suspicion for laryngeal injury and concern about exacerbating the injury by blind passage of the ETT or attempting a cricothyroidotomy. A retrograde intubation was then started with the ILMA in place. After some difficulty identifying landmarks because of swelling and subcutaneous air, a needle was inserted through the cricothyroid membrane and confirmed to be in the airway by the aspiration of air. The guidewire was inserted through the needle and passed cephalad until it was noted to be present at the end of the ILMA. The patient was continually bagged throughout the 2 min this portion of the procedure required and maintained an oxygen saturation of 100%. When the wire was visible, the bag-valve mask was removed from the ILMA and an obturator was passed over the wire into the airway. Once the obturator was into the airway and palpable at the point of the cricothyroid membrane, the wire was pulled up and out through the obturator. With the wire removed, the obturator was passed farther into the airway. The ETT was then passed over the obturator into the airway, and the obturator was removed. The ETT placement was then confirmed by breath sounds and positive end-tidal CO₂. The ILMA was then removed. This portion of the procedure took 30 seconds, and the patient maintained oxygen saturation of 100%. A chest radiograph showed the ETT in good position and a large right-sided pneumothorax and massive subcutaneous air in the neck and chest. There was a smaller pneumothorax on the left. After placement of bilateral chest tubes, the patient continued to have stable vital signs and oxygen saturation. The patient was transferred for computed tomographic scans of the head, neck, and chest and was admitted to the intensive care unit.

The patient had multiple rib fractures bilaterally and soft tissue swelling diffusely to the anterior neck. He did not have any cartilaginous fractures in his neck. He had open fractures of the left mandibular angle and the left zygoma that underwent open reduction and internal fixation on hospital day 3. He was extubated on hospital day 6, which he tolerated well, and on day 11 he was discharged to a rehabilitation center for treatment of decreased cognitive function that appeared to be related to traumatic brain injury. The patient was seen for follow-up 1 month later and appeared to be recovering well.

Case 2: Airway Obstruction from a Mass

A 57-year-old man presented to the ED with the complaint of increasing shortness of breath and labor while breathing for 1 week. The patient reported that he was beginning to feel tired with respirations. He denied

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