

Complications after using the Airtraq laryngoscope for a predicted difficult intubation

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Abstract

Although standard management of an expected difficult intubation is based on fibre-optic techniques, the application of optical laryngoscopes such as Airtraq is gaining widespread acceptance. We here describe a case where an intubation attempt with the Airtraq laryngoscope was not only unsuccessful, but negatively influenced subsequent use of a flexible fibroscopic approach.

Key words: intubation, tracheal, difficult, methods, laryngoscope, optical, complications

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CASE REPORT

A 52 year-old female patient (ASA 3) was scheduled for cervical laminectomy in a prone position. She had a long history of rheumatoid arthritis that had led to compression of the spinal cord and progressive neurological deterioration. She had symptoms of imminent tetraparesis: decreased muscle strength, especially in the lower limbs, and paresthesiae in the upper extremities. She had been treated with steroids and methotrexate without improvement. A distinct retrosternal thyroid goitre precluded an anterior approach to the cervical spine, and a posterior approach was chosen.

The patient's medical history included a failed tracheal intubation six years before. A minor gynaecological procedure was then completed with bag and mask ventilation. Physical examination revealed multiple predictors of difficult tracheal intubation. The cervical spine was almost completely immobilised in flexion (Fig. 1). The chin was withdrawn and the mouth opening was limited to 2.2 cm. Upper incisors were protruding and the left one was missing. The thyromental distance was 7 cm and visibility of the posterior pharyngeal wall was recognised as the fourth Mallampati class. The hyoid bone and the larynx were not immobilised, however slight clicks within the soft tissues of the neck were felt during palpation. The trachea was not deviated. Chest X-ray did not reveal deviation or tracheal stenosis.

The patient had agreed to an intubation attempt with an Airtraq (Prodol Meditec S.A., Vizcaya, Spain) laryngoscope under topical airway anaesthesia and sedation. As a 'Plan B', according to Difficult Airway Society guidelines [1] we chose oral fibre-optic intubation under sedation.

After premedication with 15 mg of midazolam orally, the patient was brought to the operating suite and standard monitoring was begun. The tongue and throat were topi-



Figure 1. The patient's profile with her head in a fixed position

calised with lidocaine gel and spray. After preoxygenation, we achieved an appropriate level of sedation with fentanyl 0.05 mg, midazolam 2 mg and propofol 40 mg *i.v.*, with consecutive doses of 10 mg *i.v.* as required. The patient was breathing spontaneously and her saturation reached 100%. Direct laryngoscopy with a standard Macintosh blade did not allow visualisation of the epiglottis (Cormack Lehane grade 4). For intubation we chose a 7 mm ID tracheal tube and loaded it into the channel of a small size adult Airtraq laryngoscope. Standard introduction of the Airtraq proved impossible, and a reverse approach was attempted. During advancement of the Airtraq, mucosal bleeding obscured the view. Because of very little space in the mouth, it was not possible to clear the secretions and blood adequately and assess the mucous membranes, so the intubation attempt was abandoned. At that moment the patient was aerodynamically stable, breathing spontaneously, and had a saturation of 98%. After a period of preoxygenation, we attempted flexible fibroscopic intubation. It proved extremely difficult to pass the fibroscope behind the tongue. At that moment the patient's breathing pattern changed, and she presented with the symptoms of airway occlusion and bronchospasm with saturation dropping steadily to 60%. Fencort 50 mg, dexamethasone 8 mg and atropine 0.5 mg were administered *i.v.* Ventilation via the face mask with a Mayo airway restored saturation, the patient was woken up and the surgery was postponed. Two days later, the patient underwent elective tracheostomy under local anaesthesia and spinal surgery was completed uneventfully.

DISCUSSION

Surgical intervention in the proximity of the cervical spine increases the risk of early and late postoperative respiratory insufficiency. General anaesthesia and reliable securing of the airway with a reinforced tracheal tube is mandatory.

We here describe a patient in whom several factors predictive of difficult intubation existed: *i.e.* history of a failed intubation, cervical spine rigidity, limited mouth opening, and protruding upper incisors. Visualisation of the larynx with indirect laryngoscopy was severely limited. Moreover, a retrosternal thyroid goitre created a hazard for the emergency cricothyrotomy and rescue ventilation techniques. Difficult ventilation was not expected, as previous anaesthesia for this patient had been completed with bag and mask ventilation.

Several techniques have been invented to manage predicted difficult intubation. Of these, fibre-optic intubation in a spontaneously breathing patient still remains the gold standard [2].

However, it is widely recognised that successful fibre-optic intubation requires not only an easy access to the de-

vice, but also an experienced user. A problem of acquisition and retention of fibre-optic intubation skills is acknowledged in many developed countries [3, 4, 5, 6]. Moreover, fibre-optic intubation is usually a lengthy procedure and requires proper preparation of the patient. It cannot be considered a rescue technique. In our patient, the risk of an urgent intubation extended into the postoperative period. A flexible intubation fibroscope and an experienced anaesthetist were not readily available in the postoperative period, and the surgery was relatively urgent. In recent years, several new devices have been invented to assist a difficult intubation. The use of Airtraq for patients with an immobilised cervical spine has been described in the literature [7], with encouraging results.

Taking into account the above, we based the first intubation attempt on the use of the Airtraq laryngoscope. There are many hospitals where intubating fibroscopes are not readily available for a difficult intubation scenario [2]. It has been suggested that the Airtraq might fill the gap for difficult intubation cases [8, 9, 10].

There is growing evidence of the successful use of the Airtraq laryngoscope to assist both expected and unexpected difficult intubation scenarios. Intubation success rate with the device in emergency settings is encouraging. In our hospital, we had positive experience with the use of the Airtraq in previous cases of both unpredicted, and predicted, difficult intubations. Recently, it has been documented that use of the Airtraq increases the incidence of success when the first intubation attempt has failed [11]. The device has also been incorporated into local recommendations for 'Plan B' management after a failed first intubation attempt [12].

Because of the limited mouth opening in our patient, we chose a smaller size of the Airtraq (#2). Standard introduction of the blade proved impossible, and we used a reverse approach to advance the laryngoscope into the mouth [12]. However, intubation with the Airtraq requires a certain final position of the laryngoscope. When the tip of the blade reaches the vallecula, the axis of the laryngoscope is vertical to the patient's faceplane. In the presented case we were not able to achieve such a position because of protruding incisors and head immobility in the flexed position.

Reports have indicated that the shape of the Airtraq blade is associated with an increased risk of airway trauma [13, 14]. In a number of cases, mucosal bleeding prevented successful intubation with the Airtraq. Because we were unable to assess the bleeding due to the limited mouth opening, further intubation attempts were abandoned to prevent traumatising the airway. Although the bleeding stopped immediately, it seems that the instrumentation and a small amount of blood in the airway induced a laryngospasm, leading to transient desaturation.

A novel solution has been described to facilitate oxygenation of the patient, prevent fogging of the lens, and allow suction at the proximity of the lens: a suction catheter is passed through a preloaded endotracheal tube and the tube is connected to the breathing circuit with a possibility of passive oxygen insufflation [9].

Although this approach seems very attractive, we feel that patients with an increased risk of mucosal bleeding are not the best candidates for intubation with the Airtraq laryngoscope. In our patient, the number of platelets and clotting tests were normal. However, the function of platelets was not assessed. Prolonged use of steroids and a course of methotrexate may have added to the fragility of her mucous membranes.

We present our case as a warning against overestimation of this otherwise very helpful and user-friendly laryngoscope in a difficult intubation scenario. Successful use of the Airtraq depends on the reason for the initial difficulties, and requires careful selection of patients.

In the presented case, a difficult intubation was predicted. However, a similar scenario can happen in an unpredicted difficult intubation. It seems reasonable to consider the limitations of the device before the Airtraq is adopted as a remedy for an unpredicted difficult intubation and included into strict guidelines.

The factors that should be taken into account are: mouth opening and the ability to achieve final position of the device that allows advancement of the tube. The risk of mucosal tears, bleeding and its potential consequences need to be considered [15].

CONCLUSION

Use of the Airtraq in a predicted difficult intubation scenario requires careful selection of patients. Patients with clotting disorders should be excluded because of the increased risk of mucosal tears. Application of the laryngoscope may be difficult and risky in patients with limited mouth opening combined with protruding upper incisors. In selected clinical situations, an elective tracheostomy remains a valuable method of airway management.

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