

Airway management in severe post-burn contracture of the neck using Airtraq: A case series

INTRODUCTION

Burns due to a variety of reasons are an important medico-social issue in developing countries, including India. Patients with chronic contracture of the neck and face following burns are among the most common patients visiting plastic and cosmetic surgery clinics in our hospital for reconstruction procedures. The airway management in these patients is difficult and challenging because of restricted neck movements and reduced mouth opening due to this fixed flexion deformity of the neck. Securing the airway in a timely and effective manner is a priority in these patients. The options are limited, and range from awake fiberoptic to release of contractures under ketamine anaesthesia.^[1] Certain newer airway devices are presently available and have been used to facilitate airway management in difficult situations. There has been no case series available on the use of Airtraq in post-burn contractures of the neck and face. The Airtraq[®] optical laryngoscope is a recently introduced airway device to facilitate tracheal intubation in patients with both normal and difficult airways. The Airtraq[®] is anatomically shaped and standard Endotracheal tubes of all sizes can be used [Figure 1]. We report a series of five cases with severe contracture of the face and neck presenting with difficult airway, as these patients presented with, specifically, fixed flexion deformity of the neck and distortion of the mouth opening and were successfully intubated using Airtraq[®].

CASE SERIES

After obtaining written informed consent, five patients [Figure 1] with severe post-burn contracture were selected for this case series. All the five patients selected were identified on pre-operative assessment to be at an increased risk of difficult airway. The detailed demographic and airway assessment data are mentioned in Table 1. The thyromental distance and sternomental distance were difficult to assess because of anatomical abnormalities due to severe contracture around the neck.

In the operation room, all the patients were placed in a standard position and standard monitors were



Figure 1: Photograph of the patient showing severe post-burn contracture of the neck

Table 1: Patient demographic and airway assessment data

Case	Age (years)	ASA physical status	BMI (kg/m ²)	IID (cm)	MP	CL view M	CL view A
1	38	I	23.76	3.8	II	III	I
2	44	II	21.05	2.9	III	III	I
3	22	II	19.02	3.5	II	II	I
4	23	I	23.60	3.4	III	IV	I
5	28	I	21.64	3.0	II	IV	I

BMI – Body mass index; IID – Inter incisor distance; MP – Mallampatti class; CL view M – Cormack Lehane View with MacIntosh Blade; CL view A – Cormack Lehane view with airtraq

applied. A difficult airway cart was kept ready for use in case of any life-threatening complication. After premedication with glycopyrrolate 0.2 mg IV, ondansetron 4 mg IV and midazolam 0.04 mg/kg were administered. General anaesthesia was induced after inj. fentanyl 1 micro g/kg with inj. propofol 2 mg/kg. Adequacy of bag mask ventilation was assessed before administering muscle relaxant and, subsequently, muscle relaxation was achieved with inj. succinylcholine 1.5 mg/kg body weight. Laryngoscopy was performed with a MacIntosh blade to assess the Cormack and Lehane grading, but no intubation attempt was made to prevent any unnecessary trauma to the airway. A size 3 Airtraq laryngoscope [Figure 2] was introduced into the oral cavity in the midline over the base of the tongue and the tip was positioned in the vallecula. The trachea was intubated with a size 7.0 mm or 8.0 mm endotracheal tube in the first attempt after centralizing the vocal cord in the proximal view finder, which required minor adjustments of Airtraq[®] and wrist movements pulling the Airtraq back and up. Patients were maintained on nitrous oxide, oxygen, sevoflurane and rocuronium with intermittent positive pressure ventilation. At the



Figure 2: Photograph of the Airraq device

end of the surgery, residual neuromuscular blockade was reversed with inj. neostigmine and inj. atropine.

DISCUSSION

Difficulty in maintaining a patent airway may lead to serious complications like hypoxia and hypercarbia, thereby causing increased chances of mortality and morbidity.^[2] Patients with post-burn contracture usually present with a difficult airway situation. Chronic facial and neck burns are often responsible for reduced mouth opening, leading to difficulty in introducing airway devices via the oral route. These patients have restricted neck movements with fixed flexion deformity, which leads to improper positioning, thereby causing non-alignment of the oral, pharyngeal and laryngeal axes during intubation. The submandibular space becomes stiff and non-compliant and does not allow the tongue to get compressed during laryngoscopy, resulting in an anterior appearance of the larynx^[3] (further higher up). These problems when combined together lead to limited options for airway management in these patients. Awake fiberoptic intubation is considered to be the gold standard in patients of difficult airway.^[4] Although awake intubation has advantages in patients of known difficult airway, it remains a very stimulating and painful procedure and requires patient cooperation.^[5] Also, it is not easy for every hospital in the developing countries to purchase this costly device, especially in the peripheral hospital settings. Further, it requires a longer learning curve and cannot be used in emergency situations, whereas the Airraq, has many advantages over the actual fiberoptic bronchoscope, including its cost-effectiveness, easy learning curve, ease of handling and its use in emergency situations.

Moreover, achieving adequate local anaesthesia remains a challenge in patients of scar contracture of the face and neck. Supraglottic airway devices, i.e., laryngeal mask airway, intubating laryngeal mask airway and Combitube, are of proven value in difficult airway situations but are of limited value in patients of restricted mouth opening and limited head extension. These disadvantages necessitate the use of other alternative techniques to secure the airway in these patients. Airraq-guided intubation is one such technique that can be used effectively in these set of patients. We therefore planned for intubation with an Airraq laryngoscope because of the higher advantages it offers in these situations.

The Airraq[®] laryngoscope (Prodol Meditec S.A., Vizcaya, Spain) is a newly introduced intubation aid. The extreme curvature of the blade and the optical components help in visualisation of the glottis without the need for aligning the three airway axes, i.e. oral, pharyngeal and laryngeal. Also, it does not obstruct the endoscopic view of the vocal cord during laryngoscopy because of its inbuilt conduit for the endotracheal tube.^[6] Savoldelli *et al.* reported three patients with a known history of difficult laryngoscopy in whom endotracheal intubation was easily achieved with the Airraq laryngoscope.^[7] However, there is a relative scarcity of the literature on the use of this device as an oral conduit for placement of endotracheal tube in patients of post-burn contracture of the neck. Recently a case report has been published using a Glidescope for intubation in post-burn contracture of the neck.^[8]

CONCLUSION

This case series highlights the utility of Airraq in post-burn contracture of the neck with known difficult airway. We are of the view that intubation with this device is a good alternative for known difficult intubations in any hospital setting, even in those hospitals that are generally ill equipped due to the paucity of financial assistance, and can be used as an effective primary technique in patients of post-burn contracture with restricted head and neck movements.

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