Clinical Case Report

Post-burn contracture neck with extreme microstomia and fibrosed obliterated nose: A unique airway challenge

R. SAHAJANANDHAN, SARAVANAN P. A., M. PONNIAH, J. I. JACOB, A. K. GUPTA, G. I. NAMBI

INTRODUCTION

Airway management in patients with orofacial and neck burns is often a challenge. Restricted mouth opening, decreased oropharyngeal space, limited atlanto-occipital joint extension, reduced submandibular space compliance and heavily fibrosed scars in the neck lead to a difficult airway.[1] We describe the anaesthetic management of a patient with obliteration of nasal passages, microstomia and severely limited neck extension by awake oral fibreoptic intubation aided by a Williams airway intubator.

THE CASE

An 18-year-old man weighing 35 kg, American Society of Anaesthesiologists (ASA) Class I, had sustained severe orofacial and neck burns one year before presentation to us. On examination, he had microstomia with mouth opening equal to the diameter of his index finger and burns involving the nose resulting in fibrosis and obliteration of the nasal passages. He had severe fibrosis of the anterior neck with a fixed flexion deformity (Fig. 1). The total width of the neck contracture band was 10.5 cm behind which a scale could be insinuated for 4 cm on the right side and 2.5 cm on the left. Mallampati examination could not be done due to limited mouth opening and a flexed neck. Apart from these airway findings, his clinical examination was normal. X-rays of the soft tissues of the neck showed decreased oropharyngeal space with a markedly acute angulation of the airway beyond the tongue (Fig. 2). He was planned for surgical correction of the microstomia, release of the neck contracture and skin grafting.

We planned awake oral fibreoptic bronchoscopy (FOB) and intubation with an alternative back-up plan of release of the contracture and correction of the microstomia under ketamine anaesthesia, followed by direct laryngoscopy intubation/intubating laryngeal mark airway (ILMA)-guided tracheal intubation/ laryngeal mask airway (LMA) if the FOB failed. During the preoperative visit, a good rapport was established with the patient and the anaesthesia plan was explained.

In the operating room, an intravenous line was secured and standard monitoring was started. The oropharyngeal airway was

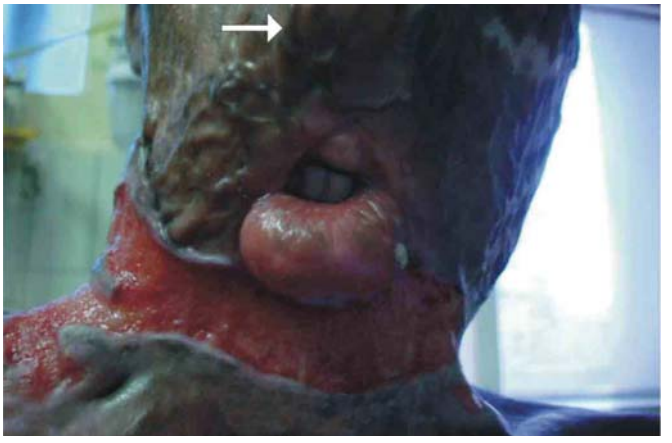

FIG 1. Microstomia, obliterated nares and fibrosis of the neck

FIG 2. Reduced oropharyngeal space and acute angulation of the airway beyond the vocal cords

anaesthetized by gargling and nebulization using 4% lidocaine. The patient was pre-oxygenated through a face mask for 5 minutes. To facilitate FOB, the operating table was lowered with a 30° elevation of the head end. A 6.5 mm internal diameter north pole RAE tube was mounted on an adult 3.5 mm bronchoscope. The patient inserted the 9.5 cm Williams airway into his oropharynx. Since the mouth opening was pointing towards the chest due to extreme fibrosis and flexion of the neck, the patient was approached

Christian Medical College and Hospital, Vellore 632002 Tamil Nadu, India
R. SAHAJANANDHAN, SARAVANAN P. A., M. PONNIAH
Department of Plastic Surgery
J. I. JACOB, A. K. GUPTA, G. I. NAMBI
Department of Anaesthesia and Critical Care
Correspondence to RAJ SAHAJANANDHAN;
rajsahajanandhan@gmail.com; *sarandoc2000@gmail.com*

from the right side instead of the head end. The patient was advised to phonate and protrude the tongue; simultaneous jaw thrust was applied by the assistant to improve visualization of the glottis. Bronchoscopy showed reduced oropharyngeal space and scarring of the epiglottis. Two ml of 2% lidocaine was sprayed on the vocal cords down to the trachea and after waiting for a minute the intubation was done without any difficulty. To minimize post-operative oedema of the airway, the endotracheal tube connector was removed and the airway slipped over the endotracheal tube. After confirming their position, the tubes were secured. The entire procedure lasted 10 minutes. Anaesthesia was induced with propofol, fentanyl and vecuronium and maintained subsequently with a combination of air, oxygen and isoflurane. The intraoperative period was uneventful and the trachea was extubated with the patient awake and breathing spontaneously. Postoperatively, he was monitored in a high dependency unit, had an uneventful stay and was discharged after 2 weeks. Outpatient examination at 6 weeks revealed mouth opening of 3 cm and neck extension of 15°–20°. The patient was started on a solid diet.

DISCUSSION

Fibreoptic tracheal intubation is a useful technique in patients whose airways are difficult to intubate.[2] Post-burn contracture of the neck with fixed flexion deformity is a challenge to the anaesthetist.[3] In our patient, this was compounded by microstomia and fibrosis of both nostrils making the nasal route of fibreoptic intubation—considered easier by many anaesthetists—not available. Oral fibreoptic intubation can be technically more difficult because of the need to advance a tube over a fibrescope located in the oral cavity as the tube tends to move posterior to the glottis.[2] A variety of airways are available for oral intubation which allow a clear visual path from the mouth to the pharynx, keep the FOB in the midline, prevent the patient from biting the FOB and have a patent airway.

The Patil–Syracuse and Williams airway intubators have an anterior channel which offers a more direct access to an anterior glottis.[4] However, the Patil–Syracuse airway must be removed from the oropharynx before a tracheal tube can be advanced over the fibreoptic cable and into the glottis offsetting the advantage of its use as a guard. Also, it has a large flat surface and was unsuitable for our patient who had a very small opening of the mouth. The Williams airway intubator allows for a tracheal tube to be passed directly through its anterior channel into the glottis. It can be removed by slipping it over the tracheal tube.[5] X-ray of the neck (lateral view) showed decreased oropharyngeal space and anterior angulation of the trachea beyond the vocal cords. Choosing an airway of the correct size was important and we used the X-ray (lateral view) to do the measurements. The measured length from the lips to the back of the tongue was 93 mm, so we used a 95 mm Williams airway which has a cylindrical tunnel in its proximal half while the distal half is open on its lingual surface. We introduced the airway with the concave side facing the tongue as we did not want to rotate the airway in a narrow oropharynx, which could have caused airway trauma. Also, the Williams airway because of the open lingual surface (anterior channel) places less restrictions on FOB and has a smoother angle for advancement of the endotracheal tube over the FOB.

Greenland and Irwin showed that during fibreoptic intubation, the Williams airway intubator provided better exposure of the glottis and a higher success rate of bronchoscopy than the Ovassapian fibreoptic intubating airway in patients without an apparent anatomically difficult airway.[6]

The successful anaesthetic management of this patient highlights the role of awake FOB aided by a suitable oral intubating airway when the airway is distorted by post-burn contractures and fibrosis.

REFERENCES

1 Gupta P, Talwar V, Verma S, Mahajan S, Gogia AR. Modified mouth prop for orotracheal fibreoptic intubation. *J Anaesthesiol Clin Pharmacol* 2006;**22:**65–8.
2 Asai T, Shingu K. Difficulty in advancing a tracheal tube over a fibreoptic bronchoscope: Incidence, causes and solutions. *Br J Anaesth* 2004;**92:**870–81.
3 Benumof JL. Laryngeal mask airway and the ASA difficult airway algorithm. *Anesthesiology* 1996;**84:**686–99.
4 Atlas GM. A comparison of fiberoptic-compatible oral airways. *J Clin Anesth* 2004; **16:**66–73.
5 Williams RT, Harrison RE. Prone tracheal intubation simplified using an airway intubator. *Can Anaesth Soc J* 1981;**28:**288–9.
6 Greenland KB, Irwin MG. The Williams airway intubator, the Ovassapian airway and the Berman airway as upper airway conduits for fibreoptic bronchoscopy in patients with difficult airways. *Curr Opin Anaesthesiol* 2004;**17:**505–10.