Case Report

Anaesthetic Management for Post Burn Contracture-A Unique Challenge in Airway Management

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ABSTRACT

Managing the airway of post burn contracture of neck has always been challenging to anaesthesiologists as it limits the alignment of oro-pharyngo-laryngeal axes because of functional and anatomical deformities that occur as a result of long standing contractures. Post burn contracture (PBC) not only restricts the movement of neck but can also lead to restriction in mouth opening, respiratory difficulty, alteration in position of trachea and distortion of cervical spine.

Keywords: Difficulty airway, post burn contracture, airway management.

INTRODUCTION

Airway assessment and management in patient with post facial and neck burns is always a challenging job. The chances of contractures which are well known sequelae after burns remains high. The post burn sequelae may present in the form of restricted mouth opening, decreased oropharyngeal space, distortion in anatomic alignment of Oro-pharynx, pharynx and trachea, cervical spine distortion and fixed flexion neck deformity. [1] These sequelae pose real challenge in direct laryngoscopy and endotracheal intubation. Such patients must have the PBC scar released before other procedures are performed, in order to ensure airway control. [2]

Here, we are presenting a case report of a 46 year old female with history of accidental flame burns 6 months back with scar over her neck, upper half of chest, right half of face involving both eyelids of right eye, nose leading to closure of both external nostrils , mouth leading to microstomia.

Performing the surgical procedure demands release of the PBC of the neck, initially under ketamine and propofol and infiltration of contracture with local anaesthetic drug, in order to allow sufficient extension of the atlanto-occipital joint followed by the insertion of the endotracheal (ET) tube, and surgery is continued under general anaesthesia. The interval between the incision and insertion of the ET tube can be crucial. [3]

CASE REPORT

A 46 year old female weighing 48 kg, ASA (American

Figure 1: Pre operative picture showing post burn contracture face, neck, upper half of the chest

Figure 2: Intubation

Figure 3: Post intubation and neck release

Figure 4: Post operative results

Society of Anaesthesiology) Grade- 2, with history of accidental flame burns 6 months back developed post burn contractures involving right half of face, neck, upper half of chest. (Figure-1) Pre-operative examination and routine investigations are within normal limits. Preoperative X-rays and a computed tomography (CT) scan for assessing her airway and related structures revealed marked thickening of the soft tissues around the neck, without distortion or stenosis of the upper airway and the trachea.

On Airway examination, mouth opening is less than 2 finger breadth, mallampati Grade - 4 with only hard palate visualization. Restricted flexion and extension movements at the neck, extension restricted at atlanto-occipetal joint. Both the external nares are closed. High risk informed consent for anaesthesia, surgery and emergency tracheostomy was taken.

On preoperative day patient was reviewed again. The patient was kept nil by mouth overnight and tab alprazolam 0.5 mg and tab ranitidine 150 mg given at night and 6 am on day of surgery. On arrival of patient in the operation theatre, Monitors connected to the patient that includes ECG, Nibp, Spo2 and baseline recordings noted. Intravenous line secured over upper limb. Pre-oxygenation was given with 100% Oxygen and Pre-medicated with Injection. Glycopyrrolate 0.2 mg, Injection. Ondansetron 4mg, injection Rantitidine 150 mg.

In view of anticipated difficult intubation, difficult intubation cart was kept ready, it consists of various sizes of cuff and plain endotracheal tubes, stylet, LMA no. 2 & 3, and Gum elastic bougie, McIntosh laryngoscope blade, mccoy blade, various sizes of oral airway and tracheostomy set kept ready. Patient then sedated with Inj. Ketamine 50mg and Inj. Propofol 50mg. Local

infiltration of scar was done with Lignocaine (totally 400 mg). Oxygen administration 4-6 liters was given.

After releasing the neck contracture, neck extension was possible but there is only mild improvement in mouth opening, mouth opening was restricted to 2.5 cm inter incisor gap. Direct laryngoscopy was done with curved McCoy blade No.3 with great difficulty, the laryngeal view was Cormack and Lehane grade-4 with external manipulation. Gum elastic bougie introduced and cuffed portex ET-tube no. 6.5 passed over it into the trachea. Tube placement in trachea confirmed, bilateral air entry checked and tube fixed. Maintenance is done by oxygen + N2O + Inj. Vecuronium. Intraoperative course was uneventful and patient was extubated at the end of surgery, postoperative period was uneventful.

DISCUSSION

The anesthetic management of patients with severe post-burn neck contracture presents many difficult problems. Difficult airway is the most critical and its consequences can be catastrophic. An airway examination should be performed prior to the initiation of anesthetic care and airway management so that anesthesiologists can estimate the degree of airway difficulty and prepare several methods for airway management.

The American Society of Anesthesiologists Task Force on Management of the difficult airway suggested several elements of the preoperative airway physical examination that may suggest the presence of difficult intubation during conventional oral laryngoscopy.[4]

There has been effort to classify burn scar patients according to the degree of contracture and evaluate airway based on previous studies. Onah [5] suggested a classification system with four major numeric categories, which is based on the extent of flexion or extension by the contracted neck and the anatomical position of the neck. Difficulty with intubation can be expected in type 2 and 3; especially in type 3, the distance between the chin and the thyroid prominence distance is shortened.

PK Gupta et al in his study for assessment for difficult laryngoscopy found that when the Maxillo-pharyngeal angle is <90 the difficulty in direct laryngoscopy was comparable to Cormack and Lehane classification III and IV.[6] Decrease in atlanto occipital distance on lateral cervical radiograph is also one of important indicator for difficult laryngoscopy. The measurement of thyromental distance, Mallampati score and mouth opening are important clinical assessment for anticipating difficult intubation. The airway must be evaluated in sitting position only. In addition to this assessment, anaesthesiologist should carefully examine the scar and contracture, paying special attention to the perinasal and oral orifices. Mentosternal contracture may limit the mouth opening and atlanto axial extension.

Wong et al [7] proposed several options for airway management with contractures involving the neck, face, and anterior chest. Those are: awake intubation with fiberoptic bronchoscopy, face mask ventilation followed by surgical scar release, then tracheal intubation, laryngeal mask airway anesthesia and scar release, Intubating laryngeal mask airway, tracheostomy or cricothyroidotomy, and surgical scar release under ketamine and local anesthesia then intubation.

Fiber optic bronchoscope has been proved as gold standard for difficult intubation with significant advantage of being flexible and allowing continuous visualization of structure and have high success rate. [8] As securing the airway is crucial aspect during the reconstructive surgeries of patients with post burn contracture face, neck and anterior chest wall, proper preoperative planning is must.

The basic principle involved in the process of airway control in the patient with difficult airway is the preservation of spontaneous ventilation till the airway is properly secured. The main challenge to anaesthesiologist in these patients is of airway control. It is also important that the attending plastic surgeon understood the complementary role he had to play in maintaining the airway. Surgeon may need to release the contracture around neck, oral orifices under ketamine or tumescent anaesthesia and after achieving the neck extension, the endotracheal intubation can be done. [9,10]

CONCLUSION

Awareness, vigilance and preparedness, teamwork between anaesthesiologists and surgical teams are the key to successful management of airway in post-burn patients. Preoperative judicious evaluation of the scar and airway is mandatory. It is important to keep in mind that underlying functional and anatomical alterations and comorbid conditions may lead to difficult endotracheal intubation. Proper preoperative evaluation and planning will help to successfully secure the airways of post-burn patients with anticipated difficult intubation and reduce anaesthetic morbidity and mortality.

CONFLICT OF INTEREST

The authors declared no conflict of interest.

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