

Post Burn Contracture Neck- An Anaesthetic Challenge

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Abstract

Burn contractures may result in poor quality of patient's life. It can be associated with loss of articulation, cosmetic disfigurement and psychological changes. This case report describes the airway management of the post burn contracture patient which involves her face, neck and upper part of chest, presented for contracture release and skin grafting. For this patient, awake limb of difficult airway algorithm was selected. She was intubated with the help of fiberoptic bronchoscope while she was awake. This technique is considered as gold standard for difficult airway management. With thorough preoperative assessment, meticulous preoperative preparation, team work and due precautions taken, these cases can be managed successfully. Also, alternative plans should be ready if plan A fails.

Keywords: Fiberoptic bronchoscope, Difficult airway, Local anesthesia, Post burn contracture, Endotracheal intubation.

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Introduction

Airway management in post burn neck contracture patients poses a great challenge to the anesthesiologists. Airway anatomy is distorted in these patients and along with limited atlanto occipital joint extension, this difficulty is further aggravated.^[1] The post burn sequelae may present as decreased mouth opening and oropharyngeal space, distorted oropharyngeal - laryngeal - tracheal alignment, fixed flexion deformity and restricted atlanto-occipital joint movements.^[2] An awake fiberoptic bronchoscopy is a gold standard for airway management in these cases.^[3,4] This case report demonstrates a successful anesthetic management of 30 year old female with post burn contracture of face, neck and upper part of chest with fixed flexion deformity and restricted mouth opening.

Case Report

A 30-year-old female ASA 1 patient with a history of thermal burns sustained with kerosene oil, five months back involving the face and neck, was scheduled for contracture release and skin grafting. Patient's medical history was non-significant. Patient had complains of drooling of saliva, difficulty in chewing, difficulty in speech and restricted neck movements. There was no history of breathing difficulty.

The patient was average built and co-operative. There was no pallor and no icterus. Patient's heart rate was 82 beats per minute, blood pressure was 112/86 mm of Hg, shape of chest was bilateral symmetrical. Bilateral chest sounds were normal. Cardiovascular, central nervous system examination was within normal limits. Spine was grossly normal and no kyphoscoliosis was present. On airway examination, mouth opening was less than 2 cm, length of upper incisor was 1 cm. No loose teeth or dental prosthesis were present. Mallampati score was grade 4. Thyromental distance could not be assessed due to distorted neck anatomy. Trachea was not palpable, submandibular space was firm in consistency, neck was short and flexed. No extension or lateral rotation of neck was possible. Patient was unable to protrude mandible. Both her nasal orifices were patent and there was no nasal septum deviation. All her investigations were within normal limits. [Figure 1]

Thorough preoperative assessment was done. Difficult airway cart prepared with different sizes of endotracheal tube, stylet, bougie, Macintosh and McCoy laryngoscope blade, laryngeal mask airway, video laryngoscope, fiberoptic bronchoscope and tracheostomy set.

Anaesthetic Management



Figure 1: Photograph of the patient showing the extent of burn

Plan A for this case was awake fiberoptic bronchoscope guided intubation under local anaesthesia. Alternative plan was to first release contracture under local anaesthesia followed by direct laryngoscopy and intubation via videolaryngoscope.

Patient was kept fasting for 8 hours and written informed consent was taken for anesthesia and surgery, including consent for tracheostomy, if required. More patent nostril was selected for intubation. Nebulization was done with 5 ml of 4% lignocaine, half hour before surgery.

In operation theatre, patient was kept in the supine position. Monitoring of the patient was done with five lead ECG, capnography, pulse-oximetry and non invasive blood pressure measurement. Intravenous 18 G cannula was inserted. Baseline vitals were recorded. Injection Ondansetron 4 mg and injection Glycopyrrolate 0.2 mg were given intravenously. Two drops of Xylometazoline 0.1% were instilled through nose and 2% lignocaine gel applied to nasal cavity. Posterior pharyngeal wall was sprayed with 10% Lignocaine spray. Injection Fentanyl 50 micrograms was given intravenously. Patient was pre-oxygenated with 100% oxygen for 5 minutes. Awake fiberoptic intubation attempted through nasal cavity and 2 ml of 2% Lignocaine sprayed at vocal cords when glottis was visualized. After this fiberoptic bronchoscope was further advanced in to the trachea until carina was visualized. Endotracheal tube was rail-roaded over the fiberoptic bronchoscope and once the tube was inside the trachea fiberoptic bronchoscope was slowly removed and the tube was fixed. Once the intubation was complete, the patient was given general anesthesia and surgery was started. [Figure 2]

Discussion

Burn contractures are produced due to over proliferation of myofibroblasts. Scarring is rarely produced by superficial



Figure 2: Photograph of the patient after successful nasal intubation

partial thickness burns but deep dermal burns may produce hypertrophic scarring. It can occur within first three months. [5]

Due to the presence of hypertrophic scar tissue underneath, the normal anatomy of the airway is distorted. Cervical spine mobility is restricted by severe mento-sternal contracture leading to difficult airway. [3] Gupta et al observed the association of maxillopharyngeal angle on lateral cervical spine radiograph and difficult laryngoscopy and found that maxillopharyngeal angle if less than 90 corresponds to Cormack and Lehane class 3 and 4. [6] Difficult laryngoscopy can also be predicted by decreased atlanto occipital distance in lateral cervical spine x-ray. [3] In this case, intubation was performed with the help of fiberoptic bronchoscope while the patient was awake.

Agarwal et al, [7] used tumescent anesthesia with intravenous ketamine in thirty patients of age group 12-50 years with post burn neck contracture. They used 70 to 200 ml volume of 0.4% lignocaine, 1:5,00,000 adrenaline with sodium bicarbonate along with injection Hylase. Ketamine was given for harvesting skin graft. The disadvantages of this technique are local anaesthetic toxicity, unsecured airway resulting in risk of aspiration and tongue fall, emergence phenomenon and wet surgical field.

Jasper et al, [8] performed airway management in 13 years old girl with mentosternal contracture by using laryngeal mask airway. Inhalational anesthesia was given with halothane and contracture release was done. It was followed by size 3 Laryngeal Mask airway insertion. This technique could not be used in patients with microstomia. Also, there is risk of aspiration with this technique.

Kaur et al,^[2] conducted successful airway management in post burn contracture patient with microstomia, obliterated nasal passages and severely limited neck extension. They performed oral intubation with the help of fiberoptic bronchoscope aided by Berman's airway.

Mathur et al,^[9] reported a similar case with contracture involving face, neck and chest. There was microstomia with nasal passage obliteration along with fixed flexion deformity. First contracture release was done under local anesthesia. Mouth opening was found, less than 1 finger after contracture release. Inhalation anesthesia was given with halothane preserving spontaneous ventilation. Labial commissure release was done followed by oral fiberoptic intubation under inhalational anesthesia. With inhalational agents, there is preservation of spontaneous ventilation but there is associated risk of hypoventilation, hypoxemia and cardiovascular side effects.

Subramanyam et al,^[10] used regional nerve blocks in similar patients with post acid burn contracture involving mouth and chest wall. Bilateral infraorbital and mental nerves were blocked followed by contracture release. It was followed by general anesthesia for release of chest wall contracture. This method can be used when fiberoptic bronchoscope was not available and also there is preservation of spontaneous ventilation and airway reflexes.

Arora et al,^[1] used neuraxial blocks for airway management in 36 years old post burn neck contracture patient. They inserted 18 G epidural catheter at C7-T1 space along with lumbar epidural at L3-L4 space. After giving test dose, bolus dose of 7ml of 1% lignocaine with adrenaline + 5 ml 0.25% bupivacaine was given. Top up doses were given after every 1 1/2 to 2 hours with 5 ml of 1% lignocaine plus adrenaline mixed with 3 ml of 0.25% bupivacaine. Lumbar epidural was activated before skin grafting using 5 ml of 1% lignocaine with adrenaline and 3ml of 0.25% bupivacaine after test dose. The disadvantage of this technique is the risk of neurological damage with cervical epidural.

Vathulya et al,^[11] performed airway management using invasive technique in 42 years old patient with severe post burn neck contracture. First release of contracture bands were done under local anesthesia, intubation was attempted but could not be performed. After two attempts of intubation, tracheostomy was done under sedation. The tracheostomy being an invasive method poses a risk of surgical emphysema, increased bleeding and edema. Also, front of neck access is considered difficult in these patients because of extensive contracture and distorted anatomy.

Qazi Ehsan Ali,^[12] conducted airway management in similar case using videolaryngoscope. After intravenous induction of general anesthesia, intubation was performed with king vision videolaryngoscope. This technique could not be performed in patients with microstomia. Also, there is risk of failed

intubation and ventilation.

Totoz et al,^[13] performed successful awake endotracheal intubation in a 7 years old child with post burn neck contracture with the help of fiberoptic bronchoscope. It was performed under local topical anaesthesia using lignocaine spray.

Whatever the technique used, thorough pre-anesthetic evaluation should be done in these cases along with careful assessment of airways including thyromental distance, MPS, mouth opening, neck movements, assessment of scar and contracture and perinasal and oral orifice. Sitting position is advocated for airway assessment.^[14] Surgeon should be kept standby for contracture release if intubation is not successful. ENT surgeon should be kept standby for emergency tracheostomy. Fiberoptic bronchoscopy is the gold standard for difficult airway management. Fiberoptic intubation is less traumatic and much more efficient than direct laryngoscopy.^[13] The advantages of awake fiberoptic bronchoscopy over other techniques are preservation of spontaneous ventilation till airway control is achieved and preservation of airway reflexes which will prevent the risk of aspiration.^[10] In the present case, nasal route was preferred for intubation as it is more convenient and straight forward than oral route. Also, nasal intubation is technically easier because the angle of curvature of endotracheal tube naturally approximates to that of upper airway than that with oral route.^[15]

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