Anaesthetic management in patients with post burn contracture of neck.

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Abstract:

Post burn contracture neck causes difficult airway due to fixed flexion deformity and mal-alignment of oral, pharyngeal and laryngeal axis. It can lead to either difficult mask ventilation or difficult endotracheal intubation or both. Here we present a successful anaesthetic management of two patients with post burn contracture of neck for release of contracture band with tumescent anaesthesia along with sedoanalgesia supplemented by Inj. Ketamine I.V., O_2 and sevoflurane.

Keywords: -Difficult airway, Postburn contracture neck, Tumescent anaesthesia.

Introduction:

Post Burn Contracture neck is one of the most common chronic burn sequalae. It causes functional limitations and aesthetic disfigurement. Functional limitations are fixed flexion deformity with no possibility of atlanto occipital extension and restricted mouth opening which offers highest chances of difficult airway.

Case report:

After obtaining written informed consent, two patients with post burn contracture neck were selected for this case report. Patient 1 is of 10 years old weighing 25 kg with bilateral contracture band over chest and neck since 1.5 year (**Image 1)** and patient 2 is of 14 years old weighing 26 kg with unilateral contracture band over chest, neck and upper limb since 6 years (Image **2**).

Pre-operative preparation:

Both patients were assessed one day before surgery for pre anaesthetic checkup. Both were having normal general and systemic examination and normal routine investigations including chest X-ray and ECG.

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Anaesthetic management:

Both patients were kept overnight NBM. Informed written consent for anesthesia risk grade III was taken and difficult airway cart was kept ready. All monitors were applied, e.g. ECG, NIBP, SpO_2, $EtCO_2$ and input output chart.

Image 1: Case 1 with post burn contracture band over bilateral upper limbs and neck& Chest

Image 2: Case 2 with post burn contractureband over unilateral limb and neck

Table 1: Pre-operative airway examination of both the patients.

Examination criteria	Patient 1	Patient 2
Nasal Patency	Present	Present
Mallampatti Grade	3	3
Neck Extension	Restricted	Restricted
Mouth Opening	2 ½ fingers	2 fingers
Thyromental Distance	6 cm	6.5 cm

Induction:

Pre-oxygenation with 100% oxygen for 5 minutes was done. Pre medication with Inj. Glycopyrrolate 4 mcg/kg i.v., Inj. Ondansetron 0.15 mg/kg i.v. and Inj. Dexamethasone 0.1 mg/kg i.v. was given. Induction was done with Inj. Ketamine 2-2.5 mg/kg i.v.+ sevoflurane + O_2 through bain's circuit. Check ventilation was possible and finding of check scopy was Cormack Lehane grade III inspite of optimal external laryngeal manipulation in both the patients. Surgeons were asked to release contracture band after giving **tumescent anesthesia** (solution: 500 ml normal saline+ 1 ml 1:1000 adrenaline + 1.5 ml lignocaine 2% + 1 ml soda bicarbonate – 15 ml of total solution was injected to release the neck contracture), followed by Inj. Propofol 2.5 mg/kg i.v. and Inj. Succinyl choline 2 mg/kg i.v. Intubation with 5 and 5.5 no. plain portex endotracheal tube with stylet was done in respective patients. Endotracheal tube placement was confirmed by$EtCO_2$ and check ventilation and bilateral air entry was established. Endotracheal tube was fixed and oral packing was done. Inj. Fentanyl 2 mcg/kg i.v. was given after intubation.

Intra operative management:

Patients were maintained with oxygen+ sevoflurane and nitrous oxide with muscle relaxant inj. Atracurium 0.5 mg/kg i.v. loading dose + 0.125 mg/kg incremental doses as per requirement were given. Intra operative surgical position was given with shoulder bag and ring under head **(Image 3).** Inj. Diclofenac 0.2 mg/kg i.v.was given for analgesia. Intraoperatively intravenous input was 800 and 850 ml respectively and urine output was 100

and 80 ml respectively. Surgical duration was 2.5 and 2 hours respectively. Both patients were reversed with Inj. Glycopyrrolate 8 mcg/kg i.v. given followed by inj. Neostigmine 0.05 mg/kg i.v. with presence of adequate tidal volume. After removal of oral pack, extubation was done in same surgical position to prevent graft displacement.

Image 3: Intra operative position of patient with shoulder bag and ring under head.

Post operative status:

Post-operative vitals of both the patients were stable. Neck extension and mouth opening of both patients were improved (**Image 4 & 5**).

Image 4: Case 1 Post-operative improvement

Image 5: Case 2 Post-operative improvement

Discussion:

Most common factors of difficult airway in patients of PBC neck are as follows: Distorted anatomy of oropharyngeal space, Limited neck movementsandReduced thyromental distance.Above mentioned factors can lead to difficult visualization of glottis, difficulty in laryngoscopy and reduced space in oral cavity as well as negotiating ET tube due to malalignment of oral, pharyngeal and laryngeal axis.

There are many techniques available for securing an airway in PBC neck like:

1. Fiber optic intubation

2. Supraglottic airway devices
3. Video laryngoscopic devices like airtraq, glidescope
4. Conventional laryngoscopy with contracture release under tumescent anesthesia supplemented with sedoanalgesia inj. Ketamine i.v. 1-1.5 mg/kg i.v.

Awake fiber optic intubation is advanced technique and offers advantages in securing an airway. This technique requires expertise and experience of user. There are chances of difficulty in negotiating flexible fiber optic bronchoscope due to malalignment of axis in PBC neck. Nowadays, pediatric fiber optic bronchoscopes are available but require sedation to perform the procedure. Fiber optic bronchoscopy is not available in our institute.

There are different types of supraglottic airway devices available like; classic LMA, Igel, intubating LMA, which can be useful in such patients but at times, we may face difficulty in insertion and positioning due to limited mouth opening and limited neck movement. Tracheostomy and cricothyroidotomy are the last emergency methods to secure an airway. Even these both invasive techniques offers difficulty in identifying tracheal anatomy to surgeons due to fibrosed bands.

Considering all above factors, we proceeded with routine conventional method of laryngoscopy and surgeons were asked to give tumescent local anesthesia at contracture site. We gave sedation for surgical release of contracture in form of Inj. Ketamine i.v. As this kind of procedure requires hyperextension, we need proper intraoperative monitoring of an airway. Therefore, continuous monitoring of oxygen saturation and $EtCO_2$ were the best guide of ventilation and oxygenation.

Conclusion:

Conventional laryngoscopy with sedoanalgesia supplemented by inj. ketamine i.v., O_2 and sevoflurane with tumescent local anesthesia for contracture release is considered a safe method for securing an airway in PBC neck.

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