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A Multipronged Approach to Attenuate Hyper Reactive Airway During Anaesthesia for a Child With Upper Respiratory Tract Infection Posted for Emergency Ophthalmic Surgery

Medical sciences

KEYWORDS : Anaesthesia for Upper respiratory tract infection, Nebulised lignocaine, Hyper reactive airway, Perioperative airway events

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ABSTRACT

Anaesthetizing children with upper respiratory tract infection (URI) is associated with many perioperative respiratory events ranging from laryngospasm to life threatening hypoxemia leading on to circulatory collapse. Various risk factors and treatment modalities for these perioperative respiratory events have been discussed by different authors. Here we report the anaesthetic management of a child with URI who had to undergo removal of caterpillar hair from the left eye as an emergency procedure.

Case report:

A two year old male baby weighing 11.5.kgs was posted for an emergency ophthalmic surgery for removal of multiple caterpillar hair which entered into the baby's eye four hours back while playing. On examination, baby had cough with running nose which has been there for two days. As per mother, the symptoms were increasing in the severity for the last 24 hours. Apart from this baby did not have any other significant present or past history. The developmental history & mile stones were normal. On further examination, baby was afebrile, and all systemic examinations were normal except occasional scattered wheeze on auscultation. Basic blood tests were also found to be normal. Chest x ray showed no evidence of lower respiratory tract involvement. Considering the emergency nature of the surgery, patient was accepted under ASA grade II E physical status . Patient's parents were also well explained about the possible post operative complications ranging from laryngospasm to need of mechanical ventilator support.

In the preoperative holding area ,after securing intravenous line with 22 G cannula Ringer lactate was started. Then, child was nebulised with 1ml of lignocaine(20mg) with adrenaline (1 in 200 000) diluted with 3ml of sterile normal saline making the total volume of 4 ml. Baby was closely monitored for any changes in heart rate, ECG , oxygen saturation and blood pressure during the period of nebulisation. Nebulisation lasted for 20 minutes and the period was uneventful. Then baby was shifted to operating room. His base line parameters were also noted (HR, 128/mt, SpO2: 98% at room air, BP: 100/70mmHg.)

Pre oxygenation was carried out after premedicating the baby with inj. Glycopyrrolate 0.1 mg, inj. Tramadol 25mg , Inj. Midazolam 0.5mg. Three minutes after premedication baby was induced with inj. Ketamine 30 mg and Inj. Propofol 30mg . Size 2 Laryngeal mask airway(LMA) was positioned after administering inj.succinylcholine 25mg. Position of the LMA was confirmed with bilateral air entry and end tidal carbon dioxide tracings. Subsequently anaesthesia was maintained with Propofol infusion. Positive pressure ventilation with oxygen was continued through out the procedure as inj. Atracurium(5mg) was used for the purpose of muscle relaxation.

The child's hemodynamic & respiratory parameters were maintained within normal range through out the procedure which lasted for nearly one hour. At the end of the procedure LMA was removed in the deeper plane and neuromuscular block was antagonised with inj. Neostigmine 0.5 mg & Inj. Glycopyrrolate 0.1 mg. As the throat was dry no suctioning was done. Patient was turned to left lateral position and allowed to recover spontaneously. No stimulation was done in between . After a period of about 20 minutes child opened the eyes spontaneously and subsequent recovery period was uneventful. There was no cough or laryngospasm or stridor were noted in the post operative period. Child was shifted to post operative ward and discharged from the hospital on 2nd post op day without any further incidents.

Discussion:

A child with URI is a major concern for the anaesthesiologist because of the highly irritable airway that may put the children at the increased risk of airway related problems ranging from laryngospasm, bronchospasm, post intubation croup, atelectasis, pneumonia, and episodes of desaturation. As per the retrospective studies , the incidence of laryngospasm increases by nearly 10 fold if the patient has upper respiratory tract infection(Olsson & Hallen, 1984)

In order to avoid airway related events secondary to hyper reactivity of airway, elective surgeries are often deferred for a period of three weeks . But in case of emergency situation , the patient may have to undergo surgery in spite of having URI depending upon the emergent nature of the situation. In such instance various methods and measures have been described by various authors to attenuate the hyper reactive airway.

These measures include removal of endotracheal tube in deeper plane(Lee et al., 2007)but there is no objective evidence that removal of LT in awake state is better than in anaesthetized state. So, we compared the incidence of respiratory adverse events after the removal of LT, either under anaesthesia or on awakening.\n\nMETHODS: Seventy healthy children between 1 and 12 yr of age were enrolled in this study. Anaesthesia was induced and maintained with sevoflurane. After induction of anaesthesia, patients were randomized into two groups: removal of LT in anaesthetized state (Group A: 2% sevoflurane using drugs like magnesium (Gulhas et al., 2003) topical lignocaine (Staffel, Weissler, Tyler, & Drake, 1991) or 'no touch technique'(Tsui et al., 2004)we evaluated the incidence of laryngospasm using a clearly defined awake tracheal extubation technique in 20 children undergoing elective tonsillectomy with or without adenoidectomy. This technique required patients to be turned to the recovery position at the end of the procedure before discontinuing the volatile anesthetics. No further stimulation, besides continu-

ous oximetry monitoring, was allowed until the patients spontaneously woke up (\"no touch\" technique in which patient was not at all stimulated till the recovery is complete.

This patient was at high risk of developing corneal ulcer and subsequent ophthalmic complications should caterpillar hairs not removed in time. Since nebulised lignocaine is shown to reduce the heightened airway reflex sensitivity associated with URI(Hall, Fox, Raphael, Nandwani, & Smith, 1999)or recovering from, a recent upper respiratory tract infection. Airway reflexes are heightened and these individuals may be more likely to suffer airway complications on administration of general anaesthesia. We have examined the effect of nebulized lidocaine on upper airway reflexes in such subjects. Using dilute ammonia as a chemical stimulus to the upper airway, we measured upper airway reactivity in 15 volunteers (aged 22-43 yr we decided to use nebulised lignocaine in this patient to reduce the hyper reactivity of the airway that may end up in laryngospasm or any other airway related complications.

Incidence of initial bronchospasm during nebulising lignocaine has also been reported (Groeben, Silvanus, Beste, & Peters, 1999). But we did not encounter any bronchospasm during the nebulisation . This might be possible as we used adrenaline along with lignocaine which is well known for its property to reverse bronchoconstriction (Abroug et al., 1995)

Conclusion:

To avoid any untoward airway related events , we employed various modalities that included nebulisation of lignocaine along with adrenaline, avoidance of inhalational agents, removing LMA in deeper plane and not stimulating the child till the he was totally awake. Since we used multi pronged strategy, we could not pinpoint exactly which of the measure could have contributed for the successful outcome.

Since it will be hard to express the advantages of this multipronged strategy based on a single case report , more number of cases with this same approach will give more and better information regarding anaesthetising a child with URI.

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