

# Effectiveness of Intratracheal 2% Lidocaine Administration to Prevent Post Extubation Phenomenon in Tonsillectomy Surgery in the Central Surgical Installation of Kertha Usada Buleleng Hospital

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**Abstract:** ***Introduction:** Post-extubation bleeding often occurs, especially in patients who experience coughing or other post-extubation phenomena. In addition, insufficient analgesia, especially in children who frequently cry or scream during the procedure, can cause tonsillar bed re-bleeding. In this case report we attempted to use intratracheal 2% lidocaine prior to extubation in a patient who underwent tonsillectomy under general anesthesia. **Case Report:** A 9 year old man who's weighing 30 kg with chronic tonsillitis underwent a tonsillectomy under general anesthesia. **Anesthetic impression:** 9 year old boy suffering from chronic tonsillitis with ASA I. Approximately 10 minutes before the end of the surgery and after the tonsil was removed, 2mg/kg of intratracheal 2% lidocaine was administered and the anesthesia was deepened to facilitate airway clearance and evaluate bleeding. Extubation is then carried out using the Smooth Emergence Techniques approach. Patient was positioned perfectly, he looked calm, complained of slight discomfort in the throat, did not experience coughing or vomiting, and there was no sign of tonsillar bleeding. **Conclusion:** in this case report, intratracheal administration of 2mg/kg 2% lidocaine 10 minutes before extubation prevented the incidence of cough and other post-extubation phenomena during tonsillectomy surgery.*

**Keywords:** Tonsillectomy, 2% Lidocaine, Extubation

## 1. Introduction

Tonsillectomy with or without adenoidectomy is a longstanding surgery and is one of the most commonly performed surgical procedures in pediatric age groups worldwide. Intubation with an endotracheal tube has become a routine part of the administration of general anesthesia. Whereas, extubation is the procedure of removing the endotracheal tube which is the last step in liberating a patient from the mechanical ventilator. Extubation is not a risk-free procedure. A study states that extubation complications are 7.4% higher than intubation. Report from the Australian Incident Monitoring Study (AIMS) on 4000 initial cases revealed there were 189 cases of laryngospasm (4.725%) where 145 (77%) cases were clinically obvious and easily diagnosed, while the remaining 23% cases was presumed by anaesthesiologist as non-laryngospasm airway obstruction (27 cases, 14%), vomiting/regurgitation (9 cases, 5%) or desaturation (7 cases, 4%) in the beginning. In other studies, it was stated that the incidence of laryngospasm in awake extubation in tonsillectomy and adenoidectomy surgery was 21-26%. In addition, there were 38-96% of cough incidence in awake extubation in nasal and paranasal sinus surgery. According to Ravi R & Howell T (2007), bleeding events after extubation often occurs, especially in patients who experience coughing or other post-extubation phenomena. Furthermore, when the analgesia is not enough, especially in children who often cries and screams during the procedure cause rebleeding in the tonsillar bed.

Research by Diachun CD, et al (2001) on the effectiveness of topical lidocaine using ETT LITA by spraying 2 mg/kg of

4% lidocaine before extubation suppressed coughing during extubation but with a peak serum plasma level of lidocaine in the amount of <math>1.63 \mu\text{g} / \text{mL}</math> (mean  $0.43 \mu\text{g} / \text{mL}</math> average). This suggests that the local effect of lidocaine spray on the mucosal area of the laryngotrachealis independent to the serum concentration. Research from Lai Fam, et al. (2015) examined the incidence of sore throat, cough, hoarseness, agitation significantly decreased and showed that alkalized and non-alkalized intracuff lidocaine prevented and reduced the occurrence of post-extubation phenomena.$

Based on the studies, we tried to use intratracheal 2% lidocaine before deep extubation in a patient who underwent a tonsillectomy procedure under general anesthesia.

## 2. Case Report

A 9 year old boy, weighing 30 kg diagnosed with chronic tonsillitis underwent a tonsillectomy procedure under general anesthesia. His blood pressure was 120/80 mmHg; 82 times/minute of pulse;  $36.8^{\circ}\text{C}$  of temperature; and rate 18 times/minute of respiratory rate, examination of the oral cavity showed no hyperemic pharynx, enlarged tonsils (T3 / T3), detritus + / + when opening the patient's mouth about 3-fingers of wide. Complete blood count found 15.4 g/dL of hemoglobin, 8230/uL of leukocytes, 45% hematocrit, 343,000 / uL of platelets, 3'00" of bleeding time, 2'00" of clotting time, and negative result for seroimmunology of SARS CoV-2 antigen. The impression of anesthesia was ASA I.

The patient was put on standard monitoring equipment and given 0.05 mg/kg of midazolam as a premedication, 0.15 mg/kg of ondansetron, preventive analgesia with 2 mcg/kg of fentanyl, induction with 2.5 mg/kg of propofol and was intubated (ETT no.5) with 0.1 mg/kg of vecuronium bromide as muscle relaxant drug, and 0.1 mg/kg of dexamethasone was also given intravenously soon after propofol administration.

During surgery, anesthesia was maintained with O<sub>2</sub>: N<sub>2</sub>O (50:50) and sevoflurane 1-2%. The patient's vital signs were stable with 100-110/70-60 mmHg of blood pressure, 90-95 times/minute of pulse, controlled respiratory rate (12-14 times/minute), and 100% of SpO<sub>2</sub>. 20 mg/kg of tranexamic acid was given intravenously because there seems to be bleeding that was difficult to stop by the operator.

Approximately 10 minutes before the end of the surgery and after the tonsil was removed, 2mg/kg of intratracheal 2% lidocaine and intravenous ketorolac 30 mg was administered and the anesthesia was deepened to facilitate airway clearance and evaluate bleeding. Extubation was carried out using the *Smooth Emergence Techniques* approach.

After extubation, patient was positioned perfectly. The patient looked calm, did not experience coughing or vomiting, with 110/70 mmHg of blood pressure, 85 times/minute of pulse, 16 times/minute of respiratory rate, 100% of SpO<sub>2</sub>, and without desaturation or agitation periods. After that, patient was transferred to the recovery room. While in the recovery room (first 2 hours), the patient's vital signs were stable where his blood pressure was 100-110/60-70 mmHg, 80-85 times/minute of pulse, 14-16 times/minute of respiratory rate, 98-100% of SpO<sub>2</sub>, and 1-2 of VAS. The patient complained of slight discomfort in the throat and no signs of tonsillar bleeding. He was calm in the recovery room accompanied by his relatives.

### 3. Discussion

Tonsillectomy with or without adenoidectomy has long been performed and is one of the most frequently performed surgical procedures in pediatric groups worldwide. Although known as a commonly performed procedure, it poses major challenges for surgeons as well as anesthetists and associated with a substantially increased risk of morbidity and mortality. Intubation with an endotracheal tube has become a routine part of the administration of general anesthesia. Intubation procedure can cause some complications. Intubation with an endotracheal tube triggers several phenomena or so-called emergency phenomena (EP), including postoperative sore throat, cough, and dysphonia after general anesthesia. The percentage of occurrence of EP ranges from 15% to 96%.

Fine extubation can improve primary prevention by reducing cough/bucking and aerosolization. There are several prevention techniques or strategies for POST (Postoperative sore throat) and other airway complications. Smooth Emergence Techniques are assisted by drugs (intracuff lidocaine, intravenous lidocaine and topical lidocaine). Lidocaine is one of the most commonly used

drugs to prevent POST (postoperative sore throat) and its efficacy was evaluated in a 2009 Cochrane review.

There are many complications that could have been prevented during the extubation process as in this case report, 2mg/kg 2% lidocaine were administered intratracheally 10 minutes before endotracheal tube extubation to prevent the occurrence of POST (Postoperative sore throat), cough/bucking, and aerosolization. Lidocaine in 1-2 mg/kg of dosage produces a plasma concentration of 3 mcg/mL which inhibits cough reflex. However, this drug has a weakness in the form of a short duration (5-20 minutes), making it difficult to obtain optimal effects.

Jee and Park (2013) conducted a study and found that lidocaine administered via ETT can suppress cough if administered about 5 minutes before extubation and is better than IV injection, reporting that local anesthesia is achieved within 2-3 minutes after application of endotracheal lidocaine. In this case there was no incidence of cough, desaturate period, agitation, and vomiting, even any hemodynamic spikes were not found after post-extubation as stated in the study of Tabasum Shabnum, et al. (2017) who concluded that both IV lidocaine and intratracheal lidocaine 1.5 mg/kg were effective in attenuating the hemodynamic response if administered within 20 minutes before extubation. Cough suppression via the intratracheal route is comparable to the IV route.

Lidocaine can protect the tracheal mucosa through the effect of a continuous topical anesthetic, and prevent the diffusion of nitrous oxide into the cuff. Endotracheal administration of lidocaine can have local and systemic effects in preventing coughing during extubation. Lidocaine has the ability to act as a local anesthetic that inhibits the delivery of impulses in the afferent pathway of the vagus nerves to the medulla oblongata. In addition, systemically, lidocaine can provide an antitussive effect by inhibiting the activity of the central nervous system.

The incidence of coughing during the extubation process is due to stretch stimulation in the trachea due to the ETT tube balloon and also direct contact between the tracheal mucosa with the ETT tube balloon. Rapidly adapting mechanoreceptors (RARs) which also known as irritant receptors with small diameter, is a myelinated fibers located in the airways that are sensitive to cough such as the larynx and the carina which are sensitive to mechanical stimuli. Irritation of the mucosa and stretch stimulation in the RARs will activate the vagus nerve afferent pathway and at the same time the cough center will be blocked by administering endotracheal lidocaine thus inhibiting coughing.

### 4. Conclusion

In this case report, intratracheal administration of 2mg/kg 2% lidocaine 10 minutes before extubation prevented the incidence of cough and other post-extubation phenomena during tonsillectomy surgery.

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