



## CASE REPORT

# Effectiveness of Transtracheal Lignocaine in Relieving Post Extubation Laryngospasm: A Case Report

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## Abstract

Laryngospasm is reversible spasm of vocal cords that is common in patients who are undergoing upper airway related surgeries under general anaesthesia. It occurs mostly following extubation; requires immediate management and if these patients are left untreated rapid decrease in saturation with bradycardia may take place. Lignocaine is considered effective in prevention of laryngospasm by both topical and intravenous route. Lignocaine is also used for transtracheal block for various upper airway related procedures. It also induces cough immediately following transtracheal injection. Here we report an adult obese patient posted for tonsillectomy, whose laryngospasm following extubation refractory to other methods did respond to transtracheal lignocaine.

## Keywords

Laryngospasm, Lignocaine, Transtracheal

## Key Message

Transtracheal lignocaine may be effective in refractory laryngospasm as it may induce cough and relieve spasm of vocal cords.

## Introduction

Laryngospasm is transient and reversible spasm of vocal cords often associated with anaesthesia [1]. Patients usually complain of speaking and breathing difficulty along with stridor which is a high pitched, harsh sound. It is attributed to reflex contraction of laryngeal muscles and is a protective reflex against aspiration [1,2]. Patients undergoing upper airway surgeries have higher incidence of developing laryngospasm and if untreated may rapidly progress to life threatening complications [3,4]. It is thereby prudent that these

patients require immediate attention and maintenance of saturation. Lignocaine is considered effective in preventing laryngospasm both by intravenous (IV) and topical routes [1,5]. Transtracheal block with lignocaine is an accepted technique for airway related procedures [2]. Few case reports are available on role of topical lignocaine for treatment of laryngospasm as it is limited for preventive measures. Here we present a patient in whom laryngospasm, refractory to the other treatments did respond to topical transtracheal lignocaine.

## Case History

A 35-year-old obese, hypothyroid male (BMI 36.2) of ASA PS 2 with recurrent tonsillitis and history of smoking was scheduled for tonsillectomy under anaesthesia. After routine pre-anaesthesia checkup, which did not reveal any history of previous surgery, any respiratory problems and normal thyroid profile patient was taken for operative procedure. Anaesthesia was induced with intravenous propofol after premedication with glycopyrrolate, ondansetron and ranitidine. Fentanyl was used as analgesic and after confirmation of ability to ventilate neuromuscular blockade (NMB) was achieved with atracurium. Three minutes following NMB and on loss of all twitches in train of four (TOF) stimulation, a gentle laryngoscopy was performed. Patient was intubated with 8.5 mm cuffed endotracheal tube. Tube was secured and repeat laryngoscopy was performed for placement of throat pack. Surgery then proceeded uneventfully. Anaesthesia was maintained with oxygen in air and sevoflurane along with atracurium, diclofenac and paracetamol. After completion another gentle

laryngoscopy was performed, any bleeding sites were noted, gentle suctioning was done and throat pack was removed. Residual NMB was reversed and on achievement of adequate tidal volume and response to commands patient was extubated. Oxygen through face mask at 4 L/min was supplemented. Shortly post extubation patient developed deep inspiratory stridor associated with progressive respiratory distress and agitation. Oxygen saturation declined to 92% with supplemental oxygen of 6 L/min. To relieve obstruction proper repositioning of head and jaw was done, nasal airway was secured and inspiratory support with bag mask along with continuous positive airway pressure (CPAP) by closing the APL (Adjustable pressure limiting) valve to 40 cm of H<sub>2</sub>O was attempted. Despite these saturation deteriorated to 86% and stridor persisted. Intravenous lignocaine at 1.5 mg/kg and dexamethasone 8 mg was given. Applying these non-pharmacological and pharmacological measures a transient improvement took place where saturation improved to 88% and intensity of stridor diminished. However, this episode was for short duration. As intensity of stridor again increased and saturation deteriorated to 86% anesthesia was deepened by propofol 1 mg/kg. Following this stridor gradually faded and on assisted bag mask ventilation saturation improved to 96%. Thereafter as patient regained consciousness, laryngospasm again reappeared and saturation diminished to 90%. At this stage a 2 cc syringe with 25G needle loaded with 2 ml of 4% lignocaine was used to puncture the cricothyroid membrane and on aspiration of air lignocaine was injected transtracheally. After one minute, intensity of stridor gradually diminished and saturation improved to 95%. By next 3 minutes stridor disappeared and patient was able to maintain saturation of 97% with spontaneous breathing. Patient was then observed in operative room and on ability to phonate patient was shifted to recovery for further monitoring.

## Discussion

Stridor is high-pitched sound found during rapid movement of air across constricted pathway and in absence of other causes (vocal cord paralysis, foreign material, upper airway edema, residual muscle paralysis) it is mostly due to laryngospasm. Adduction of vocal cord following stimulation is a protective reflex from aspiration but this is usually short lived [2]. Laryngospasm is sustained adduction of vocal cord [1,2]. In anaesthesia light plane following extubation, use of irritant volatile agents, airway instrumentation and presence of blood or secretions are important contributing factors. Over here tonsillectomy and history of smoking, which could have caused accumulation of secretions, probably attributed for laryngospasm [6].

Treatment of laryngospasm starts with prevention. Use of non-irritant inhalation agents, IV induction, awakening patients either fully awake or in deep

plane, proper suctioning, securing bleeding points, IV magnesium, topical as well as IV lignocaine and anti-sialagogue for reducing secretions are preventative measures [1,3]. Most of these preventive measures except intravenous magnesium were used for this patient. Active treatment commences with early recognition along with exclusion of other causes. A cautious gentle laryngoscopy may be attempted to remove secretions or blood and spraying the larynx with lignocaine [1,5]. However, this has the possibility of further complications and considering our patient being agitated and extubated in fully awake condition this was difficult. Other non-pharmacological methods like vigorous jaw thrust, placement of proper sized airway and CPAP with 100% oxygen along with assisted bag mask ventilation during inspiration was attempted here [1]. Pharmacological methods include use of propofol at titrated dosage with or without succinylcholine at 0.1 to 2 mg/kg and lignocaine 1.5 mg/kg [1,5,7]. In this patient laryngospasm subsided with use of propofol but regained as patient recovered.

Lignocaine; an amino amide local anaesthetic; is considered effective both by topical (4 mg/kg) and intravenous (1-2 mg/kg) routes for prevention of laryngospasm [1,5]. Topical routes include lignocaine spray on larynx during laryngoscopy, aerosol administration, application of jelly on airway securing device, superior laryngeal nerve block or transtracheal installation [2,5]. Some animal studies have depicted topical lignocaine to be more effective than intravenous route in blocking sensory stimulation of larynx, has immediate onset and low blood levels. However, effects lasted for shorter duration [2]. Transtracheal injection of lignocaine is a widely accepted technique to topicalize airway during bronchoscopy. It has the advantage over other methods of topical lignocaine application in laryngospasm as nebulization will take prolonged time and spraying of vocal cords by laryngoscopy is difficult and uncomfortable. Superior laryngeal nerve block will require expertise and cooperation [2]. Moreover as transtracheal injection stimulates cough it may help in relieving of laryngospasm. However, disadvantages of this technique are requirement of good patient compliance which may be difficult to achieve in a patient with laryngospasm, inadvertent injury to surrounding structures, bleeding and if stridor is due to other causes this may further worsen.

Larson's maneuver is essentially vigorous jaw thrust where pressure is applied bilaterally on styloid process. This maneuver however has limited evidence [1]. In this patient though vigorous jaw thrust was applied, obesity yielded difficulty in palpating styloid process. Thereby in obese patient this may not be effective. To conclude transtracheal lignocaine in laryngospasm refractory to other treatments may be considered as an effective alternative.

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