Lidocaine spray for relief of extubation laryngospasm in anesthetized patient

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ABSTRACT

Objective: To assess use of lidocaine spray to relieve post anesthesia laryngospasm.

Methods: The study was performed for one year between 2004-2005 in Tabriz Medical Sciences University, Tabriz, IRAN. Patients with ASA class I and II with laryngospasm were given two puffs of lidocaine spray locally onto vocal cords and response was observed for 60 seconds.

Results: The study included 20 patients during one year study in which 38 percent of the patients were female and 62 percent were male. Average age of the patients was 30±1.9 years. 85 percent of the patients were in ASA class I and 15 percent in class II. The treatment relieved laryngospasm in 90 percent of the patients in 10±0.1 seconds. In 10 percent anesthesiology team members applied other conventional airway opening maneuvers.

Conclusion: Spraying 10 percent lidocaine onto the vocal cords under direct vision can suppress stimulated laryngeal receptors in most patients. Advantages of this approach include drug availability, its prompt effect and easy usage. (Rawal Med J 2006;31:78-80)

Key Words: Extubation, laryngospasm, lidocaine

INTRODUCTION

Laryngospasm is a forceful involuntary spasm of the laryngeal musculature which occurs through sensory stimulation of the superior laryngeal nerve and afferent responses from the recurrent laryngeal nerve. Laryngospasm consists of two phases a “shutter” mechanism that results in partial airway obstruction and a “ball valve” mechanism which follows complete obstruction. The shutter mechanism reflects adduction of the vocal cords, whereas the ball valve mechanism entails constriction of the false vocal cords and supraglottic soft tissue. Laryngospasm occurs during all the stages of anesthesia especially in light plans of it. Stimulation from abruption of inhaled agents, insertion of oral/nasal airways, laryngoscopy, secretions, vomitus, blood, difficult airway management, coughing, bronchospasm, frequent suctioning and even removal of endotracheal tube can trigger it which may also be the result of a reflex closure of the glottis or of the larynx. Symptoms that suggest laryngospasm included patients’ respiratory effort for 15 seconds, agitation, decreased oxygen saturation, absent breath sounds and acute respiratory distress. There are many different therapeutical methods such as extension of the neck and anterior displacement of the mandible, positive pressure ventilation with 100% oxygen, subparalytic dose of IV succinylocholine (0.1mg/kg) and intravenous lidocaine. The aim of this study was to assess the effects of lidocaine spray in relieving post extubation laryngospasm.
METHODS
The study was carried out between 2004-2005 in Tabriz Medical Sciences University, Tabriz, IRAN. Patients with laryngospasm (i.e., respiratory effort and adduction of vocal cords for 15 seconds) who were adult, fasted anesthetized patient with ASA class I and II were included in the study. The reason for selecting patients categorized to ASA class I or II was duration of xylocaine effect (60 seconds), since more than that time circulatory and hemodynamic status could be compromised progressively. Patients with ASA class more than II and patients in whom laryngospasm didn’t relive after 60 seconds were excluded from the study. General anesthesia with endotracheal intubation was used in all the patients with the same induction and maintenance drugs (sodium thiopental and halothane).

After documenting signs and symptoms of laryngospasm by performing direct laryngoscopy and visualization of airway obstruction (adduction of vocal cords), two puffs of lidocaine (equal to 20mg) were sprayed onto the vocal cords. 100% oxygen was continued, while monitoring of vital signs and saturation of oxygen. Head down position and oropharyngeal suctioning were done to prevent aspiration and increasing uptake of xylocaine. Patients were monitored for signs of relief of spasm for 60 seconds by noting complete chest expansion, feeling adequate ventilation and absence of stridor in 60 seconds. Reobservation of vocal cords by direct laryngoscopy was used for documenting relief of laryngospasm. The study was carried out after obtaining approval of hospital ethical committee. Data collection was done using the questionnaire and descriptive methods used for data analysis.

RESULTS
During one year period, 20 patients were selected for this study. All had elective surgery. Average age of the patients was 30±1.9 years. 85 percent of the patients were in ASA class I and 15 percent in class II. 62 percent were male and 38 percent were female. 90 percent of the patients who were treated with two puffs of lidocaine, took 10±0.1 seconds to respond appropriately. Conventional methods were employed in remainder (10%). No hemodynamic changes were noted during the treatment and arterial saturation of oxygen returned to acceptable level in less that 60 seconds. None of the patients experience cyanosis, dyspnea, and tachycardia in post operative period.

DISCUSSION
Laryngospasm consists of prolonged intense glottic closure. Airway irritation is a common cause, which results form not paying attention to the stage of anesthesia at the time of extubation. Laryngospasm can also result from neurological diseases, electrolyte imbalances, spasmodic dysphonia and even subarachnoid block.4-9 There are varying degree of laryngospasm which must be diagnosed and treated immediately with conventional methods.4 Laryngospasm with consequent regurgitation, vomiting, aspiration, failure of oxygenation, inadequate ventilation and negative pressure pulmonary edema, may lead to brain damage and even death.10,11

In 1999 nitroglycerin was administered intravenously in a dose of 4µg/kg which relieved laryngospasm within a minute.12 In 2002 propofol (0.25mg/kg) was used for relief of extubation laryngospasm.13 In 2005 aerosolized lidocaine (a mixture of 5ml of 2% lidocaine with equivolume of 0.9% normal saline) was used for prevention of this complication.14 Topical or IV lidocaine for prevention and management of airway irritability has been used with good results.1 In our study, we used a topical preparation (4 mg/kg of 2% lidocaine or 5 ml of 2% lidocaine with equivolume of 0.9% normal saline), for laryngospasm although, it has been used intravenously for preventive measures before certain procedures such as endoscopy or intubation.15,16 We used the spray for treatment and not for prevention. Time required for relief of laryngospasm has been reported to be one minute,12 but in our study it took 10±0.1 seconds. We monitored patients closely after spraying lidocaine so that if laryngospasm was not relieved within 60 seconds, conventional airway opening maneuvers were employed immediately. Vital signs and oxygen saturation in this study were stable which was the result of prompt effect of this drug. In this study patients did not develop cyanosis, dyspnea, and tachycardia which are features of
methemoglobinemia, which has been reported with benzocaine (Hurricaine).17

In conclusion, drug dose (only two puffs of 10% lidocaine), its prompt effect (10±0.1 seconds), stability of hemodynamic status and SPO2 level during treatment and no evidence of methemoglobinemia, we recommend usage of this drug to relieve extubation laryngospasm in operating room fields as an easy and simple method by qualified anesthesia team members. Not paying attention to the process of surgical procedures, early discontinuation of inhaled anesthetics, air way stimulation and its unwanted manipulation all lead to extubation laryngospasm.

REFERENCES