Topical Anesthesia to Help Reduce Cough and Laryngospasm

The effects of lidocaine spray and intracuff alkalinized lidocaine on the occurrence of cough at extubation: a double randomized controlled trial.
Authors: D’Aragon F, Beaudet N, Gagnon V, Martin R, Sansoucy Y.

This randomized controlled double-blinded study was designed to evaluate the effects of lidocaine sprayed onto the larynx and/or injected into the tracheal cuff to decrease the incidence of coughing during extubation (primary outcome) and post-operative sore throat. One hundred twenty gynecological patients were enrolled. Before intubation, 4% lidocaine or 0.9% saline was sprayed onto the patients supra- and subglottic area. After tracheal intubation, the tracheal cuff was filled with either an alkalinized 2% lidocaine solution or 0.9% saline; this resulted in four study groups. Cough occurred in 42%, 24%, 63% and 69% of patients in the spray-cuff, spray-saline, saline-cuff and saline-saline groups respectively. Investigators concluded sprayed lidocaine was effective in decreasing the occurrence of cough peri-extubation in surgeries of less than two hours. The severity of sore throat was low for all groups. The authors surmised this was due to the use of liquid instead of air in the ETT cuff.

Laryngotracheal Topicalization with Lidocaine Before Intubation Decreases the Incidence of Coughing on Emergence from General Anesthesia.
Authors: Minogue SC, Ralph J, Lampa MJ.

This article reports a double-blind, randomized placebo-controlled study to evaluate the efficacy of pre-intubation topical lidocaine in preventing coughing on emergence from general anesthesia. Patients scheduled for gynecological surgery received intravenous sedation and anesthetics; then under direct laryngoscopy a perforated cannula with either normal saline or lidocaine was passed through the vocal cords into the trachea and an attached vial was depressed to spray the liquid. An endotracheal tube was then inserted after the cannula was removed. Post-operatively, a blinded observer noted the presence or absence of cough during emergence before and after extubation and before transfer to the post anesthetic care unit. Fifty patients were evaluable for data. Fewer patients that received lidocaine (compared to placebo) coughed on emergence both pre-extubation (lidocaine: 26%; placebo: 70%; p<0.01) and post-extubation (lidocaine: 4.3%; placebo: 30%; p= 0.022).

The efficacy of lidocaine to prevent laryngospasm in children: a systematic review and meta-analysis.
Source: Anaesthesia 2014; 69:1388-96.
Authors: Mihara T, Uchimoto S, Morita S, Goto T.

The objective of this meta-analysis was to determine the efficacy of lidocaine in preventing laryngospasm during general anesthesia in children. All pediatric trials that compared lidocaine with a control (i.e. placebo or no treatment) and reported laryngospasm incidence were included except case reports, letters to the editor and reviews. Various delivery methods and forms of lidocaine were included. There were no lidocaine related adverse effects reported. Subgroup analysis, considered moderate levels of evidence using the GRADE system, indicated that both intravenous and topical lidocaine have a statistically significant effect on reducing the incidence of laryngospasm during general anesthesia in children.

The prevention of postoperative stridor and laryngospasm with topical lidocaine.
Authors: Staffel JG, Weissler MC, Tyler EP, Drake AF.

Investigators conducted a prospective randomized study of 133 adult and pediatric patients undergoing tonsillectomy and adenoidectomy to determine if the topical application of 4mg/kg of 4% lidocaine at the time of intubation would decrease the incidence of postoperative stridor and laryngospasm. A standard laryngotracheal syringe was used to topicalize the supraglottic, glottic, and subglottic areas before the initial intubation. For both procedures eight (12%) of 67 control patients suffered postoperative stridor or laryngospasm, and two (3%) of 66 lidocaine patients developed postoperative stridor or laryngospasm, a significant difference (p = 0.05). Authors concluded postoperative stridor or laryngospasm may be significantly reduced with topical 4% lidocaine 4mg/kg just prior to intubation.
Topical Anesthesia to Help Reduce Pressor Responses

Differences in cardiovascular response to airway stimulation at different sites and blockade of the responses by lidocaine.

**Source:** *Anesthesiology* 2000;93:95-103.

**Authors:** Hamaya Y, Dohi S.

This randomized and controlled study was conducted to evaluate differences in cardiovascular responses (CVR) to mechanical stimulation in three anatomical locations of the airway (the larynx, trachea and carina and bronchus); and the effects of local anesthesia with lidocaine on those responses after either topical and/or intravenous lidocaine. Investigators found insignificant differences in each region to stimulation. Topical 4% lidocaine reduced all the airway CVRs. Intravenous administration of lidocaine also attenuated the CVR increases but to a lesser extent than the topical lidocaine. Investigators concluded responses to mechanical stimulation of the larynx, trachea, carina, and bronchi were completely blocked by topical application of lidocaine to each part of the airway and were partially blocked by intravenous lidocaine without significant adverse cardiovagal response.

Effect of tracheal lidocaine on intubating conditions during propofol-remifentanil target-controlled infusion without neuromuscular blockade in day-case anesthesia.


**Authors:** Kim J-S, Kim D-H, Joe HB, Oh CK, Kim J-Y.

This randomized, double-blind study evaluated the effect of laryngotracheal lidocaine on the intubating conditions and hemodynamic responses for tracheal intubation during propofol and remifentanil infusion without neuromuscular blocking agent in day-case anesthesia. Four minutes after induction, lidocaine or normal saline was applied into the larynx with a spray tip attached to a syringe. Tracheal intubating conditions were scored. The overall intubating condition was regarded as clinically acceptable (excellent or good) in 13 of 25 (52%) patients in the control group and in 22 of 25 (88%) in the lidocaine group, a significant difference ($p = 0.005$). Intubating conditions were excellent in 6/25 patients in the control group and 14/25 patients in the lidocaine group ($p = 0.021$). Intubating conditions were poor in 12/25 and 3/25 patients in the control and lidocaine groups, respectively ($p = 0.005$). In the control group, the most common cause of poor intubating conditions was vigorous coughing. Mean arterial pressure was significantly higher in the control group ($p = 0.033$). Investigators concluded that in this clinical scenario laryngotracheal administration of lidocaine achieves better intubation conditions without increasing the risk of hypotension by attenuating the pressor response to tracheal intubation.

Local Airway Anesthesia Attenuates Hemodynamic Responses to Intubation and Extubation in Hypertensive Surgical Patients*.

**Source:** *Med Sci Monit* 2014;20:1518-24

**Authors:** Meng YF, Cui GX, Gao W, Li ZW.

This study was a randomized, controlled and blinded trial intended to evaluate the effects of topical anesthesia on hemodynamic responses during intubation and extubation of hypertensive patients. Patients were randomized to one of three groups: a control group receiving 5 ml saline, and two groups receiving topical anesthesia. Most hemodynamic parameters were significantly higher in the saline group than in either of the topical anesthetic groups. Investigators concluded topical anesthesia can effectively reduce hemodynamic responses during intubation.

*This study includes a discussion of a topical use of ropivacaine that has not been approved by the Food and Drug Administration (FDA). Teleflex does not recommend or endorse the described use of ropivacaine.*