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Research Article

Effect of intratracheal lidocaine spray on recovery from general anesthesia after Eye surgery: A randomized double-blinded study

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Abstract
Background: Local anesthesia for eye surgery is increasingly popular, but there will always be a need for general anesthesia. Cough during emergence from general anesthesia is considered critical event as it may lead to surgical bleeding laryngospasm hemodynamic instability and could be life threatening in patients who are at risk of complications related to increase in intracranial or intraocular pressure. **Objectives:** To detect the effect of intratracheal lidocaine on cough reflex in eye surgery.
Study design: Prospective randomized double blind controlled study will be conducted on 80 adult patients. **Methods:** This study involved 80 patients who are undergoing general anesthesia for elective keratoplasty and retinal detachment. The patients will be allocated into 2 groups (40 patients on each group). 40 patients Received (5ml) 2% of lidocaine was sprayed down the intratracheal tube of patients while 40 patients Received 5ml saline in medical spray bottle was sprayed down intratracheal tube of patients. observed variables included hemodynamic parameters, intraocular pressure, postoperative cough, surgeon satisfaction and complications related to drugs. **Results:** The results have shown that lidocaine was more effective in attenuating cough in eye surgery, and provide satisfactory analgesic effect after surgery. **Conclusion:** lidocaine was more effective in attenuating cough in eye surgery, and provide satisfactory analgesic effect after surgery

Keywords: Intratracheal Lidocaine, postoperative cough, eye surgery.

Introduction
Local anesthesia for eye surgery is increasingly popular, but there will always be a need for general anesthesia. Patients may refuse local anesthesia, may be unable to keep still or lie flat for the duration of surgery or lack the mental facility to cooperate whilst awake. Young children and those with allergy to local anesthetic also need general anesthesia [(1)]

Cough during emergence from general anesthesia is considered critical event as it may lead to surgical bleeding laryngospasm hemodynamic instability [(2)] and could be life threatening in patients who are at risk of complications related to increase in intracranial or intraocular pressure [(3,4).]

Recently lidocaine administration has been widely used for reducing cough during extubation due to its simplicity and lack of serios adverse effects; There are two major routes for lidocaine administration systemic intravenous injection and local direct application on the laryngeal inlets such as spraying lidocaine on the supraglottic and subglottic regions or applying lidocaine jelly or sprayed [(5)]

Method
After ethical committee approval (ID: 22_2021) and written informed consent was obtained from all patients, this prospective randomized double blinded controlled study was carried out at El-Minia University Hospital during the

period from March 2021 to March 2022. The study was conducted on 80 adult patients. Written informed consent was obtained from all consecutive adult patients who were undergoing general anesthesia for elective keratoplasty and retinal detachment.

According to the sample size, the patients were allocated into 2 groups (40 patients on each group). Randomization was done according to computer Random number table. Only the researcher is doing the study. knows the subject the participant was receiving until the trial is over. The patient, the surgeon and the anesthetist who collect the data were blind to patient group.

Inclusion criteria:

1-Age 18-60
2-Both gender
3- intraocular surgery (cataract, glaucoma, vitrectomy and keratoplasty)
4- American Society of Anesthesiology class I and II

Exclusion criteria:

1-Major organ diseases (renal impairment, cardiorespiratory abnormalities, bronchial asthma, COPD, restrictive lung diseases, liver failure).
2-Allergy to drugs will be used
3-patient refuse
4-pregnancy-lactation
5-signicant obesity

Study groups:

Group L (40 patients): Received (5ml) 2% of lidocaine was sprayed down the intratracheal tube of patients.
Group C (40 patients): Received 5ml saline in medical spray bottle was sprayed down intratracheal tube of patients.

A careful medical history will be taken. General examinations include pulse, arterial blood pressure, respiratory rate, and oxygen saturation. Physical examination includes chest, heart, abdomen, and other system. Routine investigations include complete blood picture (Hb, platelet), coagulation profile (PC, PT, INR), renal function test (urea, creatinine), liver function test (AST, ALT, albumin, bilirubin) and random blood sugar. Patients will be randomized to two groups (40 patients in each group): When the patients will be admitted to the operating room, pulse oximeter, ECG, non-invasive blood pressure and peripheral oxygen saturation monitors will be applied until discharging the patient from the operative room. A 20 G cannula will be inserted in the dorsum of the hand and ringer lactate infusion will be started at 5-10ml\kg\hour. The ophthalmologist and anesthesiologist will be the same for all patients. Anesthesia was carried out with propofol (1-2mg/kg IV), atracurium (0.5 mg/kg IV) followed by insertion of endotracheal tube and maintained anesthesia with Isoflurane (1% - 1.5%), atracuruime (0,1 mg/kg intermittent every 20-30 minutes) to maintain controlled ventilation and oxygen. fentanyl will be given in operating room according to the patients need and clinical discretion. At the end of operation by 15min, 5ml 2% lidocaine in the L group, control group administrated 5ml saline sprayed down intratracheal tube of patients.

Statistical analysis

Data was analyzed using Statistical Package of Social Sciences (SPSS) software and expressed as mean ± standard deviation and median (minimum-maximum) for numerical data or as number and percent (%) for categorical data. Intergroup comparisons of continuous numerical variables were done using ANOVA test for parametric data or Kruskal Willis one way test for non-parametric data. Intragroup comparisons to baseline values were done using paired t-test for parametric data or Wilcoxon test for nonparametric data. The level of significance was fixed at a minimum of 0.05%.

Results

There was no statistically significant difference when comparing the two studied groups as regard age, sex, ASA, type of surgery, weight and duration of surgery.

Table (1): Characteristics of patients and surgical procedures in the two groups. Variable are presented as Mean ± SD or number (%).

Variables	Group L (n=40)	Group C (n=40)	P value
Age (year)	40.5±11.9	43.2±12.9	0.280
Sex: n (%)			
Male	21(52.5%)	25(62.5%)	0.376
Female	19(47.5%)	15(37.5%)	
Weight (kg)	85.3±7.1	86.3±10.4	0.577
ASA classification: n (%)			
ASA I	25(62.5%)	32(80%)	0.219
ASA II	15(37.5%)	8(20%)	
Type of Surgery: n (%)			
Keratoplasty	10(25%)	11(27.5%)	0.270
RD	30(75%)	29(72.5%)	
Operation time (min)	87.01±10.07	87.40±10.44	0.971

ASA, American Society of Anesthesiologists, RD, Retinal detachment. Group L: lidocaine and Group C: control. p-value is considered significant at <0.05

There was significant increase in group C when compared to group L regarding heart rate at M2 up to M10.

Table (2): Heart Rate (beat/minute) changes in the studied groups. Values are presented as Mean ± SD.

Time	Group L (n=40)	Group C (n=40)	P value
before anesthesia (M0)	92.34±6.39	91.57±6.97	0.131
Before administration of drugs baseline (M1)	84.23±10.00	84.15±10.07	0.995
5 min after the administration of drugs (M2)	83.06±4.744	83.06±4.744	0.044#
10 min after the administration of drugs (M3)	82.59±5.66	84.72±4.30	0.0001#
At the end of surgery (M4)	82.57±5.33	84.92±4.36	0.0001#
At the point of awareness (M5)	82.08±4.81	91.60±5.60*	0.0001#
At the point of extubation (M6)	82.90±4.87	92.32±5.23*	0.0001#
2 min after extubation (M7)	80.72±4.23*	89.64±3.97*	0.0001#
5 min after extubation (M8)	78.15±3.59*	86.95±4.03	0.0001#
15 min after extubation (M9)	79.00±3.69*	87.85±4.12*	0.0001
30 min after extubation (M10)	78.15±3.59*	87.20±4.31*	0.0001#

Group L: lidocaine and Group C: control.

#: Significant difference between groups at p value < 0.05.

****: Significant difference within each group at p value < 0.05***

There was significant increase in group C when compared to group L regarding mean blood pressure at M3 up to M10.

Table (3): Mean blood pressure (mmHg) changes in the studied groups. Values arepresented as Mean ± SD.

Time	Group L (n=40)	Group C (n=40)	P value
before anesthesia (M0)	99.19±4.81	99.06±4.31	0.261
Before administration of drugs baseline (M1)	81.75±5.60	82.42±6.15	0.749
5 min after the administration of drugs (M2)	81.07±5.24*	82.90±6.22*	0.084
10 min after the administration of drugs (M3)	80.67±5.62*	82.77±5.68	0.002#
At the end of surgery (M4)	82.00±6.27	84.35±4.86*	0.006#
At the point of awareness (M5)	84.80±5.84*	101.16±6.66*	0.0001#
At the point of extubation (M6)	85.65±6.18*	102.43±6.78*	0.0001#
2 min after extubation (M7)	84.70±6.28*	101.73±6.55*	0.0001#
5 min after extubation (M8)	84.39±5.56*	95.92±4.36*	0.0001#
15 min after extubation (M9)	82.03±6.48	93.35±4.65*	0.0001#
30 min after extubation (M10)	81.40±5.13	86.89±4.15*	0.0001#

Group L: lidocaine and Group C: control.
#: Significant difference between groups at p value < 0.05
****: Significant difference within each group at p value < 0.05***

There was significant difference between the two studied groups as regard postoperative cough

Table (4): Postoperative cough in the studied groups. Values are presented as number (%).

Variables	Group L (n=40)	Group C (n=40)	P value
No cough (0)	28 (70%)	11(27.5%)	<0.0001*
Minimal Cough (1)	11 (27.5%)	16 (40%)	0.002*
Moderate cough (2)	1 (2.5%)	10 (25%)	<0.0001*
Severe cough (3)	0%	3 (7.5%)	0.035*

Group L: lidocaine and Group C: control.
#: Significant difference between groups at p value < 0.05.

Discussion

It is widely believed that approximately 82.5% of patients experience a cough upon emergence from general anesthesia [(6)]. With causes possibly including the presence of an endotracheal tube, uncleared secretions, and anesthetic gas cough during tracheal extubation may lead to several complications, such as hypertension, tachycardia, myocardial ischemia and postoperative bleeding [(7)].

Several studies have shown that lidocaine can reduce the incidence and severity of cough during anesthetic emergence through different methods, including intracuff, tube lubrication, intratracheal instillation and intravenous bolus infusions before an induction [(8)].

In the present study, we found that lidocaine spray (1.5 mg/kg) was effective in attenuating the hemodynamic responses during extubation than the control. In Group-L, MAP remained below the baseline value throughout the study period but in Group-L, it raised before the extubation and the rise of HR was less in Group-L than Group-C.

Takita et al.,, used tracheal lignocaine (4%, 4 ml) before intubation, and they observed that tracheal lignocaine was very effective to reduce cardiovascular responses during intubation [(9)].
In contrast to our results, the study done by Benzadi et al., that measured the heart rate from 1 to 5 min after extubation shows no significant difference among the group with a p-value of 0.942 [(10)].
Jee and Park had compared the effect of 2% lignocaine in a dose of 1 mg/kg given endotracheally and intravenously 5 min and 3 min before extubation, respectively. In the results, lignocaine given endotracheally was better than the IV lignocaine in attenuating airway-circulatory reflexes during extubation [(11)].

Lee and Park had evaluated the effect of 10% lignocaine spray in a dose of 1.5 mg/kg to the larynx and trachea before suspended laryngoscopy and they observed that lignocaine spray (10%) was effective in attenuation of rise of arterial pressure during suspended laryngoscopy and suppression of a cough during extubation [(12)].
In our study there was a significant decrease in cough occurrence in group L when compared to group C (P value 0.0001, 0.003) at grades 0,2 respectively.

In a previous study Nath et al.,, 2018 aimed to test the hypothesis that alkalinized lidocaine would reduce the incidence of emergence cough after surgeries lasting <120 minutes. A total of 213 patients were randomized and 100 patients in each group completed the experimental protocol. Patients were divided into two groups. With either 2 mL of 2% lidocaine and 8 mL of 8.4% bicarbonate (group AL) or 10 mL of normal saline (group S). found that, the incidence of extubation cough in lidocaine group was 12%, significantly lower (1-sided P = .045) than the 22% incidence in normal saline group. The 1-tailed risk ratio for cough in lidocaine group was 0.55 (0–0.94, P = .045) **[(13)]**

Conclusion

lidocaine was more effective in attenuating cough in eye surgery and provide satisfactory analgesic effect after surgery.

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