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ORIGINAL ARTICLE

Comparison Between nebulized Lidocaine and Budesonide for Prevention of airway complications after adult ophthalmic surgeries.

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ABSTRACT

BACKGROUND: Securing the airway is the most important part of safe anesthesia. In clinical practice there is always a potential risk for encountering endotracheal intubation (ETT) related airway complications especially laryngospasm which can lead to acute desaturation and subsequent organ dysfunction. Nebulization of lidocaine can achieve highly effective anesthesia from oral cavity up to trachea for intubation without significant elevation in lidocaine blood level. Simplicity and lack of discomfort is the major advantage of this technique. Budesonide nebulizer suspension is nebulized corticosteroids used in treating chronic obstructive pulmonary disorders and to improve upper airway function.

PATIENTS AND METHODS: 120 patients were encountered in the study and subjected to physical examination, vital signs (heart rate, blood pressure, and peripheral oxygen saturation), cardiac and pulmonary conditions were evaluated. All patients were investigated for complete blood count, Liver functions test, kidney functions test and coagulation profile. Patients were randomly assigned into one of three groups using computer generated randomization software

RESULTS: Perioperative patient management and data collection will be done by an independent anesthesiologist who is blinded to patient's group

CONCLUSIONS: Pre-induction nebulized lidocaine and budesonide can prevent post-extubation laryngospasm. Nebulized Budesonide (250 ucg) and to less extent nebulized lidocaine (60 mg) can reduce the incidence of post-extubation laryngospasm, cough, sore throat and hoarseness of voice.

KEYWORDS:lidocaine ; budesonide; airway complications

INTRODUCTION

Securing the airway is the most important part of safe anesthesia. In clinical practice there is always a potential risk for encountering endotracheal intubation (ETT) related airway complications especially laryngospasm which can lead to acute desaturation and subsequent organ dysfunction. [1]

Laryngospasm, which is defined as the occlusion of the glottis by the action of the intrinsic laryngeal muscles, can occur during induction, intubation or after extubation. The cause of this complication is unknown, but it may be due to insufficient depth of anesthesia during extubation, postoperative pain, presence of an airway irritant (e.g. laryngoscope blade, an irritant volatile agent, suction catheter). Other minor airway complications may occur like sorethroat, hoarsness of voice, cough which are more common complications. Airway complications can occur in both sexes and all ages. Higher incidence and worse outcomes of airway complications during general anesthesia have been reported for many years, but few preventive measures are put forward.[1]

During ophthalmic surgery we can control the intra-ocular pressure which is a prime importance, so prevention of airway complications signs as cough, breath difficult and laryngospasm is highly recommended during such procedures. [2]

Efficacy of intravenous lidocaine in prevention of airway complications (e.g laryngospasm and persistent cough) has been argued [3]. Lidocaine interrupts nerve conduction by blocking sodium channels. [4]

Lidocaine is considered a safe local anesthetic agent can be given by nebulization before the procedures of bronchoscopy which allow to reach more airway depths [5,6].

Nebulization of lidocaine was given an effective anesthesic form which begin at the oral cavity till the trachea for intubation without significant elevation in lidocaine blood level. Simplicity and lack of discomfort is the major advantage of this technique [7].

The efficacy of prophylactic administration of corticosteroids is controversial in decreasingthe postoperative complications incidence of the airway including sore throat, cough, hoarseness and even more severe complications such as laryngeospasm& pulmonary edema after elective procedures under general anesthesia [8].

Budesonide nebulizer suspension is nebulized corticosteroids used in treating chronic obstructive pulmonary disorders and to improve upper airway function [9].

PATIENTS AND METHODS

Written informed consent was obtained from all participants, the study was approved by the research ethical committee of Faculty of Medicine, Zagazig University. The study was done according to The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Patients:

This prospective randomized controlled study was carried out at anesthesia and surgical intensive care department – faculty of medicine - Zagazig University Hospitals after approval of IRB and obtaining patients' informed consents during the period from April 2019 to October 2019.

Inclusion Criteria

Patients who were admitted to the hospital for elective ophthalmic procedures under general anesthesia

Age group between 21 and 60 years, both sexes, American Society of Anesthesiologists (ASA I, II) ,Mallampati 1,2, Body mass index (BMI) < 35 kg/m^{2}and duration of ophthalmic surgeries (30 – 90 minutes).

Exclusion Criteria

More than 2 intubation attempts, intubation period more than 2 hrs, Patient refusal, upper respiratory tract infection – bronchial asthma - chronic lung disease, previous airway surgery,Cardiovascular diseases,Pre-operative use of analgesics or corticosteroids, pregnancy, use of throat packand known allergy to study drugs.

Withdrawal Criteria

The patient has the right withdrawal at any time without any negative consequences or harm on their medical treatment plan.

Method of Randomization:

Patients were divided into three groups using computer generated randomization software.

Study groups

Lidocaine group (Group L)(n=40): 10 minutes pre-operatively, nebulized lidocaine 60mg (3 ml of lidocaine 2%) in oxygen was administered to the patient via O2 mask.

Budesonide group (Group B)(n=40): 10 minutes pre-operatively, nebulized Budesonide 250 ucg. (1 ml diluted by normal saline 0.9% to 3 ml) in oxygen was administered to the patient via O2 mask

Control group (Group C)(n=40): 10 minutes pre-operatively, nebulized normal saline 0.9% (3 ml) in oxygen was administered to the patient via O2 mask

Operational design:

All participating patients were interviewed preoperatively during their preoperative preparation. The goal and endpoints of the study were discussed. Understanding of the technique was reviewed and emphasized.

On physical examination for vital signs including HR, BP, and peripheral O_2 saturation), cardiac and pulmonary conditions were evaluated. All patients were investigated for complete blood count, Liver functions test, kidney functions test and coagulation profile.

Patient preparation:

Standard monitoring was applied (ECG, NIBP, Pulse oximetery and Capnograph). Patient was premedicated by midazolam 2-3 mg. Patient received assigned drug as nebulization through O2 mask.

Anesthesia:

Anesthesia has been induced using propofol in a dose of 1-2 mg/kg and muscle relaxation was achieved in a dose of atracurium 0.5 mg/kg followed by intubation endotracheally by tube size 7.5 for male and size 7 for female then cuff inflation guided by manometer to make cuff pressure(20-25mm/Hg). After confirmation of endotracheal intubation, mechanical ventilation was performed by tidal volume 6-8 mg/kg, respiratory rate 12/ minute, FiO2100%. Anesthesia was maintained by isoflurane inhalation based on MAC 1.2 ,and muscle relaxation was confirmed by IV atracurium in a dose of 0.1 -0.2 mg/ kg/20min. At the surgical procedure ending, anesthesia was discontinued and muscle relaxation was reversed by IV neostigmine in a dose of 50 µg/kg + Atropine in a dose of 15 µg/kg. Tracheal extubation was achieved when extubation criteria were met (ability to follow commands ,opening the eyes, adequate reversal of neuromuscular blockade by clinical tests and nerve stimulators, stable hemodynamic status, spontaneous breathing, regular respiratory rate, adequate tidal volume >5 ml/kg)(27 -28) and patient was discharged to PACU until early recovery criteria were met (Modefiedaldret score ≥ 9) (29).

Assessments

Perioperative patient management and data collection were done by an independent anesthesiologist who was blinded to patient's group including: Time to successful ET intubation (starting from insertion of laryngoscope into oral cavity till securing endotracheal tube) .Intubation period (starting from endotracheal intubation to tracheal extubation). Cardio-respiratory vital signs (MABP and HR) as baseline before nebulization, just before and after induction of anesthesia, 1 and 5 minutes after endotracheal intubation then every 5 minutes during the first 20 minutes followed by every 10 minutes until the end of the procedure. Time to extubation (started from anesthetic discontinuation). Incidence of laryngospasm and other airway complications. Need for tracheal reintubation (indicators :excessive sedation, Hypoxemia, Respiratory failure). Time to PACU discharge (from extubation to discharge(Perioperative complications (nausea ,hypotension, allergy, tinnitus).

Statistical Analysis:

The data were analyzed using Statistical Package of Social Services version 22 (SPSS). Data were represented in tables and graphs. Quantitative variables were expressed as median, and qualitative variables were expressed as absolute and relative frequencies in numbers and percentage. Suitable statistical tests of significance were used after checked for normality. The results were considered statistically significant when the significant probability was less than 0.05 ($P < 0.05$). P-value < 0.001 was considered highly statistically significant (HS), and P-value ≥ 0.05 was considered statistically insignificant (NS).

RESULTS

No patient suffered perioperative hypoxemia, laryngospasm with complete VC obstruction or required tracheal re-intubation among the studied groups of patients. After extubation, the incidence of laryngospasm, with partial vocal cord obstruction, was significantly lower in group L and group B (0%) compared to group C (3 patients (7.5%)) (p 0.046). Postoperatively, Budesonide group had the significantly lowest incidence of sore throat, cough and hoarseness of voice compared with control and lidocaine group up to 6 hrs. post-operatively ($P<0.05$). Control group patients suffered the highest incidences of cough and hoarseness of voice up till 1hr after extubation. However, the significantly highest incidence of cough was reported in lidocaine group at the 6th hr postoperatively. In addition the most significant decline in the incidence of cough and sore throat, during the 1st postoperative 6 hrs. was also reported in budesonide group with no significant change in incidence of hoarseness in the same group and no significant difference between lidocaine and control groups ($P> 0.05$).(Fig. 1 and 2)

Table (1): Post extubation complication among the studied groups:

Post extubation complications	**Control group N. 40**		**lidocaine group N. 40**		**budesonide group N. 40**		**P value**
	Up to 1 hr	**1 up to 6 hrs**	**Up to 1 hr**	**1 up to 6 hrs**	**Up to 1 hr**	**1 up to 6 hrs**	
Sore throat							
All	**40 (100%)**	**40 (100%)**	**40 (100%)**	**40 (100%)**	**32 (80%)¥**	**8 (20%)¥**	0.000
Minimal sore throat	0(0%)#	8(20%)	4(10%)#	20(50%)*	24(60%)*	8(20%)*	
Moderate sore throat	16(40%)	24(60%)*	24(60%)*	16(40%)	8(20%)	0(0%)	
Severe sore throat	24(60%)*	8(20%)	12(30%)	4(10%)	0(0%)#	0(0%)	
p-value	0.000		0.000		0.000		
Cough							
All	**40 (100%)**	**28 (70%)**	**36 (90%)**	**36 (90%)**	**16 (40%)¥**	**0¥**	0.000
Minimal	4(10%)	28(70%)*	8(20%)	32(80%)*	16(40%)*	0(0%)	
Moderate	36(90%)*	0(0%)	24(60%)*	4(10%)	0(0%)	0(0%)	
Severe	0(0%)#	0(0%)	4(10%)#	0(0%)#	0(0%)	0(0%)	
p-value	0.000		0.000		0.000		
Hoarseness of voice							
All	40 (100%)	40 (100%)	36 (90%)	**36 (90%)**	**16 (40%)¥**	**16 (40%)¥**	0.000
Noted only by patient	0(0%)#	20(50%)*	4(10%)	36(90%)*	8(20%)	16(40%)*	
Noted but mild	12(30%)	8(20%)#	24(60%)*	0(0%)	8(20%)	0(0%)	
Noted but severe	28(70%)*	12(30%)	8(20%)	0(0%)	0(0%)#	0(0%)	
p-value	0.000		0.000		0.000		

Data were presented as number and %, compared using Chi-square test

* The significantly most frequent degree in corresponding group ($P < 0.05$).

The significantly least frequent degree in corresponding group ($P < 0.05$).

¥ The significantly lowest incidence compared with other groups

No significant difference detected as regard PACU discharge in 3 studied groups, where as in control group 3 (2-7), and in Lidocaine and budesonide groups 3 (2-4) (P >0.05).

No side effects other than post-operative nausea, which occurred only in 8 patients of lidocaine group representing high significant difference from other studied groups.

There was no significant difference between studied groups as regard age and gender (P > 0.05). However, BMI significantly differ between the three studied groups with the highest in budesonide group and lowest in control group (p<0.001).Table (2)

Table (2): Demographic characteristics of the studied groups.

Item	control group (N=40)	lidocaine group (N=40)	budesonide group (N=40)	Test value	P value
Age (years)[@]	38.5 (25 – 55)	34.5 (26 – 50)	32.5 (23 – 53)	1.787	0.409
Sex					
Male	24 (60.0%)	24 (60.0%)	24 (60.0%)	0.000	1.000
Female	16(40.0%)	16(40.0%)	16(40.0%)	0.000	1.000
BMI[$](kg/m^2)	28.3 ± 1.92	30.7 ± 1.28*	31.50 ± 1.98#	37.55	0.000*

Data were presented as N. and %, compared using $\chi 2$: chi-square test[@]

data werepresented as median and range, compared using KWt: Kruskal Wallis test.

[$]data were presented as mean± S, compared using F test:ANOVA

*significantly higher than that in control group (P<0.05)

Significantly higher than those in control and lidocaine groups (P<0.05).

Time to successful intubation was significantly longer in group C compared to other groups (P < 0.05) without significant difference between group L and group B. There was no significant difference between groups as regard intubation period (P > 0.05).(Table 3)

Table (3): Time to successful intubation and intubation period amongthe studied groups.

Item	control group (N=40)	lidocaine group (N=40)	budesonide group (N=40)	KWT	P-value
Time to successful intubation (Sec.)	9 (6-15) *	6 (5-9)	6 (4 – 8)	46.41	0.000
Intubation period (min.)	40 (30-60)	4 (30-50)	42.5 (30 – 60)	1.41	0.493

Data were presented as median and range, compared using KWt:Kruskal Wallis test.

* Significantly longer compared with other groups (P < 0.05).

Patients of group L demonstrated significantly lower MAP compared with other groups (P< 0.05) at all intraoperative measuring points except after induction of anesthesia (P>0.05) with no significant difference between group B and C except that MAP was significantly higher in group B after induction of anesthesia and in group C at 50 minutes after intubation (P< 0.05). All intraoperative readings of MAP were significantly lower than that of baseline value in group L (P< 0.05). Most of intraoperative readings of MAP were significantly lower than that of baseline value in group B (P< 0.05). Some intraoperative readings of MAP were significantly lower than that of baseline value in group C (P< 0.05).(Table 4)

Table (4): Comparison of Mean Arterial Pressure (mmHg) at different times between the studied groups.

MAP (mmHg)	control group (N=40)	lidocaine group (N=40)	budesonide group (N=40)	P value
Before nebulization	98.33 90-104.6	94.66 80-105.33*	98.33 90-106.6	0.072
Before induction	96.66 93.3-101.6	92.16 77.3-99.67*¥	96 89.3-104¥	0.000
After Induction	83.33 73.3-90¥	86.16 70-89.3¥	87.16 86-91.6#¥	0.000
at 1 min	101.5 88.3-108.3	85 66.6-91*¥	96.83 91-108.3	0.000
at 5 min	96.5	87.33	96	0.000

MAP (mmHg)	control group (N=40)	lidocaine group (N=40)	budesonide group (N=40)	P value
	93.3-100.67¥	71.6-94.6*¥	88-103¥	
at 10 min	95.8 88.3-100¥	91.16 73.3-95*¥	95.16 93.3-100.6¥	0.000
at 15 min	96.66 90-99.3	93.3 65-98.33*¥	96.33 93.3-98.3¥	0.000
at 20 min	95.8 86.6-102.67¥	91.83 63.3-96.6*¥	94.5 91.6-96.6¥	0.000
at 30 min	97 91.6-104.3	87.66 69.3-98.3*¥	97.6 94-104¥	0.000
at 40 min	98.3 94.3-101.6	91 75.6-100*¥	94.6 89-102¥	0.000
at 50 min	100.0 95.33-105.33#	87.3 74-89.3*¥	96 89.3-102	0.000
P- value	**0.000**	**0.000**	**0.000**	

Data were presented as median and range, compared using Kwt test. Intragroup comparison was done using of Friedman test

* significantly lower compared with other groups P < 0.05

significantly higher compared with other groups P< 0.05

¥significantly lower compared with baseline value P < 0.05

MAP: mean arterial pressure.

There was no statistical significant difference between the 3 groups as regarding heart rate readings before nebulization, and before induction of anesthesia (P>0.05). There was significant difference between the studied groups at all measuring points after induction of anesthesia with the highest values recorded in group C and lowest in group B at most measuring points (P< 0.05). HR demonstrated lower values compared to corresponding baseline values in most readings of group C and B and in some of those in group L.Table (5)

Table (5): Comparison of Heart rate (beats/min) at different times among the studied groups:

Heart rate (beats/min)		control group (N=40)	lidocaine group (N=40)	budesonide group (N=40)	P value
Before nebulization		80 70-88	75.5 66-88	75 65-88	0.060 (NS)
Before Induction		80.5 73-86	77.5 65-87	75 66-88	0.114 (NS)
After Induction		80.5 73-89	80.5 62-85	71 60-85*	**0.000**
After tracheal intubation	**at 1 min**	87 79-97#¥	81 60-86	79 72-95*¥	**0.000**
	at 5 min	85 75-95#¥	77 63-83¥	76 75-85*¥	**0.000**
	at 10 min	79.5 73-89#	74.5 62-82*¥	76 73-82	**0.000**
	at 15 min	79 74-85#	76 59-80	76.5 73-80¥	**0.000**
	at 20 min	80 73-86	80 61-80*	80 75-82¥	**0.028**
	at 30 min	82 75-89#¥	79 62-85	80.5¥ 71-82	**0.000**
	at 40 min	82 79-85#¥	81 64-84	80 69-84	**0.005**
	at 50 min	81 80-90#¥	80 62-86¥	76.5 73-83¥	**0.005**
P- value		**0.000**	**0.000**	**0.000**	

Data were presented as median and range, compared using Kwt test. Intragroup comparison was done using of Friedman test

* significantly lower compared with other groups P < 0.05

significantly higher compared with other groups P< 0.05

¥ significantly higher compared with baseline value $P < 0.05$

Time to extubation was significantly shorter in group C [median 4 (3 – 5)] compared to other groups ($P < 0.05$) without significant difference between that of group L and C [median 5 (4 – 6)] for both

DISCUSSION

The current study demonstrated that pre-induction nebulized lidocaine and budesonide can prevent post-extubation laryngospasm. Nebulized Budesonide (250 ucg) and to less extent nebulized lidocaine (60 mg) was lower the incidence of post-extubation cough, sore throat and hoarseness of voice. In addition to being the most effective in reduction of incidence of postoperative airway complication up to 1hr, budesonide can fasten patients' recovery from cough and sore throat during the 1st post-extubation six hours.

In general anesthesia, there was a necessary need for the endotracheal intubation for controlling the respiration and protect the air pathway. Most of patients who were under intubated procedures for long short term operations may had a differ degrees of injury in thier airway especially at larynx which consider a common sites of injury such as 1ocal irritation and inflammation of larynx and even may extend to necrosis in the laryngeal area [10].

Although multiple injuries of trachea are minor and reversible lesions, but it may may converted to severe lesions as edema and granuloma formation of the trachea which lead to acute or chronic obstruction of the airway after extubation which could be enough to necessitate the surgical intervention. These lesions are causing impairment of the normal laryngeal function and interfere with its protective roles and may predispose to pulmonary aspiration [11]

Post-endotracheal intubation side effects including hoarseness of voice, sore throat and cough which considered undiserable effects after using endotracheal intubation during general anesthesia. All this complications can be developed in the same patiets[12]. These complications can lead to dissatisfaction and discomfort after surgery and can delay a patients' return to normal routine activities [13]. Coughing can exacerbates pain, increases intraocular pressure in patients undergoing ophthalmic surgery [14]

The correlation for the occurrence of complications may associated with different as age and gender of patients, seasonal variations, anesthetic gases and drugs used as well as intubation duration, the size and type of the endotracheal tube, surgery site, and usage of lidocaine or steroids intra and postoperatively [12]

Many trials were done to decrease or avoid the occurrence of post-endotracheal intubation side effects. these trials may be non-pharmacological methods including the use of endotracheal tubes with a low intra-cuff pressure, smaller endo-tracheal tubes, putting the patient in the supine head-down position, limiting number of attempts and duration of intubation, or pharmacological ones including application of local anesthetics as lidocaine (gel or spray), or steroids (beclomethasone inhaler, fluticasone propionate inhaler, betamethasone gel) [15]

Lidocaine is a local anesthetic agent which can be defined as the drug which used to produce inhibition of excitation and conduction in peripheral nerves which is reversible action causing loss of sensation the target body area [16]

The cough suppression mechanism by lidocaine which administered intravenously was not clearly known. This suppression may be due to the inhibition of airway sensory C fibers and that may lowering neuropeptide amount which released and tracked by neuroplasticity inside airway and brainstem.

In our study, No patient suffered perioperative hypoxemia, laryngospasm with complete VC obstruction or required tracheal re-intubation among the studied groups of patients. After extubation, the incidence of laryngospasm, with partial vocal cord obstruction, was significantly lower in group L and group B (0%) compared to group C (3 patients (7.5%) (p 0.046).

Lee et al, proved the prophylactic doses of dexamethasone (5mg every six hours during the day preceding extubation) could be effective in lower the post-extubation incidence of edema in patients whose have a tracheal intubation more than 48 h [17].

The post extubation incidence of stridor was lower in the dexamethasone group significantly compared to the placebo group which were (10% (4/40) versus 27.5% (11/40); P=0.037), where as there was no significant difference in re-intubation rate between the two groups (2.5 % (1/40) versus 5% (2/40); P=0.561).

Similarly, **Robert et al.,**have shown benefit for corticosteroids (mostly administered in prophylactic intravenous therapy (20-40 mg every 4-6 hours) 4 divided doses over 12-24 hrs before extubation) and corticosteroids may be more effective and can be targeted towards a population with a higher incidence of post extubation stridor [18]

The prophylactic administration of corticosteroids have been shown to reduce the incidence of post

extubation laryngeal edema and stridor up to 22.5%

In our study Postoperatively, Budesonide group had the significantly lowest incidence of sore throat (20%), cough (0%)and hoarseness of voice (40%) compared with control and lidocaine group up to 6 hrs. post-operatively ($P < 0.05$). Control group patients suffered the highest incidences of cough and hoarseness of voice up till 1hr after extubation (100%). However, the significantly highest incidence of cough was reported in lidocaine group at the 6th hour postoperatively (90%). In addition, the most significant decline in the incidence of cough and sore throat, during the first postoperative 6 hrs. Was also reported in budesonide group with no significant change in incidence of hoarseness in the same group and no significant difference between lidocaine and control groups ($P>0.05$).

While **Thomas et al.,** who demonstrated that the IV dexamethasone preoperatively in a dose of 8 mg was significantly lower the severity of sore throat in patients with intubated tracheas postoperatively [19].

The incidence of sore throat during first 24 hrs post-operative was lowered in about 20% of patients in the dexamethasone group (D) compared to (56.3%) patients in the control group (C). VAS scores for at one, 3, 6, 12 and 24 hr, post-operatively for sore throat complications at the rest and during the effort were decreased in the dexamethasone group (D) compared to the control group ($P<0.01$) at parallel time intervals.

Budesonide is a glucocorticoid steroid which is a moderate in the potency and has an antiinflammatory and immunosuppressive effects. A steriode budesonide not cause sodium and water retention as other steroid drugs and can be applied topically in the form of cream, ointment, foam, lotion or gel. Betamethasone sodium phosphate can be used intramuscularly for treatment of itching and allergic reactions [20]

In agreement with the results of the current study, **Ayoubet al**., reported that application of betamethasone (betamethasone 0.05%) as a topical steroid cream, to the portions of contact between the endotracheal tube and posterior wall of phaeynx, vocal cords and trachea was reduced the occurrence of sore throat and cough complications [21].

The scores of sorethroat and hoarsness were lower in the steroid group significantly at 1hr and 24 hr ($P<0.05$), the cough score was tended to be less degree of severity in the treated group, but the inter group difference was not significantly different. The number of patients with neither sore throat or hoarseness after steroid treatment was 18 and 28 at 1 and 24 hr respectively. In contrast, only 4 and 13 patients reported with no sore throat nor hoarseness at 1 and 24 hr after placebo gel lubrication ($p<0.05$).

Honarmand et al., had compared the effect of beclomethason inhaler 50 pg versus intravenous lidocaine (1-1.5mg/kg) in the prevention of postoperative airway complications. They concluded that beclomethasone inhalation was comparable to intravenous lidocaine in a dose of 1.5 mg/kg before intubation lead to decreasing the postoperative sore throat and cough incidence at 21 hours follow an extubation and lowers the severity of sputum postoperatively [22].

One hundred twenty ASA I or II patients were done elective surgery were assigned to one of 4 treatments: I/V lidocaine with a dose of 1 mg/kg (Group Ll, n:30), I/V lidocaine with a dose of 1.5 mg/kg (Group L2, n:30), beclomethasone inh. with a dose of 50 pg (Group B, n:30) or : I/V saline (Group C, control group, n=30).

The incidence for complicated signs including sore throat, cough, presence of sputum, hoarseness, and dysphagia severity were match up to inhalation of beclomethasone and I/V lidocaine groupsjust after complete operation, 1 hour, at time of for assessment of dysphagia postoperatively.

It was found that the severity of sore throat incidence at all time intervals were significantly lower in group L2 and B compared to group C ($P<0.05$). at 21 hrs after anesthesia, the incidence of cough severity were significantly lower in group L2 and B compared to group C ($P<0.05$). The incidence of both complications were not significantly different inbetwwen L2 and B groups. The incidence of sputum severity were significantly lower in group B compared to group C ($p<0.05$) therefore, it could be concluded that beclomethasone inhaler versus I/V lidocaine previous to intubation has the ability to decrease the postoperative comlications including sore throat and cough. Additionally, beclomethasone inhaler was decrease the severity of sputumpostoperatively.

Tazehet al., concluded that inhaled fluticasone (500 pg.) proportionately diminishes the severity of sore throat, cough, and hoarseness and their incidence postoperative directly after extubation in case of cesarean delivery surgery with general anesthesia [23].

The sore throat and other complications included cough, and hoarseness incidence was lower in group F (3.33% ,3.33% and 3.33%) significantly versus the control group (36.67 % ,18.33% and 35 %) ($P<0.05$)just after operation and at 24 hrs (13.33%,13.33% and 25% in group F vs 40% ,41.67% and 50% in the control group) .The

moderate to severe hoarseness incidence in the group F was significantly less than the control group ($p<0.05$) at the first hour follow surgery.

Opposing to our findings, **Selvaraj and Dhanpal** who found that, postoperative incidence of cough and hoarseness were showed decreasing in the steroid gel group but increasing in lidocaine gel group compared to the control group. However, there was no standardized protocol for the extubation in the studied groups, which may caused the difference from current study as regard this complications [24].

The patients were questioned about the squeal at 1,12 and 24 hours after general anesthesia .the incidence of sore throat was 33.30% in the steroid gel group vs 73.3 % in both groups ($p<0.01$) where as the incidence of cough and hoarseness was 23.30% in the steroid gel group , 63.30% in the lidocaine gel group and 50 % in the control group.

Other studies also proved the application of steroid gel over an endotracheal tube due to its effective mitigated for sore throat and hoarseness postoperatively versus application of lidocaine jelly form as it not have an anti-inflammatory action [25,26]

Current study showed the beneficial effect of Budesonide and to lesser extent lidocaine, as a simple single preoperative inhalational application, in preventing major and minor airway complications after ophthalmic surgeries in which elevation of IOP can be catastrophic and such complications can delay patient home discharge in such mostly one day surgeries taking in mind the small sample size of the studied population.

CONCLUSION

Pre-induction nebulized lidocaine and budesonide can prevent post-extubation laryngospasm. Nebulized Budesonide (250 ucg) and to less extent nebulized lidocaine (60 mg) can reduce the incidence of post-extubation laryngospasm, cough, sore throat and hoarseness of voice.

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