

## Research Article

# Effect of endotracheal tube lidocaine instillation in prevention of smokers emergence coughing: sample of Iraqi patients undergoing emergency appendectomy

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## ABSTRACT

**Background:** Cough reflex is normal protective reflex but cause various complication during emergence from general anesthesia especially to smokers

**Methods:** 300 patients of both sex enrolled in this study to have open emergency appendectomy. Patients divided into 4 groups. 50 non-smoker patients as control group. 50 smokers patient received no per operative efforts to reduce the incidence of postoperative cough, 100 smokers patient received 20 ml of 0.5% lidocaine dropped slowly into the endotracheal tube throughout the procedure, and 100 smoker patient received 20 ml normal saline dropped slowly into the endotracheal tube throughout the procedure. At the end of surgery, after extubation, the patient was considered to have cough if develops irritating cough or have 3 or more bucking.

**Results:** Incidence of cough significantly decreased ( $p \leq 0.05$ ) among smoking patients treated with lidocaine in relation to patients treated with normal saline, smokers without intervention.

**Conclusions:** Instillation of lidocaine to endotracheal tube is effective method in reduction of smokers cough during emergence from general anesthesia.

**Keywords:** Anesthesia, Cough, Lidocaine, Smokers

## INTRODUCTION

Cough reflex important to preserve upper airways from foreign objects and accumulation of mucus however, postoperative cough, is uncomfortable, distressing sequelae after tracheal intubation. Coughing affect surgery results, causing potentially dangerous patient movements, and increase wound bleeding.<sup>1,2</sup> It postulated that these effects are because of irritation and inflammation of the airway mucosa by endotracheal tube.<sup>3</sup> Cigarette smokers known to have respiratory problems during induction of anesthesia with increased incidence of laryngospasm and cough during extubation as the integrity of epithelia lost by smoke irritation.<sup>4</sup> Anesthetic providers aim to increase patients comfort and

reduce coughing complications. Using simple, easy, cheap and acceptable methods with negligible side effects like local anesthetics application provide patients comfort. Many studies have demonstrated the effectiveness of using local anesthesia topically or intravenously, and corticosteroids or opioids to reduce smoker cough during or post extubation.<sup>5-7</sup> This study performed to evaluated whether endotracheal tube (ETT) dropping of lidocaine through the tube was superior to saline in blunting emergence coughing of smokers.

## METHODS

This study done in Al-Hayat private hospital in Babil, Iraq from March 2014 to April 2015. The study designed

to measure the incidence of post-operative cough in patients undergoing emergency open appendectomy and Al-Hayat hospital ethical committee approved the design of the study.

Informed consents taken from 300 patients scheduled to have open emergency appendectomy. Patients divided into 4 groups, Table 1.

- 50 non smoker patients.
- 50 smoker patients received no efforts to reduce the incidence of postoperative cough.
- 100 smoker patients received 20 ml of 0.5% lidocaine dropped slowly into the endotracheal tube throughout the procedure, and
- 100 smoker patients received 20 ml normal saline dropped slowly into the endotracheal tube throughout the procedure.

Patients considered smokers if they smock regularly 20 cigarettes or more daily for more than single year and patients smoke less than 20 cigarettes or less than one year excluded from the study. All patients received standardized anesthesia using IV line, sleeping dose of thiopental sodium ranging from 4-6 mg/kg with 0.5 mg/kg ketamine for analgesia. Neuromuscular block performed using 0.5 mg/kg atracurium.

Patients intubated and ventilation controlled using 100% oxygen and 1.5% halothane using tidal volume of 6ml/kg, at a rate of 12/min .All patients received paracetamol 10mg/kg with tramadol 1.5 mg/kg for postoperative pain relief. Reversal of neuromuscular block by 40miq/kg neostigmine with 20 miq/kg atropine.

At the end of surgery, after extubation, the patient was considered to have cough if develops irritating cough or have 3 or more bucking of cough from the time of extubation to 8 hour post operatively.

**Method of installation:** Plain lidocaine 2% diluted by distilled water to 20 ml. The resultant concentration is 0.5%. Immediately after intubation 2 ml dropped into the tube and ventilation started then 2 ml dropped every 2 minutes through the CO<sub>2</sub> sampling port so ventilation not interrupted and CO<sub>2</sub> sampling interrupted minimally, normal saline used was 20ml and installation was similar to that of lidocaine.

**Statistical analysis:** The data presented using descriptive statistics such as mean and standard deviation for continuous variables and frequency and percentage for categorical variables. Associations between categorical variables were assessed using Chi-square tests. Comparison of continuous outcomes among groups performed by ANOVA at level of significance of p≤0.05 using IBM SPSS statistics version 22.

**Drugs**

Xylocain 2% (lidocaine Hcl) for instillation and nerve block. ASTRA USA.

**RESULTS**

**Table 1: Demographic data.**

Groups	Gender		Age means±SD	Total number patients
	Male	Female		
Smoker without intervention	23	27	33.76±14.52	50
Non Smoker without intervention	27	23	34.12±9.80	50
Xylocain treated smokers	50	50	31.95±11.92	100
Normal saline treated smokers	42	58	35.101±12.72	100

p≥0.05 no significant differences related to gender and age.

This study reveal significant increase in cough incidence among smokers without intervention as compared with non-smokers, in addition to that significant decrease found in cough incidence (p≤0.05) among patients treated with lidocaine in relation to patients treated with normal saline, smoker without intervention and nonsmokers, Table 2.

Normal saline treated smokers also, show significant reduction of cough incidence in relation to smokers without intervention Table 2. There were no significant differences of cough incidence (p ≥ 0.05) among gender in all groups Table 3.

**Table 2: Incidence of cough among xylocain and normal saline treated smoking patients expressed by percentages.**

	Nonsmokers without intervention	Smokers without intervention	Xylocain treated group	Normal saline treated group
Cough	30%	86%*	35.2%**	59.6%**
No cough	70%	14%*	64.6%**	40.4%**

\*p≤0.05; \*\*p≤0.05 significant differences related to smokers without intervention group.

**Table 3: Incidence of cough among groups related to gender.**

Gender	Smoker without intervention		Xylocain treated group		Normal saline treated group	
	Cough	No cough	Cough	No cough	cough	No cough
Female	55.8% of (27)	42.9% of (27)	45.7% of (50)	51.6% of (50)	55.2% of (58)	44.8% of (58)
Male	44.2% of (23)	57.1% of (23)	54.3% of (50)	48.4% of (50)	65% of (42)	34.1% of (42)

p $\geq$ 0.05 no significant differences related to gender.

## DISCUSSION

Coughing during emergence from general anesthesia is unwanted reflex that cause various undesirable complication.<sup>8</sup> This study found significant increase in cough incidence among smokers without intervention than nonsmokers Table 2. This finding goes with findings of other studies that state smoking exaggerate coughing reflex and could be explained by chronic smoking affect respiratory epithelia ranging from inflammation to dysplasia and this render respiratory epithelia to be more reactive to endotracheal tube insertion which cause stretch stimuli in the trachea.<sup>9,10</sup> According to that chronic smokers should managed very carefully with modification of anesthetic technique and that performed by adding lidocaine to endotracheal tube which, is efficient local anesthesia ,cheap and available in Iraq and its efficiency in reduction of postoperative cough incidence proved in this study as compared with smokers without intervention and normal saline treated patients, Table 2.

We believed that lidocaine has dropped slowly through the endotracheal tube stabilize neural membrane of trachea and bronchi providing better local anesthetic effect to abolish the local irritable effect of tube to the previously irritated mucosa of smokers. 20 ml volume chosen because the total dose given is far from toxicity and we think that it can well cover the irritated area of the bronchial tree, as well as, can liquefy the dry secretions in the tracheobronchial tree.

In spite of differences in lidocaine administration technique many studies prove the effect of lidocaine in reduction of post-operative cough incidence of smokers like Laís Navarro and colleagues that use lidocaine by intra cuff injection and Caranza colleagues who prove the effect of nebulized lidocaine in reduction of induction complication in smokers.<sup>11,12</sup> On the other hand, Smitha Elizabeth George and colleagues study show that endotracheal lidocaine instillation in the dose of 1 mg/kg does not prevent cough at extubation if given 20-30 min before extubation; this finding disagree with current study results which could be explained by different type of instillation technique and surgical operation.<sup>13</sup>

Our study found no significant differences in cough incidence among gender of all study groups and it seems normal finding, as there are no physiological or anatomical variation among sexes.

## CONCLUSION

As conclusion, endotracheal dropping of lidocaine is effective technique in reduction of cough incidence of smokers during emergence from general anesthesia.

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