



ALKALINIZED LIGNOCAINE PRELOADED ENDOTRACHEAL TUBE CUFFS REDUCE EMERGENCE COUGH AFTER BRIEF SURGERY: A PROSPECTIVE RANDOMIZED TRIAL

Anaesthesiology

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ABSTRACT

Aim And Objectives: To evaluate the efficacy of alkalinised lignocaine preloaded endotracheal tube cuffs in reducing emergence cough after brief surgery.

KEYWORDS

INTRODUCTION:

Tracheal intubation with an endotracheal tube is necessary during general anaesthesia. After intubation, inflating a cuff around the endotracheal tube maintains a seal. Irritant or stretch stimuli in trachea caused by tube and its cuff are presumed mechanisms in inducing emergence cough. Smooth emergence from General anaesthesia is frequently complicated by coughing induced by stimuli from ET tube cuff. Coughing during emergence result in HTN, tachycardia, increased in traocular pressure, raised ICT, M.I, bronchospasm, wound dehiscence and surgical bleeding. This can be of particular relevance in neurosurgical, ophthalmic and vascular and plastic surgical procedures. The nociceptive stimuli in trachea caused by cuff can be blocked by topically applied anaesthetics. Multiple techniques such as deep extubation, administration of intravenous opioids before extubation and most recently instilling lignocaine in the ET cuff has been described effective in reducing cough and cardiovascular response associated with ETT during emergence. The use of the ETT cuff as a reservoir for lignocaine to provide local anaesthesia at points of contact with trachea was first described in 1990. Since then studies have shown that adding bicarbonate to lignocaine drastically increases its diffusion across the polyvinyl chloride (PVC) cuff membrane and decreases the incidence of cough on emergence after surgery lasting more than 2 hrs. The reduction of emergence cough in surgeries lasting < 2hrs is also desirable, but the effectiveness of alkalinized lignocaine filled endotracheal tube cuffs in reducing emergence cough is not clear in short duration surgeries < 2 hrs, in our study, we want to evaluate the efficacy of preloaded alkalinised lignocaine in reducing emergence cough in surgeries of short duration.

MATERIALS AND METHODS:

After obtaining institutional committee approval, patients belonging to both sexes, aged between 20-50 yrs, of ASA I,II who were posted for different surgeries of short duration were included in this study, after taking consent.

- Group AL : (study group):** these patients received preloaded (alkalinised lignocaine in ET cuff 90 min before intubation) 2% alkalinised lignocaine in the ET cuff, volume dedicated by minimum occlusion volume technique
- Group S : (control group)** : these patients received normal saline in ET cuff after intubation

Exclusion Criteria:

- Patients with asthma, COPD.
- Patients with respiratory tract infection.
- Patients using preoperative cough suppressants.
- Patients with anticipated difficult intubation.
- Surgeries on airway.
- Patients with altered sensorium.
- Patients with documented h/o allergy to lignocaine and
- Patient refusal

Procedure:

After entering operation theatre, 18 gauge i.v cannula secured peripherally and patients in both groups were pre medicated with inj.

Glycopyrrolate 5 mcg/kg and inj. Fentanyl 1 mcg/kg, Monitoring in all patients included pulse oximetry, NIBP, ECG, patients were induced with inj. Thiopentone 4-5 mg/kg i.v and intubated after giving inj. Vecuronium 0.12 mg/kg using appropriate sized ET tube.

Group AL:

ET cuff was inflated with 2% alkalinised lignocaine (9ml of 2% lignocaine and 1ml of 8.4% sodium bicarbonate by minimum occlusion volume technique.- the cuff is inflated slowly to prevent damage to tracheal mucosa or cuff rupture.

Group S:

ET cuff inflated with normal saline by minimum occlusion volume technique. Maintenance was done with O₂+N₂O+ sevoflurane 1-1.5%, Neuromuscular blockade was continued with vecuronium, at the end of surgery, neuromuscular blockade was antagonised with neostigmine and glycopyrrolate. No ET cuff perforations were noted and no airway trauma and laryngospasm noted.

OBSERVATIONS:

Demographic data were analysed by using Student's t-test. The incidence of coughing was compared by using the one tailed fisher exact test. Continuous data are presented as means $\pm$ SD.

P<0.05 was considered to be statistically significant.

Demographics:

Parameter	Group AL	Group S	P value
age	34($\pm$ 8)	33 ($\pm$ 8)	0.80
Weight (kg0	67($\pm$ 7)	68 ($\pm$ 8)	0.85
Duration of surgery (min)	91($\pm$ 17)	93 ($\pm$ 17)	0.69
Volume of cuff (ml)	6($\pm$ 1)	7 ($\pm$ 1)	0.32
Preloading time (min)	100($\pm$ 13)	101 ($\pm$ 14)	0.56

	Cough	No cough
Alkalinised lignocaine	6(12%)	44
Normal saline	14(25%)	36

Three category scale for assessing cough on emergence

Mild	Single episode of cough
Moderate	More than 1 episode of un sustained for <5 sec
Severe	Sustained bouts of cough for >5 sec

Severity of Cough

	Alkalinised lignocaine cuff group	Normal saline group
Mild	6(12%)	7(14%)
Moderate	-	5(10%)
Severe	-	2(4%)

DISCUSSION:

2 % alkalinized lignocaine placed in the cuff of an endotracheal tube, diffused across the cuff membrane. The cuff could act as a potential reservoir for a local anesthetic, allowing diffusion and subsequent anaesthesia of the underlying mucosa. The simple preloading

technique for alkalized lignocaine ET cuff demonstrate the significant reduction in emergence cough. The basis of our study was that lignocaine instilled into the endotracheal cuff might cause anaesthesia of the trachea by diffusing across the polyvinyl chloride membrane of which the cuffs composed. The local anaesthetic effect should be confined to the mucosa in contact with the cuff. The protective cough reflexes above the tube cuff and of the vocal cords should remain intact. Mean volume which was inflated in to ET tube cuff was 6.6 ± 2 ml, but no signs of lignocaine toxicity was observed during intra operative & post operative period in our study. The deflated volumes were always less than the inflated volumes. The deflated volume among the study group is 6.2 ± 1.5 ml. There is risk of cuff damage and leakage, in our study, all tubes were intact post extubation. By alkalinising lignocaine with soda bicarbonate allowed better diffusion as the hydrophobic neutral base is able to diffuse better than plain lignocaine and the dose of lignocaine can be reduced. The dose of lignocaine used to produce clinical effect is also reduced by alkalinisation. There by reducing the plasma concentration and toxicity.

CONCLUSION:

Alkalized lidocaine in ETTs preloaded with the same solution before surgery appears to significantly lower the incidence of emergence cough during short surgical procedures. Also reduces emergence agitation and provides hemodynamic stability during extubation by avoiding the pressor response.

REFERENCES:

1. Estebe JP, Dollo G, Le Corre P, et al. Alkalinization of intracuff lidocaine improves endotracheal tube-induced emergence phenomena. *Anesth Analg*. 2002;94:227-230
2. Treggiari M, Richebe P, Joffe A, Chevanne F, le Corre P. In vitro evaluation of diffusion of lidocaine and alkalized lidocaine through the polyurethane membrane of the endotracheal tube. *Ann Fr Anesth Reanim*. 2014;33:e73-e77
3. Effect of intracuff media-alkalised lignocaine, saline, and air on endotracheal tube induced emergence phenomena a randomized controlled study Indu S1. Arun M. G2, Taznim Mohamed3, Suvarna K4 2016 Month : July Volume : 3 Issue : 59 Page : 3173-3177