

**Title:** EXTUBATION OF THE TRACHEA: LIDOCAINE REVISITED  
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**INTRODUCTION:** Intravenous administration of lidocaine 1-2 mg/kg has been used as an anesthetic adjuvant to suppress cough reflex during endotracheal intubation (1). It is, however, unclear whether lidocaine is effective in stopping cough reflex during extubation of the trachea (2,3). One study of the cardiovascular effects of intravenous lidocaine reported that no patients who received lidocaine coughed on extubation, whereas those who had not received it had a greater than 60% incidence of coughing (2). Lidocaine 1.5 mg/kg was found not to prevent laryngeal spasm on extubation following tonsillectomy in children (3). This study was designed to determine whether intravenous lidocaine 1 mg/kg was effective at reducing coughing and bucking during extubation of the trachea at the end of anesthesia and further to determine whether tobacco usage had any effect on the quality of extubation.

**METHOD:** Following Human Investigation Committee approval, 93 patients ( $46 \pm 14.0$  years,  $74 \pm 18.7$  kg) scheduled for elective surgery gave informed consent to the study. They were randomly allocated to receive lidocaine (47 patients) or saline (46 patients). No restrictions were placed on the anesthetic technique. At the end of surgery, full reversing dose of muscle relaxant was given. Volatile agents were discontinued approximately 5 min before planned time of extubation. When the patient was breathing spontaneously at a rate of 4 or more per minute and maintaining an end tidal of  $\text{CO}_2$  of less than 50 mmHg, lidocaine 1 mg/kg or an equal volume of saline was administered intravenously (double blind). Nitrous oxide was discontinued. Two minutes after administration of the test medication, if the patient was otherwise still breathing satisfactorily, endotracheal extubation was performed following oropharyngeal suction and a single forced inspiration. Assessment was made of the quality of the extubation on the following 5 point scale:

1. smooth extubation, no bucking or coughing, patient apparently unaffected by extubation.
2. slight bucking or coughing noted on extubation.
3. moderate bucking or coughing. extubation accompanied by some difficulty.
4. severe coughing and/or bucking. Traumatic extubation with high pharyngeal spasm.

Time from administration of test medication until the patient opened eyes on command was also measured. The anesthetist assessing the extubation was asked to decide whether he thought he had used lidocaine or saline. Data are presented as mean  $\pm$  SD and statistical analysis was with Chi Square for nonparametric data and t-test for parametric data.

**RESULTS:** There was a statistically significant difference between the patients who received lidocaine and saline with regard to the quality of

extubation (See table). In the lidocaine group, no patient had grade of extubation higher than 3, whereas in the saline group 1 patient each was graded as 4 and 5. More patients in the lidocaine group were graded as having extubation quality of 1 and 2 compared with the saline group. Lidocaine did not prolong the duration of emergence from anesthesia. The time from administration of test medication until open eyes on command was not statistically different between the two groups and was  $4.8 \pm 3.5$  in the lidocaine group and  $6.4 \pm 4.9$  in the saline group. However, 3 of the lidocaine patients became apneic after administration of the drug and extubation was delayed. 47 of the patients had a significant history of tobacco usage. However, the grading of extubation in these patients was not statistically significantly different from those who did not use tobacco. The anesthesiologists who were grading the extubation were correct 61 times, incorrect 30 times and made no assessment on the other 2 occasions.

**DISCUSSION:** Although lidocaine has been proposed as an anesthetic supplement during endotracheal intubation, in order to suppress coughing and hemodynamic responses to placement of the endotracheal tube (1), its use is not universally approved (4). The findings of this study, using lidocaine at the end of surgery, confirm previous data (2) that lidocaine is indeed effective at suppressing coughing and bucking at this time. It also appears to be effective when patients have positive history of tobacco usage. Lidocaine, 1 mg/kg given intravenously, 2 minutes before proposed time of extubation, can therefore be recommended to reduce the instance of coughing and bucking on the endotracheal tube at the end of surgery.

**REFERENCES:** 1. Steinhaus JE, Howland DE. *Anesth Analg* 37:40-46, 1958.  
2. Bidwai AV, Bidwai VA, Rogers CR, Stanley TH. *Anesthesiology* 51:171-173, 1979.  
3. Leicht P, Wisborg T, Chraemmer-Jorgensen B. *Anesth Analg* 64:1193-6, 1985.  
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TABLE 1: Grading of extubation according to group.

	Grade					Total Number
	1	2	3	4	5	
Lidocaine	25	16	6	0	0	47
Saline	17	10	17	1	1	46
Chi Square 10.16 degrees of freedom 4 P < 0.037						