

Title : PROPHYLACTIC EFFECT OF DEXAMETHASONE AND/OR LIDOCAINE ON POSTEXTUBATION CROUP IN CHILDREN

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Introduction. Post extubation croup occurs in pediatric surgical patients, ranging from 1.6 to 6%,^{1,2} which is presumably related to laryngeal spasm and/or inflammation, edema, causing laryngeal aperture narrowing. The contributing factors for development of this problem are as follows 1) age of the patient, 2) trauma associated with intubation, 3) size of the tube, 4) cuff of the tube, 5) positional changes, 6) duration of intubation and 7) site of surgery. The rapid development of croup after extubation is a potential threat to the patient's life.⁶

Lidocaine⁴ and dexamethasone⁵ have been used to prevent post extubation croup and the effectiveness is controversial.³ The aim of this study is to evaluate the effectiveness of lidocaine and/or dexamethasone in the prophylaxis of post extubation croup.

Patients and Method. Eight hundred patients ranging in age from one to eight years, undergoing dental restorative procedures and T & A are studied. Premedication consisted of atropine 0.01 mg./kg., demeral 1 mg./kg. given IM, thirty minutes prior to arriving in O.R.. Monitoring included tympanic temperature, EKG, precordial stethoscope, blood pressure and an inline oxygen analyzer.

All patients were induced with N₂O/O₂/halothane by mask and then intravenous line established and endotracheal intubation accomplished after paralyzing with succinylcholine 2 mg./kg. I.V.. Anesthesia maintained with N₂O/O₂/ 3L:2L with halothane 1 to 1.5%. Procedures lasted from one to three hours. All patients were extubated at the end of the procedure at a level where they were breathing spontaneously but not reacting to the tube. Thorough and careful suctioning of the pharynx was done prior to extubation.

The eight hundred patients were grouped into four groups of two hundred patients as follows:

- (A) Control: No drugs given.
- (B) Lidocaine: 1 mg./kg. I.V. given one minute before extubation.
- (C) Dexamethasone: 0.3 mg./kg. I.V. given thirty minutes before end of procedure.
- (D) Combination of (B) and (C).

The anesthesiologist administering the drugs was not aware of the type of drug being given. Assessment of all the patients for croup scores was done by yet another anesthesiologist who was also not aware of what drug was given.

The following scores were used to evaluate croup after extubation, refer to Table I.

TABLE I

I. Inspiratory Breath Sounds	Normal	Harsh and Ronchi	Delayed, Harsh and Ronchi
II. Stridor	None	Inspiratory	Inspiratory and Expiratory Grunt
III. Retractions and Nasal Flaring	None	Nasal Flaring Plus Suprasternal Retractions	Nasal Flaring, Suprasternal, Intercostal, Substernal Retractions
IV. Cyanosis with Oxygen by Mask	None	Nail-Base Peri-Oral	Obvious Cyanosis
V. Airway Care	None Needed	IPPB With Oxygen	Reintubation Required with or Without Succinylcholine

TABLE II

GROUPS	SCORE
(A) Control N(200)	MEAN 6.07 SD ±2.06
(B) Lidocaine N(200)	MEAN 2.53 SD ±0.91
(C) Dexamethasone N(200)	MEAN 0.73 SD ±0.72
(D) Lidocaine + Dexamethasone N(200)	MEAN 0.60 SD ±0.50

Results. The results are tabulated as follows, refer to Table II. It is obvious that there is a great difference in the control and treatment group. The data were subjected to analysis of variance. There is a significant difference between the treatment groups and the control group, (P less than 0.01). Within the treatment groups there are significant differences between group (B) and (C) and group (B) and (D), but the difference is not significant between group (C) and (D).

Discussion. The mechanism of post extubation croup seems to be due to 1) stimulation of the pathway of reflex arc⁴, 2) laryngeal edema due to mechanical trauma.³ The post extubation croup in our patients may be due to one or more of the above factors. Dexamethasone has been shown to have edema reducing properties in general.⁸ The mechanism of action of lidocaine may be 1) interrupting the reflex arc centrally or 2) direct peripheral action on the sensory or motor nerve terminals in the larynx.⁴ It does not reduce the laryngeal edema. In our study, dexamethasone proved to be much more effective than lidocaine indicating that laryngeal edema is probably the major factor.

References. 1. Pender JW: Anesthesiology 15:495-505, 1954. 2. Goddard JE Jr., Phillips OC, Marcy JH: Anesth Analg 46:348-353, 1967. 3. Koka BV, et al: Anesth Analg 56:501, 1977. 4. Baraka A, Anesth Analg 57:506, 1978. 5. Deming MV, et al, Anesthesiology 22:933, 1961. 6. Stoeltomg, et al, JAMA, 206:155 '68. 7. Rex MAE, BJA, '70. 8. Goodman, Gilman, Pharmc Basis of Therap, '75, p. 1487.