THE EFFECT OF BETAMETHASONE GEL IN REDUCING SORE THROAT, COUGH, AND HOARSENESS AFTER LARYNGO-TRACHEAL INTUBATION

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Abstract

Background and aims: Tracheal intubation for general anesthesia often leads to traumatization of the airway mucosa resulting in postoperative sore throat, hoarseness and cough. This study was undertaken to determine the effects of betamethasone gel in reducing these complications.

Materials and Methods: One hundred patients (ASA I-II) to undergo endotracheal intubation, were randomly divided equally into two groups; 50 Case (Group A). 50 Control (Group B). The tracheal tubes for Case Group A were lubricated with 0.05% betamethasone gel and for the Control Group B with KY gel. Patients were interviewed at end of procedures and 1 and 24 hour after extubation.

Results: The incidence and severity of sore throat, hoarseness and cough, 1 and 24 hours postoperatively was reduced significantly in Case Group A.

Conclusion: Betamethasone gel, when was used for lubrication of endotracheal tubes pre-operatively, was shown to be effective in decreasing postoperative sore throat, hoarseness, and cough.

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Key words: **b**ethamethasone jelly, tracheal intubation, sore throat, hoarseness, cough.

Introduction

Endotracheal intubation is necessary in general anesthesia to control respiration and protect airways. Almost all patients who were intubated for long term or short-term operations, had some degrees of airway injury. Larynx is one of the most common sites of injury usually manifested as local irritation, inflammation, and even necrosis. Although most of the injuries to the trachea are minor and reversible, potentially, however, may become severe. Due to edema and granuloma formation, injury to the trachea after extubation may manifest as acute or chronic obstruction of the airway that may be severe enough to necessitate surgical intervention. These injuries can also impair normal function of the larynx and their protective roles and predispose the patient to pulmonary aspiration[1].

Sore throat, cough, and hoarseness though minor, are fairly common problems after general anesthesia with endotracheal intubation. Sore throat and hoarseness in the first 24 hours after the procedure were among the most common complications of endotracheal intubation, occurring in 5.7 to 90 percent of cases[2,3]. Incidence of some degree of pharyngotracheal complications (sore throat, hoarseness and cough) is high, and one patient can develop two or all the three complications[4].

Different factors were known to correlate with occurrence of these complication, including sex[4,5], age, season, anesthetic drugs and gases, numbers of trials for intubation[4], duration of intubation[4,6], size of endotracheal tube its type and cuff type and size[7], site of the surgery[4,8], and application of lidocaine[2,4,9] or steroids [3,10,11].

It is not surprising that local anesthetic agents, such as lidocaine gel or spray, were ineffective in preventing sore throat after endotracheal intubation[2,3,9]. Although these agents limit injury to tracheal mucosa and prevent cough, they cannot be effective in preventing sore throat because they have not any anti-inflammatory effects[3]. Hamelberg first described beneficial effects of lignocaine ointment (that contained 1%

hydrocortisone) in prevention of post-surgical sore throat[3]. On the other hand, Stride et al. reported that topical hydrocortisone could increase the frequency of post-surgical sore throat[3]. In other studies, variable reports about the efficacy of these agents on different complications of endotracheal intubation have been made too[5,11].

In view of the uncertainty about the effects of topical steroids on sore throat, hoarseness, and cough, the aim of the present study was to evaluate and compare the efficiency of 0.05% betamethasone gel in reducing the incidence of the commonly occurring complications following endotracheal intubation and to compare its use in a Case group in contrast to a Control group.

Materials and Methods

This study was a double blind clinical trial, on 100 patients (ASA I or II), 16 to 50 years old, who were referred for elective surgery, to Nemazi Hospital of Shiraz University of Medical Sciences during Jan 2003 to Dec 2004.

At entry to the operating room, patients were randomly divided into two equal groups; of Case Group A and Control Group B (50 each).

All patients received anesthesia in the supine position; were first hyperoxygenated for 2 minutes, and then received 0.2 mg/kg diazepam for sedation, 0.2 mg/kg morphine for analgesia, 3-5 mg/kg pentothal for induction, and 0.6 mg/kg atracurium for muscular relaxation. Then, the appropriate endotracheal tube (low pressure high volume cuff, 7–8 mm internal diameter) was selected.

The first 15 cm of the end parts of the tubes (including their cuff) were lubricated either by 3 ml of water soluble 0.05% betamethasone jelly (Case Group A) or by 3 ml KY jelly (Control Group B). This function was performed by someone who was blind to the jellies.

Three minutes after injection of muscle relaxant, patients were intubated by an expert person. The cuffs of the tubes were then inflated with room air and the tubes fixed. Cuff pressure was monitored by cuff

inflator gauge manufactured by VBM Company, Germany.

Anesthesia was maintained with 50% oxygen and 50% nitrous oxide and halothane. Oral airways were inserted into patients' mouth, whenever needed. Unnecessary suction of mouth and trachea was avoided.

At end of surgery, 2.5 mg neostigmine plus 1.25 mg atropine were administered for reversal and patients' mouth suctioned smoothly. Following reassurance about patients' gag reflex and adequacy of their respiratory volumes, patients were extubated in the operating room. After the surgical procedure patients received oxygen by mask. One hour after extubation, and when the patients were fully alert and could respond to questions, and by 24 hours after that, patients were questioned about their sore throat, hoarseness, and cough, and symptoms were evaluated according to the Grading system as in Table 1. The questioning was performed by the person who lubricated the tubes.

Table 1

Grading system for sore throat, hoarseness, and cough 1 hour to 24 hours after surgery

Sore throat
0. no sore throat
1. mild (less than what is seen in common cold)
2. moderate (like what is seen in common cold)
3. severe (more than what is seen in common cold)
Hoarseness
0. no hoarseness
1. mild (no hoarseness in the time of interview but had it previously)
2. moderate (only is felt by the patient)
3. severe (recognizable in the time of interview)
Cough
0. no cough
1. mild (less than what is seen in common cold)
2. moderate (like what is seen in common cold)
3. severe (more than what is seen in common cold)

Exclusions from the study included patients who had surgical procedures on head neck or airways, received naso-tracheal intubation, needed naso-gastric tube in the first 24 hours after the procedure, needed

to be re-intubated for any cause, position was changed during surgery, had a previous history of steroids application, used them at the time of procedure or later, had a difficult intubation or needed rapid sequence induction or Sellick's maneuver.

The obtained data about patients' symptoms and their severity were statistically analyzed by Mann-Whitney U-test and Chi Square using SPSS WIN 10 software. A P value less than 0.05 was considered significant.

Results (Table 2)

The mean duration of anesthesia was 128±45 minutes in the Case Group A and 140±48 minutes in Control Group B. The difference was not statistically significant.

Sore throat-free incidence after surgery

In One hr. – 39 (78%) patients in Case Group A, and 23 (46%) in Control Group B. The difference was statistically significant.

In 24 hrs. – 43 (86%) patients in Case Group A, and 27 (54%) in Control Group B. The difference was statistically significant.

Hoarseness-free incidence after surgery

In One hr. – 40 (80%) patients in Case Group A, and 20 (40%) patients in Control Group B. The difference was statistically significant.

In 24 hrs. – 41 (82%) patients in Case Group A, and 30 (60%) patients in Control Group B. The difference was statistically significant.

Cough-free incidence after surgery

In One hr. – 41 (82%) patients in Case Group A, and 34 (68%) patients in Control Group B. The difference was not statistically significant.

In 24 hrs. – 45 (90%) patients in Case Group A, and 32 (64%) patients in Control Group B. The difference was statistically significant.

Table 2
Number and percentage of patients free of symptom 1 and 24 hours after surgical procedures.

	Case Group A (0.05% Betamethasone gel)				Control Group B (KY gel)				P value	
Grade system	0	1	2	3	0	1	2	3		
Mean duration fanesth (min)		128±45				140±48				Not Signif.
Sore throat-free*										
1st hour	39 (78%)	11	0	0	23 (46%)	17	6	4	0.0003	Signif.
24th hour	43 (86%)	6	1	0	27 (54%)	16	3	4	0.0004	Signif.
Hoarseness-free										
1st hour	40 (80%)	8	1	1	20 (40%)	15	7	8	0.00001	Signif.
24th hour	41 (82%)	6	3	0	30 (60%)	10	4	6	0.0098	Signif.
Cough-free										
1st hour	41 (82%)	7	2	0	34 (68%)	12	3	1	0.063	Not Signif.
24th hour	45 (90%)	3	2	0	32 (64%)	16	2	0	0.0023	Signif.

* P value <0.5 is significant.

Discussion

It has been shown that the frequency of pharyngolaryngotracheal complications and injuries after general anesthesia with laryngoscopy and endotracheal intubation was relatively high and it was shown that virtually all tracheal intubations were associated with laryngeal changes that affect voice-frequency histogram, even if they did not cause any obvious hoarseness[11].

The causes of cough, hoarseness, and sore throat in post-intubation period are attributable to local irritation, inflammation and edema in some parts of pharynx, larynx, vocal cords, or trachea with endotreachal tube (specially its cuff)[11]. Therefore, topical administration of steroids can be beneficial in prevention and treatment of these complications[11].

Stride in 1990 used topical 1% hydrocortisone for prevention of

postoperative sore throat and found it to be ineffective[3]. The observed difference with our study can be due to several factors: the application of different sizes[6] of entotracheal tubes (in the present study smaller tubes were used), the lower length of tube that was lubricated by topical steroid than the presenting study (5 cm versus 15 cm respectively).

In 1998 Ayoub et al.[11] observed that 0.05% betamethasone was effective in decreasing the frequency of sore throat and hoarseness but ineffective in reducing cough. In our study, the frequency of cough and sore throat was lower than that reported by Ayoub et al. These differences can be due to application of betamethasone gel 15 cm from the tip of the tubes, however Ayoub et al. used it 15 cm from the cuffs of the tubes and no mention of type of tube used was made[11].

As shown by our Results, the Case Group A (betamethasone gel group), 39 40 & 41 patients were free of post intubation complication (sore throat, hoarseness and cough respectively) in first hour after operation, in comparison to 23 20 & 34 patients in Control Group B (K.Y gel) in the same time.

Betamethason gel was ineffective in preventing cough in the first hour after surgery but effective in the 24th hour. It can be concluded that betamethasone gel had preventive effects on cough and needed a 24 hours period to manifest itself.

We recommend lubrication of all part of endotracheal tube that is in contact with posterior pharynx, larynx and trachea (15 cm away from the tip of tube) with betamethasone gel in order to reduce postoperative cough, hoarseness, and sore throat.

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