

The Effect of Beatamethasone Gel in Reducing Post Operative Sore Throat and Cough After Endotracheal Intubation in Khartoum Teaching Hospital in Sudan

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Abstract

Background: Sore throat and cough are common postoperative problems following the use of endotracheal intubation during general anesthesia. **Objectives:** To determine the effects of betamethasone gel in reducing postoperative sore throat and cough. **Methodology:** It was interventional, prospective, double-blind clinical trial and hospital based study, implemented during a time period of six month from (February till August 2012) in Khartoum Teaching Hospital. One hundred patients (ASA I-II) to undergo endo tracheal intubation, were randomly divided equally into two groups; 50 Case (Group A); 50 Controls (Group B). The tracheal tubes for Case Group A were filled with 0.05% betamethasone gel, and for the Control Group B with Normal saline. Patients were interviewed at end of procedures and 1, 6 and 24 hour after extubation. **Results:** The incidence and severity of sore throat and cough, at 1 and 24 hours postoperatively was reduced significantly in Case Group A (betamethasone gel). **Conclusions:** Betamethasone gel when was used for lubrication of endotracheal tubes pre-operatively, is qualitatively superior to normal saline for decreasing postoperative sore throat and cough.

Keywords

Betamethasone Gel, Endotracheal Intubation, Postoperative, Sore Throat, Cough, Comparison

1. Introduction

Endotracheal intubation (ETI) is a rapid, simple, safe and non surgical technique that achieves all the goals of airway management, and remains the gold standard procedure for airway management. However, introduction of the tracheal tube usually requires direct laryngoscopy, which may cause several problems such as laryngopharyngeal trauma leading to pain, sore throat and loss of voice, even after short-term intubation^[1], coughing, hypertension, tachycardia, dysrhythmia, and, elevation of intracranial and intraocular pressures may occur^[2].

Sore throat and cough 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^[3,4]. 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^[5]. Different factors were known to correlate with occurrence of these complication, including sex^[5], age, season, anesthetic drugs and gases, numbers of trials for intubation^[5], duration of intubation^[5,6], size of endotracheal tube its type and cuff type and size^[7], site of the surgery^[5,8], and application of lidocaine^[3,5] or steroids^[4]. As steroids are known for their anti - inflammatory action, betamethasone gel applied to tracheal tube might reduce the incidence of postoperative sore throat, cough, and hoarseness of voice^[9,10]. The present paper focus to evaluate the efficacy of

betamethasone gel lubricate the endotracheal cuff with compared to cuffs lubricate with normal saline in reducing the incidence of postoperative sore throat and cough.

2. Material and Methods

It was an interventional prospective, double-blind clinical trial and hospital based study implemented during a time period of six month from (February till August 2012) in Khartoum Teaching Hospital. A total of 100 patients from either gender, aged between 20-60 yrs who scheduled for elective surgery under general anesthesia and had duration of tracheal intubation between 45 and 300 min were selected. The patients were randomly divided into 2 groups. Group A: 50 patients who ETT lubricate with 0.05% betamethasone gel. Group B -50 patients who ETT inflated with normal saline. A standardized form was used to collect patients' details, technique of airway maintenance and number of attempts at intubation. The use of nasogastric tubes, throat packs, duration of intubation, and status of the anaesthetist were also noted. All the patients were interviewed in the postoperative period within 1- 6- 24 hours after surgery. The presence of sore throat: pain during swallowing, dryness of the throat, and cough were noted. The throat related complications were managed accordingly.

PROCEDURE: In the operating room, monitoring was consist of noninvasive arterial blood pressure, pulse oximetry. Before intubation, ventilation was controlled with 100% oxygen via a face mask. Induction was accomplished with i.v. thiopentone (4–6 mg/kg), followed by muscle relaxant (depolarizing or non depolarizing). Tracheal intubation, with high volume/low pressure was performed. The desirable size (internal diameter of 7.5 - 8.0 for male or 7.0-7.5 mm for female patients). Immediately after intubation, the patients were assigned to one of two groups:

Normal saline group (control): These patients were incubated using a tracheal tube with high volume/low pressure which initially deflated to its maximum and then inflated with Normal saline, The ETT cuffs was inflated to the minimal occlusive volume (i.e. no leakage detected under controlled ventilation).

Betamethasone gel group: These patients were incubated using a tracheal tube with a large volume/ low pressure cuff which was initially deflated to its maximum and then lubricate with 0.05% betamethasone gel, and then a supplementary volume of sodium bicarbonate (NaHCO₃) 8.4% was added to obtain the minimal occlusive volume. Anesthesia was maintained with O₂ in NO₂ and inhalation agent. At the end of surgery, the patients were given neostigmine (0.05 mg/kg) and atropine (0.02 mg/kg) intravenously, and the lungs were ventilated with 100% O₂ until the patient will be fully awakened and recover from the muscle relaxant. After gentle aspiration of the oral secretions (suction catheter used), the cuff was deflated fully and the tracheal tube was removed and the duration of tracheal intubation was recorded. Then the patients were transfer to the recovery room.

Statistical analysis was performed via SPSS software (SPSS, Chicago, IL, USA). Continuous variables were compared using student's t test (for paired data) or Mann-Whitney U test for non-parametric data. For categorical data, comparison was done using Chi-square test (X²) or Fisher's Exact test when appropriate. A P value of <0.05 was considered statistically significant. Ethical clearance and approval for conducting this research was obtained from the general manager of the hospital and informed written consent was obtained from every respondent who agreed to participate in the study.

3. Results

The mean age of patients in the study group was 35.21 ±3.26 years; while that in the control group was 37.32±3.16 years. The difference was statistically significant. 45 patients (45%) were male while 55 patients (55%) were female. The mean duration of surgery was 145±0.32 minutes in the Case Group A and 160±0.41 minutes in Control Group B. The difference was statistically significant. The mean BMI of women in the study group was 23.13±1.22; while that in the control group was 24.26±1.19. The difference was not statistically significant (Table 1)

Table 1. Grading system for sore throat 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)
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)

Table 2 showed sore throat-free incidence after surgery. In One hour, 34 (68%) patients in Case Group A, and 21 (42%) in Control Group B. The difference was statistically significant. In 6 hours, 31 (62%) patients in Case Group A, and 27 (54%) in Control Group B. The difference was statistically not significant. In 24 hours, 37 (74%) patients in Case Group A, and 28 (56%) in Control Group B. The difference was statistically significant.

Table 3 showed cough-free incidence after surgery. In One hour, 29 (58%) patients in Case Group A, and 24 (48%) patients in Control Group B. The difference was statistically significant. In 6 hours, 32 (64%) patients in Case Group A, and 28 (56%) patients in Control Group B. The difference was statistically significant. In 24 hours, 41 (82%) patients in Case Group A, and 30 (60%) patients in Control Group B. The difference was statistically significant.

Table 2. Shows the nonparametric correlation between case and control regarding overall demographic data.

Demographic data	Case A Betamethazone		Control B Normal saline		P value
	Count	%	Count	%	
Age in years					
20-35	15	30.0%	08	16.0%	0.01*
36-50	26	52.0%	20	40.0%	
51 -60	09	18.0%	22	44.0%	
Total	50	100.0%	50	100.0%	
Gender					
Male	24	48.0%	21	42.0%	0.078
Female	26	52.0%	29	58.0%	
Total	50	100.0%	50	100.0%	
Duration of surgery					
30min-2 hours	23	46.0%	19	38.0%	0.004*
>2 -4 hours and more	27	54.0%	31	62.0%	
Total	50	100.0%	50	100.0%	
BMI					
<20	8	16.0%	10	20.0%	0.132
20-24.9	16	32.0	12	24.0%	
25-30	26	52.0%	28	56.0%	
Total	50	100.0%	50	100.0%	

*Statistically significant at 0.05 level

Table 3. Shows the nonparametric correlation between case and control regarding postoperative sore throat in grading system.

Postoperative sore throat in grading system	Case A Betamethazone		Control B Normal saline		P value
	Count	%	Count	%	
Sore throat after 1 hours					
0	34	68.00%	21	42.00%	0.001*
1	11	22.00%	18	36.00%	
2	5	10.00%	9	18.00%	
3	0	0.00%	2	4.00%	
Total	50	100.00%	50	100.00%	
Sore throat after 6 hours					
0	31	62.00%	27	54.00%	0.633
1	15	30.00%	15	30.00%	
2	2	4.00%	5	10.00%	
3	2	4.00%	3	6.00%	
Total	50	100.00%	50	100.00%	
Sore throat after 24 hours					
0	37	74.00%	28	56.00%	0.00*
1	10	20.00%	14	28.00%	
2	3	6.00%	6	12.00%	
3	0	0.00%	2	4.00%	
Total	50	100.00%	50	100.00%	

*Statistically significant at 0.05 level

Table 4. Shows the nonparametric correlation between case and control regarding postoperative cough in grading system.

Postoperative cough in grading system	Case A Betamethazone		Control B Normal saline		P value
	Count	%	Count	%	
Incidence of cough after 1 hours					
0	29	58.0%	24	48.0%	0.534
1	15	30.0%	19	38.0%	
2	05	10.0%	06	12.0%	
3	01	02.0%	01	02.0%	
Total	50	100.0%	50	100.0%	
Incidence of cough after 6 hours					
0	32	64.0%	28	56.0%	0.633
1	13	26.0%	15	30.0%	
2	03	06.0%	04	08.0%	
3	02	04.0%	03	06.0%	
Total	50	100.0%	50	100.0%	
Incidence of cough after 24 hours					
0	41	82.0%	30	60.0%	0.00*
1	08	16.0%	15	30.0%	
2	01	02.0%	03	06.0%	
3	00	00.0%	02	04.0%	
Total	50	100.0%	50	100.0%	

*Statistically significant at 0.05 level

4. Discussion

Sore throat and cough are common complications after surgery and anaesthesia. Any technique that would allow patients emerging from anaesthesia to tolerate an endotracheal tube, while affording airway protection with intact supraglottic reflexes would be desirable in selected groups. Several factors have been described to influence the incidence of this sequels like the diameter of the endotracheal tube used, the intra-cuff pressure, coughing on the tube, and excessive pharyngeal suction [11]. It is very interesting to notice that, Stride in 1990 used topical 1% hydrocortisone for prevention of postoperative sore throat and found it to be ineffective [4]. Contrary to Stride findings, other studies have demonstrated the effectiveness of betamethasone gel in reducing postoperative sore throat and cough [9,10].

The discrepancy between these studies and Stride may be explained by that Stride and his colleagues applied topical hydro- cortisone only from the distal tip to 5 cm above the cuff [4]. The beneficial effect of steroid gel application was observed in subsequent studies because of wide spread application of steroid gel to all portions of the tube that came in contact with the posterior pharyngeal wall, vocal cords, and trachea and not just confined to the tip and cuff of the tracheal tube [9,10].

The results of the present study showed a decrease in the incidence and severity of sore throat observed in patients emerging from general anaesthesia after lubricate the endotracheal cuff with betamethasone gel, which was free (68%.62% and 74%) after 1, 6 and 24 hours in betamethasone gel group compare to (42% 54% and 56%) to normal saline group respectively. There was statistically significant difference between the time of reducing sore throat in study group when compared to control group at 1 and 24 hours respectively.

The current study correlate with previous studies done by

Ayoub et al and Selvaraj et al compared betamethasone gel against a control [9,10]. They reported the beneficial effects of the steroid gel when applied to all portions of the tube that come into contact with the posterior pharyngeal wall, vocal cords, and trachea, and not just to the tip and cuff of the tracheal tube. Ayoub et al and colleagues [9] studied the effect of betamethasone gel in decreasing the frequency of sore throat, cough and hoarseness and they found that 0.05% betamethasone was effective in decreasing the frequency of sore throat and hoarseness but ineffective in reducing cough .

The present study observed same finding and concluded that, betamethasone gel had preventive effects on cough and needed a 24 hours period to manifest itself. Additionally the current study matches previous data from findings of studies done by Sumathi and colleagues [12] and the study done by George Allen [13] proving that widespread application of betamethasone gel significantly reduces the incidence of postoperative sore throat and cough.

In the present study it was found that, socio-demographic determinants, such as age , gender and other factors like duration of surgery, size and type of tubes are variables indirectly associated with sore throat and cough and these results consistent with other studies which concluded that different factors were known to correlate with occurrence of these complication, including sex [5], age, season, anesthetic drugs and gases, numbers of trials for intubation [5], duration of intubation [5,6], size of endotracheal tube its type and cuff type and size [7], site of the surgery [5,8], and application of lidocaine [3,5] or steroids.

5. Conclusion

Betamethasone gel when was used for lubrication of endotracheal tubes pre-operatively, is qualitatively superior to normal saline for decreasing postoperative sore throat and cough. Thus, Betamethazone gel -lubricate ETT cuffs seem to be more efficient than normal saline lubricate ETT cuffs.

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