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The Effectiveness of Mometasone Spray and Triamcinolone Acetonide Gel in Preventing Sore Throat, Cough, and Hoarse after Intubation

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ABSTRACT

Background: Endotracheal intubation is a procedure performed by inserting an endotracheal tube into the airway. With endotracheal intubation, there can be several complications ranging from mild to severe. Sore throat, coughing, and hoarseness were several endotracheal intbation complications. From several studies, it was found that the incidence of POST was 21-65%. This study aimedto determine the efficacy between 0.1% triamcinolone acetonide gel and 100 mcg mometasone spray in reducing sore throat, cough, and hoarseness due to endotracheal intubation.

Method: A Randomized Controlled Trial, Open-Label was carried out on patients undergoing endotracheal intubation with general anesthesia in RSMH operating room from September 2020 - November 2020. Seventy-two study subjects met the inclusion criteria and were divided into two groups, namely the triamcinolone acetonide gel group, and the mometasone spray group. Analyzing data was SPSS version 23.

Result: There were no difference between age, sex, ASA PS classification, and length of operation between the two groups ($p > 0.05$). Mometasone spray 100 mcg and triamcinolone acetonide gel 0.1% had the same effectiveness to reduce endotracheal intubation such as sore throat, cough, and hoarseness within 24 hours of endotracheal intubation ($p > 0.05$). There was a significant difference in the incidence of sore throat between two groups in the first hour ($p = 0.039$).

Conclusion: There was no statistically significant difference between the efficiency of mometasone spray 100 mcg and triamcinolone acetonide gel 0.1% on a sore throat, cough, and hoarseness within 24 hours of endotracheal intubation ($p > 0.05$).

Keywords: Mometasone Spray 100 Mcg, Triamcinolone Acetonide Gel 0.1%, Randomized Controlled Trial.

Introduction

Endotracheal intubation is a procedure performed by inserting an endotracheal tube into the airway. Using endotracheal intubation can be several mild to severe complications. Sore throat, coughing, and hoarseness were several endotracheal intbation complications. [1] In Orandi's 2013 study, the prevalence of cough, sore throat, and hoarseness was 18% - 65%, and in Narimani et al's study, it was 14.4-50%.[2,3] Meanwhile, in 2017, Wendy's showed the prevalence of sore throat, cough, and hoarseness in RSMH was 17.8% - 21.4%.[4] Pain throat, hoarseness, coughing, and nausea were the most common complication after endotracheal intubation. Although sore throat, cough, and hoarseness do not cause serious complications, they make the patient stressed and have a bad memory after the intubation procedure. Risk factors for sore throat, cough, and hoarseness are female gender, history of smoking, time of extubation, history of cough, duration of anesthesia, history of ulcers, size of Endotracheal Tube (ETT), dentures, ETT cuff pressure,

Main complaints that often occur after endotracheal intubation are cough, sore throat, and hoarseness after surgery. The causes of sore throat, coughing and hoarseness make irritation and traumato the airway. The ETT lubrication drug that has been tested and researched for its ability to reduce the incidence of sore throat, cough and hoarseness has mixed success rates. ETT lubrication is useful for reducing mucosal damage by facilitating the entry of ETT into the trachea. Topical steroids as lubrication drugs are a good choice for reducing the incidence of cough, sore throat, and hoarseness beca use they reduce thracea mucosal irritation and inflammation of which may be the main cause of sore throat, cough, and hoarseness.

Triamcinolone acetonide is a corticosteroid that has anti-inflammatory, anti-pruritic, and vasoconstrictive effects. Anti-inflammatory mechanism in topical steroids is not clear yet. Corticosteroids induce phospholipase A2 inhibitor proteins called lipocortins. This protein functions to control the production of inflammatory mediators (prostaglandin and leukotrienes) by inhibiting its precursor, arachidonic acid. Arachidonic acid is released from the phospholipid membrane by phospholipase A2. In the research, Ayoub et al stated that Triamcinolone acetonide gel 0.1% only has one-fifth of the glucocorticoid activity of betamethasone with a dose of 0.1% triamcinolone acetonide gel equivalent to 0.4 mg of prednisone. The study found that the incidence endotracheal complication (sore throat, cough, and hoarseness) was 19, 4% lower than other studies using betamethasone [6,7]

Mometasone is a topical glucocorticosteroid with local anti-inflammatory effects at a systemically

inactive dose. Mometasone has antiallergic and anti-inflammatory effects because mometasone can inhibit the release of mediators from allergic reactions. In cell culture, mometasone shows high potency in inhibiting the synthesis and release of IL-1, IL-5, IL-6, and TNFα. Besides mometasone inhibits leukotriene production, mometasone is a strong inhibitor of the production of Th2, IL-4, and IL-5 cytokines, from CD4 + T cells. Mometasone spray is a corticosteroid with moderate potency available in the form of a nasal spray which is effective as a therapy for allergic rhinitis. The study was conducted by Arunchai et al. of 42 American Society of Anesthesiologists (ASA) physical status of 1 and 2 general anesthesized patients. They concluded that the administration of mometasone spray reduced post- intubation sore throat. Wirdiyana et al also stated that mometasone spray is effective in postintubation complications such as cough and sore throat. [8,9]

The analgesic and anti-inflammatory potential of 0.1% triamcinolone acetonide gel and anti-inflammatory potential in 100 mcg mometasone spray, the administration of 0.1% triamcinolone acetonide gel, and 100 mcg mometasone spray can be used as lubrication in ETT before endotracheal intubation and is expected to prevent pain events. throat, cough, and hoarseness after intubation. Also, the use of triamcinolone acetonide gel 0.1% and mometasone furoate spray 100 mcg are relati vely safe to use, minimal side effects, well-tolerated, and available in the operating room so that it is expected to reduce the incidence of cough, sore throat, and hoarseness. This study aims to analyze the effectiveness ofmometasone spray 100 mcg with triamcinolone acetonide gel 0.1% in reducing sore throat, cough, and hoarseness after endotracheal intubation.

Method

This study is a randomized clinical trial with an open-ended companion in a patient undergoing surgery under general anesthesia with the endotracheal intubation technique performed in the operating room of Dr. Mohammad Hoesin hospital, from September 2020-November 2020 or until the number of samples is met. The study was conducted after the approval of the Health Research Ethics Committee.

All patients who underwent elective surgery undergoing general anesthesia with endotracheal intubation technique at RSUP Dr. Mohammad Hoesin Palembang who met the inclusion criteria will be the research sample. The inclusion criteria included male and female patients who were going to undergo planned surgery under general anesthesia with endotracheal intubation in the supine position, age 18-65 years, ASA I-II status, underwent anesthesia for 30-240 minutes, and willingness to follow. research and

sign informed consent.

Patients who underwent surgery on the head, neck and airways, patients who had nasal intubation, patients who required NGT during the first 24 hours postoperatively, patients who had difficulty intubating and induced fast or *Sellick Maneuver*, patients with a history of hoarseness and asthma before surgery, mallampati grade > 2, allergies to the drugs to be tested, a history of using NSAIDs before surgery, patients suffering from upper respiratory tract infections 1 week before, patients taking steroids, patients using oral packing Patients with more than 2 attempts to intubate, bleeding during intubation, which are known directly at tintubation or after extubation, patients who require mechanical ventilation after surgery, anesthesia time is more than 4 hours, patients who are allergic to drugs drugs used during surgery, patients who experience shock and massive bleeding during the operation, Patients referred or transferred from another hospital's ICU, patients with active bleeding, malignancy, acute coronary syndrome, have a history of platelet abnormalities, treated for less than 24 hours, re-admission to the ICU within the same treatment period and incomplete medical record data will be excluded. in research.

The research samples were elective surgery patients with general anesthesia at Mohammad Hoesin hospital who was matched based on age, sex, and duration of operation with a minimum number of samples for each group is 33 people or 66 people for both groups. Adding 10% to the likelihood of exclusion from the study would take 72 people in all for both groups. The sample size for each group is 33 people or 66 people for both groups. Adding 10% to the likelihood of exclusion from the study would take 72 people in all for both groups.

Data retrieval is carried out *matching* based on age, gender, and length of operation in elective surgery patients with general anesthesia at dr. Mohammad Hoesin Palembang. This study consisted of 3 variables, namely: independent variables (sore throat, cough, and hoarseness), the dependent variable (0.1% triamcinolone acetonide gel lubrication bat and 100 mcg Mometasone spray), universal variables (age, gender, length of time). operation).

The data will be processed and analyzed by computer, using the SPSS program (*Statistical Package for Social Science*). All data that has been collected is entered in the master table, and after completion, it is processed and displayed in tabulated and/or graphical form. Continuous variables were analyzed using the T-test, while dichotomic variables were analyzed using the Chi-Square test. The Mc Nemar test was used to analyze the effectiveness by using a matching sample. All data analysis used SPSS*ver* 23.

Result

Clinical testing was carried out by comparing 2 groups of the study population as many as 72 elective surgery patients with general anesthesia and endotracheal intubation technique that met the inclusion criteria and did not include the exclusion criteria. There were 36 patients in the Triamcinolone Gel 0.1% group and 36 patients in the 100 mcg mometasone spray group who were the subject of the study. *The* study was held from October to December 2020.

Based on age, the mean age of the 0.1% triamcinolone acetonide gel group was 45.81 ± 17.04 years and the mean age of the 100 mcg mometasone spray group was 41.67 ± 14.05 years (Table 1). With the chi-square test, the p-value was 0.410 (p> 0.05), which means that there was no significant difference in age between the two groups.

The mean duration of operation of the 0.1% triamcinolone acetonide gel group was 113.33 ± 17.73 minutes and the average operating time of the 100 mcg mometasone spray group was 110.42 ± 21.26 minutes. With the chi-square test, the p-value was 0.884 (p> 0.05), which means that there was no significant difference in the length of operation between the two groups.

Table 1. Characteristics of research subjects

Variable	Triamcinolone gel 0.1% group (n = 36 subjects)	Mometasone Spray group 100 mcg (n = 36 subjects)	p
Age (years), mean + SD	45.81 ± 17.04	41.67 ± 14.05	0.410 *
Operation time (minutes), mean + SD	113.33 ± 17.73	110.42 ± 21.26	0.884 **
Gender, n (%)			
Man	22 (61.1%)	11 (30.6%)	0.458 **
Women	14 (38.9%)	25 (69.4%)	
ASA, n (%)			
1	17 (47.2%)	24 (66.7%)	0.096 **
2	19 (52.8%)	12 (33.3%)	

Chi Square test, p = 0.05; p is significant if p <0.05

The mean duration of operation of the 0.1% triamcinolone acetonide gel group was 113.33 ± 17.73 minutes and the average operating time of the 100 mcg mometasone spray group was 110.42 ± 21.26

minutes. No difference in the length of operation between the two groups (p = 0.884).

Based on the sex of the triamcinolone acetonide gel group 0.1% 22 men (61.1%) and 14 women (38.9%), the 100 mcg mometasone spray group found 11 male patients (30, 6%) and women as many as 25 people (60.4%). There was no significant difference between the sexes of the two groups (p = 0.458).

Based on the ASA group of 0.1% triamcinolone acetonide gel, 17 patients with ASA 1 were found (47.2%) and 19 people with ASA 2 (52.8%) while the 100 mcg mometasone spray group found 24 patients with ASA 1. people (66.7%) and ASA 2 as many as 12 people (33.3%). ASA physical status were the same between the two groups (p = 0.096).

Furthermore, the effectiveness of triamcinolone acetonide was compared 0.1% gel and 100 mcg mometasone spray against sore throat, cough, and hoarseness in 24 hours after endotracheal intubation. The incidence of sore throat, cough, and hoarseness of the two groups was examined at 24 hours, then a statistical test was performed to compare the incidence between the two groups using the Mc Nemar test. From the statistical test triamcinolone acetonide gel group and 100 mcg mometasone spray had no endotracheal intubation complication differences (p-value = 1,000). (Table 2)

Table 2. Comparison of the effectiveness of triamcinolone *acetonide gel* 0.1% and mometasone spray 100 mcg

Variable	After 24 hours of administration		P
	Triamcinolone gel 0.1% group (n = 36 subjects)	Mometasone Spray group 100 mcg (n = 36 subjects)	
Sore throat			
Yes	0 (0%)	0 (0%)	1.000
Not	36 (100%)	36 (100%)	
Cough			
Yes	0 (0%)	0 (0%)	1.000
Not	36 (100%)	36 (100%)	
Hoarseness			
Yes	0 (0%)	0 (0%)	1.000
Not	36 (100%)	36 (100%)	
Total	36	36	

* Mc Nemar test, the p-value is significant if <0.05

No sore throat difference at 0, 6 and 24 hours, the incidence of sore throat after endotracheal intubation was obtained by statistical analysis of the probability value of sore throat at 0, 6, and 24 hours,

respectively 0.543; 0.643 and 1.000 ($p > 0.05$). Meanwhile, the probability value of sore throat on the 1st hour was 0.039 ($p < 0.05$), so it can be concluded that there was a significant difference in the sore throat at the 1st hour between the two groups. (Table 3)

Table 3 Degree of Sore Throat

The degree of sore throat	Triamcinolone gel 0.1% group (n = 36 subjects)	Mometasone Spray group 100 mcg (n = 36 subjects)	P
Hour 0			
No pain	22 (61.1%)	26 (72.2%)	
Mild pain	10 (27.8%)	8 (22.2%)	0.543
Moderate pain	4 (11.1%)	2 (5.6%)	
Severe pain	0 (0%)	0 (0%)	
Hour 1			
No pain	24 (66.7%)	32 (88.9%)	
Mild pain	10 (27.8%)	2 (5.6%)	0.039
Moderate pain	2 (5.6%)	2 (5.6%)	
Severe pain	0 (0%)	0 (0%)	
Hour 6			
No pain	33 (91.7%)	34 (94.4%)	
Mild pain	3 (8.3%)	2 (5.6%)	0.643
Moderate pain	0 (0%)	0 (0%)	
Severe pain	0 (0%)	0 (0%)	
Hour 24			
No pain	36 (100%)	36 (100%)	
Mild pain	0 (0%)	0 (0%)	1.000
Moderate pain	0 (0%)	0 (0%)	
Severe pain	0 (0%)	0 (0%)	

* Chi Square test, Pearson chi square; p is significant if $p < 0.05$

The incidence of cough after endotracheal intubation was obtained from statistical analysis of cough probability values at 0, 1, 6, and 24 hours, respectively 0.836; 0.556; 0.555; and 1.000 ($p > 0.05$) so it can be concluded both groups had similar efficacy to reduce the incidence of cough at 0, 1, 6, and 24 hours between the two groups statistically (Table 4).

Table 4 Degree of cough

Degree of cough	Triamcinolone gel 0.1% group (n = 36 subjects)	Mometasone Spray group 100 mcg (n = 36 subjects)	P
Hour 0			
No cough	27 (75%)	29 (80.6%)	
Cough lightly	8 (22.2%)	6 (16.7%)	0.836
Moderate cough	1 (2.8%)	1 (2.8%)	
Severe cough	0 (0%)	0 (0%)	
Hour 1			
No cough	32 (88.9%)	30 (83.3%)	
Cough lightly	4 (11.1%)	5 (13.9%)	0.556
Moderate cough	0 (0%)	1 (2.8%)	
Severe cough	0 (0%)	0 (0%)	
Hour 6			
No cough	34 (94.4%)	35 (97.2%)	
Cough lightly	2 (5.6%)	1 (2.8%)	0.555
Moderate cough	0 (0%)	0 (0%)	
Severe cough	0 (0%)	0 (0%)	
Hour 24			
No cough	36 (100%)	36 (100%)	
Cough lightly	0 (0%)	0 (0%)	1.000
Moderate cough	0 (0%)	0 (0%)	
Severe cough	0 (0%)	0 (0%)	

* Chi Square test, Pearson chi square; p is significant if $p < 0.05$

The incidence of hoarseness after endotracheal intubation obtained the results of statistical analysis of the probability value of hoarseness at 0, 1, 6, and 24 hours, respectively 0.204; 0.233; 0.555 and 1.000 ($p > 0.05$) so it can be concluded that there is no significant difference in the incidence of hoarseness at 0, 1, 6, and 24 hours between the two groups. (Table 5)

Table 5 Degree of Hoarseness

Hoarseness degree	Triamcinolone gel 0.1% group (n = 36 subjects)	Mometasone Spray group 100 mcg (n = 36 subjects)	P
Hour to 0			0.204
Not hoarse	29 (80.6%)	29 (86.1%)	

Light hoarseness	4 (11.1%)	5 (13.9%)	
Medium hoarse	3 (8.3%)	0 (0%)	
Heavy hoarse	0 (0%)	0 (0%)	
1st hour			
Not hoarse	31 (86.1%)	30 (83.3%)	
Light hoarseness	5 (13.9%)	5 (13.9%)	0.223
Medium hoarse	0 (0%)	1 (2.8%)	
Heavy hoarse	0 (0%)	0 (0%)	
The 6th hour			
Not hoarse	34 (94.4%)	35 (97.2%)	
Light hoarseness	2 (5.6%)	1 (2.8%)	0.555
Medium hoarse	0 (0%)	0 (0%)	
Heavy hoarse	0 (0%)	0 (0%)	
24th hour			
Not hoarse	36 (100%)	36 (100%)	
Light hoarseness	0 (0%)	0 (0%)	1.000
Medium hoarse	0 (0%)	0 (0%)	
Heavy hoarse	0 (0%)	0 (0%)	

* Chi Square test, Pearson chi square; p is significant if p <0.05

Discussion

Sore throat, cough, and hoarseness or *Post Operative Sore Throat* (POST) is a complaint that is often experienced by patients after surgery under general anesthesia with endotracheal i ntubation. Although minor complications can lead to patient dissatisfaction and morbidity.[2] Sarki et al said the incidence of sore throat, cough, and hoarseness was 80%, 43.3% 46.7% without prophylaxis.[10] Accordingto Mchardy et al the incidence of POST was 14.4% - 50% [2] whereas according to Ayoub et al. amounted to 21% - 65%.[6] Of the 200 patients studied according to Edomwongi et al, the incidence of sore throat was 49%, coughing 36% and hoarseness of 5%.[11] This was due to irritation and inflammation of the respiratory tract mucosa due to trauma. Lubrication is useful for minimizing mucosal injury by facilitating the entry of ETT into the airways.

Comparison of the effectiveness of giving 0.1% triamcinolone acetonide gel and 100 mcg mometasone spray on the prevention of sore throat, cough, and hoarseness within 24 hours after endotracheal intubation. The incidence of cough, sore throat, and hoarseness in both groups was examined and then the Mc Nemar statistical test was performed. In the triamcinolone acetonide gel group

0.1% of all patients who experienced a cough, sore throat, and hoarseness all recovered within 24 hours of endotracheal intubation. In the 100 mcg mometasone spray group, patients who experienced a sore throat, cough, and hoarseness recovered all 24 hours after endotracheal intubation. So there is no statistically significant difference (Table 2) between triamcinolone acetonide gel 0.1% and mometasone 100 mcg to reduce sore throat. cough and hoarseness within 24 hours after endotracheal intubation ($p = 1.000$; $p > 0.05$). This shows that the two groups of drugs have no difference in effectiveness in reducing and preventing the incidence of POST after 24 hours after endotracheal intubation.

The result supports the study of Mchardy et al which states that large damage to the larynx and tracheal epithelium occurs as a result of insertion of tracheal intubation, especially in one hour after surgery and according to Vangipuram the peak of complaints occurs in the first 2-6 hours after extubation. of these complaining patients recovered spontaneously within 24 hours of endotrachealintubation. [3,12]

According to Selvaraj et al who compared steroid gel with mometasone spray, 100 mcg found the incidence of sore throat 33.3% in the steroid gel group compared to 73.3% in the 100 mcg mometasone spray group.[23] According to Sarki et al. 36.7%, 66.7%; cough was 13.3%, 26.7%; and hoarseness was 23.3%, 30%, for betamethasone compared to mometasone spray 100 mcg.[10]

The percentage of incidence of sore throat, cough, and hoarseness at 0 hours in the Zentika and Wendy study did not differ much (± 10%). Meanwhile, at 24 hours in Wendy's study, there were still incidents of sore throat, cough, and hoarseness. The incidence of sore throat, cough, and hoarseness in this study at the 0 hours was 38.9%, 25%, and 19.4%, respectively, and at the 24th hour were 0%, 0%, and0 respectively. % when compared with Park et al's study with an incidence 24 hours after intubation of 18-22%.[13] It can be concluded that triamcinolone acetonide gel 0.1% and mometasone 100 mcg are effective in reducing the incidence cough, sore throat, and hoarseness within 24 hours after intubation endotracheal. According to research by Wirdyani et al, mometasone spray is effective in reducing the incidence cough, sore throat, and hoarseness.

Sore throat after surgery is an inflammatory pain that occurs in about 90% of patients undergoing endotracheal intubation. Pharmacologically, the mechanism of this mometasone spray is inactivating the factor *transcript of pro-inflammatory nuclear factor-κB*(NF-κB) and activator protein-1 (AP-1) so that inflammation and pain do not occur. [14] Dian et al's study, mometasone spray was more effective in reducing the incidence and degree of pain in the first hour after extubation compared to IV

dexamethasone. [7] The results at the first hour were also confirmed by the study of Arunchai et al, stating that the incidence of sore throat after surgery in the mometasone group spray at the 1st hour was 40% compared to the saline group at 75%.In Dian et al's study, mometasone spray is a moderate potency corticosteroid with a mechanism of action as a local anti-inflammatory, reducing capillary permeability and mucus production, causing vasoconstriction of the airway mucosa. The study of Freiri et al concluded that the clinical effect of mometasone spray in patients with allergic rhinitis consists of 2 phases, namely reducing the histamine level in nasal secretions (early phase response) which is seen within 30 minutes after administration and decreasing IL-6, IL-8, and eosinophils. during the slow phase response. The results of this study support previous studies that mometasone spray 100 mcg are effective in reducing the incidence of sore throat at the 1st hour. Whereas at -0, 6th, and 24th hours, the results obtained are p> 0,

The degree of cough between the two groups, the incidence of cough after endotracheal intubation, obtained a statistical analysis of the probability value of sore throat at 0, 1, 6, and 24 hours, respectively 0.836; 0.556; 0.555 and 1,000 ($p > 0.05$) so that it can be concluded that there is no difference in the incidence of cough at 0, 1, 6, and 24 hours between the two groups. The incidence of cough at 6, 24 hours in the triamcinolone acetonide gel 0.1% and mometasone 100 mcg groups was 5.6% and 2.8%, respectively, indicating the effectiveness of these drugs in reducing cough. So it was concluded that there was no significant difference between the two groups in reducing the incidence of cough in the first 24 hours post-extubation. Sore throat, coughing and hoarseness due to intubation are three things that are related to the location of the trauma,

The cough reflex is innervated by primary vagal afferent nerves such as *bronchopulmonary rapidly adapting receptors* (RAR) and *bronchopulmonary C fibers* which are triggered by mechanical stimulation and the presence of deformities of the airway epithelium such as mucus and smooth muscle contraction. These reflexes are in the larynx, trachea, and carina. RAR is very sensitive to histamine mediators, bradykinin, prostaglandins, *5-hydroxytryptamine, capsaicin, tachykinin* which is stimulated when there is trauma to the airway resulting in smooth muscle contraction, vasodilation, and edema. Inflammatory reactions can be treated with corticosteroid drugs such as triamcinolone acetonide. [16]

Muscles that play a role in the cough reflex include the laryngeal abductor muscles on the posterior cricoarytenoid and adductor muscles such as the thyroarytenoid and arytenoid. Local anesthetics such as lidocaine can block coughing as an antitussive by inhibiting neural sensory activity but their use is controversial because of their irritability.

The degree of hoarseness between the two groups, the incidence of hoarseness due to endotracheal intubation, obtained a statistical analysis of the probability value of hoarseness at 0, 1, 6, and 24 hours, respectively 0.204; 0.223; 0.555 and 1,000 (p> 0.05) so that it can be concluded that there is no difference in the incidence of hoarseness at 0, 1, 6, and 24 hours between the two groups. The percentage of sore throat, cough, and hoarseness after 24 hours post-extubation in the 0.1% triamcinolone acetonide gel group and 100 mcg mometasone spray was almost 0%. From tables 3, 4, and 5 the comparison of sore throat, cough, and hoarseness at hours 0,1,6, and 24 hours after endotracheal intubation between the two groups in percentage, the incidence of cough, sore throat, and hoarseness of the triamcinolone acetonide gel group 0, 1% was always greater but not significantly different from the 100 mcg mometasone spray group. This is due to reduced inflammation and edema because the application of local steroids reduces the inflammatory mediator production, by inhibiting phospholipase A2 and cyclooxygenase 2 during inflammation resulting in effective inhibition of inflammatory or ulcerative lesions in the mucosa.

Conclusion

There was no significant difference in the effectiveness of *mometasone spray* 100 mcg with 0.1% triamcinolone acetonide gel against sore throat, cough, and hoarseness within 24 hours of endotracheal intubation. Comparison of the effectiveness of mometasone spray 100 mcg and triamcinolone acetonide gel 0.1% in reducing the incidence of sore throat after endotracheal intubation at 1 hour, mometasone spray 100 mcg was more effective than triamcinolone acetonide gel 0.1% statistically P = 0.039 (P <0.05), while at 0, 6 and 24 hours there was no significant difference, with each statistical value of p = 0.543; 0.643; and 1,000 (P> 0.05). Comparison of the effectiveness of mometasone spray 100 mcg and triamcinolone acetonide gel 0.1% in reducing the incidence of cough after endotracheal intubation was statistically no significant difference at 0, 1, 6 and 24 hours with p-value = 0.836; 0.556; 0.555; and 1,000 (P > 0.05). Comparison of the effectiveness of mometasone spray 100 mcg and triamcinolone acetonide gel 0.1% in reducing the incidence of hoarseness in 24 hours after endotracheal intubation there was no statistically significant difference at 0, 1, 6, and 24 hours, respectively. each p-value = 0.204; 0.233; 0.555; and 1,000 (p > 0.05).

Thus, it is recommended that triamcinolone acetonide gel 0.1% and mometasone 100 mcg can be used before endotracheal intubation procedure to prevent and reduce the incidence of sore throat, cough, and hoarseness within 24 hours of endotracheal intubation. This research can be continued by examining

the comparison of 0.1% triamcinolone acetonide gel and 100 mcg mometasone spray in reducing sore throat with endotracheal intubation technique.

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