The Role of Dexamethasone in Reducing the Severity of Postoperative Sore Throat

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ABSTRACT:

BACKGROUND:

Effect of intravenously administered dexamethasone in reducing the incidence and severity of post operative sore throat in patients receiving general anesthesia with endotracheal intubation.

OBJECTIVE:

To investigate the effect of dexamthasone administered intravenously preoperative in reducing post opretive sore throat

METHODS:

80 patients receiving general anesthesia with endotracheal intubation in randomized double blinded placebo controlled were randomly assigned to two groups: group1(control) patients receiving normal saline 2 mLiv and group 2 (D) patients received dexamethasone 8 mg iv. After surgery, visual analogue scale(VAS) scores at rest and with effort (swallowing movment) for post operative sore throat were recorded.

RESULTS:

This study revealed that post operative sore throat during the first 24 hr following surgery was lower in dexamethasone group(D) compared to the control group(C).Nine (22.4%) patients in the dexamethasone group had postoperative sore throat, compared to 23(57.5%)patients in the control group ($p<0.01$). Postoperatively at one hour,threehours, six hours, 12 hours and 24 hours, the VAS scores for postoperative sore throat at rest and during effort were lower in dexamethasone group (D) compared to the control group($p<0.01$) at corresponding time intervals.

CONCLUSION:

Preoperative administration of dexamethasone 8mh iv reduces the incidence and severity of postoperative sore throat in patients receiving general anesthesia with endtacheal intubation.

KEY WORDS: endotracheal intubation, dexamethasone , postoperative sore throat.

INTRODUCTION:

About 80% of patients complain of sore throat after anesthesia and surgery, common causes:

1- Truma during tracheal intubation to the pharynx and tonsillar fauces by laryngoscope blade.
2- Truma to larynx by poorly stabilized tube .
3- Truma to the pharynx ; this may occur during passage of a nasogastric tube or insertion of an oropharyngeal airway.
4- other factors: the mucous membrane of the mouth, pharynx and upper airway are sensitive to the effect of unhumidified gases, the drying effect of anesthetic gases may cause postoperative sore throat[1].Cuff design, pressure affecting tracheal mucosal capillary perfusion [2,3] .

The common measures for the prevention of postoperative sore throat include the use of endotracheal tubes with a low intracuff pressure [3,4] , smaller- sized endotracheal tubes[5], topical lidocaine[6], steroid coated endotracheal tubes[7]and inhalation of steroids.

Dexamethasone is a potent synthetic member of the glucocorticoid class of steroid drugs. It has an anti-inflammatory and immunosuppressant. When taken orally, it is 26.6 times more potent than the naturally occurring hormone cortisol and 6.6 times more potent than prednisone. It has many uses including:

1- Anti-inflammatory uses: dexamethasone is used to treat many inflammatory and autoimmune conditions, such as rheumatoid arthritis and bronchospasm.

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2- Oncologic uses : cancer patients undergoing chemotherapy are given dexamethasone to counteract certain side effects of their antitumor treatment.
3- Endocrine uses: dexamethasone is the treatment of very rare disorder of glucocorticoid resistance. In adrenal insufficiency and Addisons disease, dexamethasone is prescribed when the patient does not respond well to prednisone or methylprednisolone.
4- obstetrics uses: dexamethasone may be given to women at risk of delivering prematurely to promote maturation of fetus lungs. This has been associated with low birth weight, although not with increased rates of neonatal death.
5- diagnostic uses: dexamethasone is also used in a diagnostic context, namely in its property to suppress the natural pituitary-adrenal axis [8].

Dexamethasone has contraindications for its use, some of these contraindications are relative :Existing gastrointestinal ulceration, Cushings syndrome, Severe forms of heart insufficiency, severe hypertension, Uncontrolled diabetes mellitus, Systemic tuberculosis, Severe systemic viral, bacterial and fungal infections, Pre-existing wide angle glaucoma and Osteoporosis [8].

METHODS:

80 patients of ASA class1,2 where allocated in randomized, double blinded placebo controlled study between ages25-55 and weighing 45-80kg. Patient history of recent respiratory tract infection or sore throat and preoperative use of analgesics or steroids excluded.

Patients examined preoperatively and patients with cardiac, respiratory, hepatic or major renal diseases were excluded from research. Any patients with diabetes mellitus and obesity also excluded. Monitoring during operation with electrocardiogram, non invasive blood pressure monitor and pulse oximeter was applied. The patients received premedication with 1-3 mg midazolam iv and fentanyl 50-100 ^{m}g iv. Patient either receive an injection of dexamethasone 8 mg iv or an equivalent volume of normal saline anesthesia randomly 30 min preinduction. Induction of anesthesia either with propofol 2 mg/kg iv. Endotracheal intubation done with aid of laryngoscopy blade 3# by same anesthiologist. Muscle relaxant atracurium were used for endotracheal intubation. Male patients received either an 8 or 8.5 mm internal diameter (ID) ETT and female patients received a 7 or 7.5 mm ID ETT.

Application of external laryngeal pressure to aid endotracheal intubation was recorded.The cuff was inflated just to the point of obtaining a seal in the presence of positive airway pressure. Maintenance of anesthesia with halothane and non depolarizing muscle relaxant. Muscle relaxtion was maintained with appropriate doses of atracurium until skin closure. At end of surgery, neuromuscular block was antagonized with neostigmine (0.035-0.07) and atropine (0.01mg/kg) and the lungs were ventilated with 100% oxygen until the patient was fully awake and had recovered from the muscle relaxant. The patients were administered O_2 via a face mask. Oropharyngeal suction before extubation was done under direct vision to avoid truma to the tissues as well as to confirm that secretion clearance was complete. Any patient need two attempts at passage of an endotracheal tube or presence of blood in the oropharyngeal suction or on the endotracheal tube after extubation also excluded from the study. Assessment of the patients post operatively for sore throat by VAS scores which is an imaginary line 10 cm starting from 0=no pain to 10=worst pain were recorded at rest and with effort (swallowing movement) at one hour postoperatively, and then at three hours, six hours, 12 hours, 24 hours interval by second investigator that unaware of study group. Metaclopromide 10 mg im was prescribed for nausea and/or vomiting. Hemodynamic variables (heart rate, mean arterial pressure,spo2) and occurrence of any intra or postoperative adverse events including nausea and or vomiting, coughing, hoarseness, dysphonia or dysghagia were recorded. Postoperative analgesia during 24hr was pethidine 1mg/kg and diclofenac 75 mg. Demograghic inter-group comparisons of demograghic data were made using Students t test results are expressed as mean $\pm$ SD . A value of $p < 0.05$ was considered statistically significant.

RESULTS:

Patient characteristics in the remaining 80 subjects were comparable with respect to age, weight, smoking habits and intubation time (table 1).

The number of patients requiring a second attempt at endotracheal intubation was similar in both groups, application of external laryngeal pressure during intubation and bucking or coughing on the endotracheal tube was different in each group (table II).

The incidence of postoperative sore throat during the first 24hr postoperatively was lower in the dexamethasone group (D) compared to the control group.

Nine (22.4%) patients in which dexamethasone was administrated suffered from postoperative sore throat compared to 23(57.5%) patients in the control group($P<0.01$, table III).

The VAS scores at one hour, three hours, six hours,12hours and 24 hours, during both rest and effort, were lower in group D than the control group($p<0.01$, tableIII).

The frequencies of adverse events during the 24 hours observation period were comparable in both groups. One patient in the control group experienced nausea and vomiting and two patients in the D group suffered from nausea and vomiting, however no patient in either group experienced coughing, hoarseness, dysghonia, dysghagia or other side effects.

Table I: Demograghic data.

	Group 1(control) (n=40)	Group 2 (D) (n=40)
Sex(M/F)	22/18	21/19
Age(year)	36.16±9.22	34.22±7.96
Weight(kg)	57.17±3.44	56.84±2.89
Duration of surgery(min)	128.33±15.5	120.70±13.8
Smokers(%)	13(32.4%)	17(42.7%)

Data are presented as mean ±SD or number of patients(%).

Table II: Factors associated with postoperative sore throat.

	Group1(control), N=40	Group2(D), N=40
Second laryngoscopy attempt(%)	0	1 (2.5%)
External laryngeal pressure(%)	8 (20%)	3 (7.5%)
Bucking or coughing during tracheal intubation (%)	2 (5%)	0
Nasogastric tube placement (%)	2 (5%)	1 (2.5%)

Data are number of patients(%).

Table III: VAS scores at rest and during effort at different time intervals and the incidence of sore throat amongst the groups.

	Group1 (control), n=40		Group2 (D), n=55	
Incidence Time	23(57.5%)		9*(22.4)	
	VAS (rest)	VAS (effort)	VAS (rest)	VAS (effort)
1 hr	3.1±1.0	3.8±1.2	1.1±0.3*	2.0±0.6*
3 hr	2.7±0.9	3.6±1.0	1.2±0.3*	1.8±0.4*
6 hr	2.4±0.8	3.3±0.9	1.0±0.2*	1.7±0.5*
12 hr	2.1±0.7	3.1±1.1	0.8±0.1*	1.6±0.6*
24 hr	1.8±0.5	3.0±1.0	0.6±0.2*	1.6±0.4*

Data represent the mean+(SD) or numbers of patients(%) .
*P<0.05 different from corresponding value of group 1.=visual analogue scale.

DISCUSSION:

The incidence and intensity of sore throat in the dexamethasone group were lower than in the control group in this study.

The major finding of the present study is that dexamethasone 8mg iv is effective in reducing anesthesia with laryngoscopy and orotracheal intubation 30 min preinduction. These findings are consistent with the topical application of corticosteroid on the upper air way prior to endotracheal intubation [7,8].

The dose and time of administration of dexamethasone in this study was similar to a previous investigation which showed a reduction in postoperative surgical pain in patients undergoing molar dental extraction[9]. Although a single dose of dexamethasone considered safe, long-term administration of corticosteroid is associated with adverse events, such as : glucose intolerance, susceptibility to infections, delayed wound healing, adrenal suppression and avascular necrosis of joints [10].

A previous study undertaken to evaluate the role of dexamethasone for the prevention of postoperative sore general incidence and severity of sore throat after endotracheal intubation did not address the confounding factors responsible for sore throat [11]. Wang *et al* studied the effect of dexamethasone on post-operative sore throat in patients undergoing thyroidectomy and concluded that dxamethasone decreases postoperative sore throat [11]. However, confounding factors influencing postoperative sore throat such as : type of endotracheal tube [2,3] , type of cuff and intracuff pressure [12], oral suctioning [1], coughing or bucking on the endotracheal tube, blood staining on endotracheal tube after extubation and history of smoking and lung disease [13] were not controlled, as their study was primarily undertaken to examine the influence of dexamethasone on postoperative nausea and vomiting.

In contrast, Hamelberg [14] found that there was an insignificant decrease in the incidence of post-operative sore throat when 1% hydrocortisone ointment is applied to endotracheal tube before intubation. Possible explanations for the differences between studies include anesthetic and interview techniques [15]. In 1991, Stride [16] used the same method as Hamelberg and concluded that hydrocortisone ointment wsa ineffective in prevention of postoperative sore throat, the probable reason being the presence of additive substances which are irritating to the tracheal mucosa.

Coricosteroids are capable of reducing the synthesis of inflammatory mediators, prostaglandins and leucotrienes by inhibiting phospholipase A2 through production of calcium-dependent phospholipids binding proteins called annexins, taking several hours [17], and by the inhibition of cyclo-oxygenase-2 during inflammation [18].

Park et al showed that the prophylactic use of 0.2 mg/kg of dexamethasone significantly decreased the incidence and severity of sore

throat and hoarseness at 1 and 24 hour after tracheal extubation of a double-lumen endobronchial tube [19].

A steroid gel applied widely over an endotracheal tube effectively mitigated postoperative sore throat and hoarseness compared with application of lidocaine gelly, which does not possess any intrinsic anti-inflammatory activity [20].

CONCLUSION:

Prophylactic single dose of dexamethasone 8 mg iv reduces the incidence and severity of sore throat following endotracheal intubation, with no apparent side effect.

Recommendations

We recommended the usage of iv dexamethasone in preinduction of general anesthesia.

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