

Effect of Nebulized Dexamethasone and Ketamine on Sore Throat after Thyroid Surgeries, Mini Review

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Abstract

Background: Postoperative sore throat is common after thyroid surgery due to manipulation of the trachea during positioning, dis-section of the gland and the neck being hyperextended leading to injury of the tracheal mucosa and vocal folds. The aim of the present study to evaluate effect of Nebulized Dexamethasone and Ketamine on Sore Throat after Thyroid Surgeries. **Conclusions:** The use of pre-operative dexamethasone and ketamine nebulization reduced the incidence and severity of POST during early post-operative period in patients receiving general anesthesia with tracheal intubation.

Keywords: POST, Dexamethasone, Ketamine, Nebulization, Sore throat

Introduction:

Postoperative Sore Throat (POST) is ranked by the American anesthesiologist as the 8th most undesirable subjective complaint following General Anesthesia (GA)⁽¹⁾. The severity of POST is categorized on a 4-point scale. The severity of POST is at its peak two to four hours after extubation and decreases gradually in 24 hours. POST is an undesirable outcome following general anesthesia with tracheal intubation, which occurs in 30% to 80% of patients⁽²⁾. POST may affect up to 42% of postoperative pediatric patients⁽³⁾.

Postoperative Sore Throat Following Tracheal Intubation

Etiology:

The etiology of POST is multifactorial, including the choice of airway device, high Endotracheal Tube (ETT) cuff pressure, surgical manipulation of the airway, airway suctioning and the type and length of surgery⁽⁴⁾. Preoperative risk factors such as asthma or a dry cough increase the probability of developing POST⁽⁵⁾.

Risk factors:

Several risk factors have been identified been tracheal intubation and increase the incidence of postoperative sore throat. 40% incidence⁽⁵⁾. Subsequent logistic

regression analysis demonstrated that female sex, pre-existing lung disease, duration of anesthesia and the presence of a blood-stained tracheal tube on extubation were all associated with the greatest risk of postoperative sore throat. In addition, age was inversely related to the risk⁽⁶⁾. Women may be more likely to report any postoperative complication, thereby potentially introducing reporting bias, which could account for the higher incidence seen in women⁽⁷⁾.

Incidence:

The highest POST incidence was observed after tracheal intubation (45.4%) when compared to laryngeal mask (17.5%) and open mask (3.3%)⁽⁸⁾. A prospective study of 809 patients found a 40% incidence⁽⁹⁾.

Severity:

Postoperative sore throat (POST) is a common occurrence following general anesthesia and, although clinicians often regard it as a relatively minor complication, patients perceive avoidance as being of great importance **Macario et al**⁽¹⁾. POST is ranked by the American anesthesiologist as the 8th most undesirable subjective complaint following General Anesthesia (GA). The severity of POST is categorized on a 4-point scale as described by Stout et al.⁽¹⁰⁾ The severity of POST is at its peak two to four hours after extubation and decreases gradually in 24 hours **Jaensson et al**⁽³⁾. POST may affect up to 42% of postoperative pediatric patients⁽¹¹⁾.

A similar reduction in the incidence was seen in a randomised controlled trial that included 100 female patients when a 6.0-mm ID rather than a 7.0-mm ID tracheal tube was used (27.1% vs 51.1%, respectively)⁽³⁾. In addition, a subsequent meta-analysis of trials involving 509 female patients suggested that the use of 6.0 mm rather than 7.0-mm ID tracheal tubes reduced the incidence of postoperative sore throat both in the recovery unit and at 24 h postoperatively, with risk reductions of 0.56 and 0.69, respectively⁽¹²⁾.

It may appear somewhat surprising that a 1-mm reduction in internal diameter should result in such a marked decrease in the rate of sore throat, since it is only the tracheal tube cuff that is in contact with the trachea. However, what patients describe as 'sore throat' encompasses a wide range of conditions including pharyngitis, laryngitis, tracheitis, cough, hoarseness or dysphagia. Smaller tracheal tubes subjectively provide a better view of the passage of the tube through the larynx, which may reduce the trauma associated with laryngoscopy and tube insertion⁽¹³⁾.

Undertaking tracheal intubation without neuromuscular blockade increases the incidence of postoperative sore throat **Combes et al**⁽¹⁴⁾. It has been suggested that the use of suxamethonium may increase sore throat, possibly due to fasciculation and subsequent myalgia of striated pharyngeal muscle fibres. A study, however, found a similar incidence and severity following the use of suxamethonium and rocuronium⁽¹⁵⁾.

Double-lumen endobronchial tubes are associated with a greater risk of sore throat, although those made from silicon may have lower rates than polyvinylchloride **Clayton-Smith et al⁽¹⁶⁾, Jeon et al⁽¹⁷⁾**. In addition, insertion with the tracheal lumen facing anteriorly during passage through the vocal cords reduces rates by 50%⁽¹⁸⁾. A meta-analysis demonstrated that bronchial blockers are associated with a lower incidence compared with double lumen tubes all types of bronchial blocker appear to be similarly efficacious in this regard. The type of single-lumen tracheal tube has no effect⁽¹⁹⁾.

Prevention:

It is necessary to search for pre-emptive strategies to relieve POST. Different approaches attenuating POST, including non-pharmacological or pharmacological approaches have been evaluated. The non-pharmacological techniques include: using supraglottic airway devices and cuffed oral tracheal tubes. Likewise, gentle esophageal suctioning, minimizing intracuff pressure to be less than 20 cm H₂O and extubation when the tracheal cuff is fully deflated; have the advantage of decreasing POST occurrence⁽²⁰⁾.

The pharmacological methods include various pre-, intra-, and postoperative drugs such as corticosteroids, local anesthetic agents, Nonsteroidal Anti-Inflammatory Drugs (NSAIDs), α^2 agonists and ketamine. The ease of administration, ability to reach distal airways and safety; make nebulization a good method of drug delivery⁽²¹⁾.

Steroids:

Dexamethasone is a widely used potent corticosteroid with analgesic, anti-inflammatory, and antiemetic properties. It has minimal side effects after a single dose administration and may have the potential for reducing the incidence of POST during recovery, of which the mechanism is probably by modifying the inflammatory process caused by tissue injury^(22,23).

Dexamethasone is the most popular steroid studied in this regard. A meta-analysis that included seven randomized controlled trials suggested that an intravenous dose greater than 0.1 mg.kg that reduced the incidence and severity of postoperative sore throat at 24h and standardized mean difference⁽²⁴⁾. The smallest tracheal tube used in these studies was 7.0-mm ID, one study used only double lumen tubes and tracheal cuff pressures were controlled in only one study. The application of triamcinolone paste (0.1%) to the tracheal tube and cuff was associated with a reduction in the incidence and severity of sore throat at 24 h compared with chlorhexidinegel⁽²⁵⁾. Similarly, betamethasone gel (0.05%) reduced the incidence compared with 2% lidocaine gel⁽²⁶⁾. Preoperative inhaled fluticasone and budesonide have also been shown to reduce the incidence and severity of postoperative sore throat⁽²⁷⁾.

Potential severe side effects of long-term administration of dexamethasone, such as hyperglycemia, problems with wound healing, susceptibility to infection, were not reported in all the studies. Although side effects of using dexamethasone for the prevention of POST were referred in some studies, most were minimal ones with no statistical difference with placebo⁽²⁴⁾.

Ketamine

Ketamine has multiple uses in anesthesia, the effect of ketamine on the respiratory and circulatory systems is different from that of other anesthetics. When used at anesthetic doses, it will usually stimulate rather than depress the circulatory system. It is used as an IV induction agent in the emergency setting in shocked patients, In patients with cardiac tamponade and restrictive pericarditis, it provides excellent anesthetic induction, and maintenance^(28,29).

It has bronchodilating effect and profound analgesia allowing use of high oxygen concentration. It is considered to be the Intravenous (IV) induction agent of choice in patients with active bronchospasm⁽³⁰⁾.

Pharmacokinetic properties of inhaled ketamine have been studied officially in previous studies. It can be given in dose 25-50 mg nebulization to reduce POST⁽³¹⁾.

Ketamine has been used successfully to treat acute pain in intranasal form. Nebulised ketamine as an analgesic bypassing first pass metabolism and without the need for intravenous access, used to decrease the need for rescue analgesia during PACU care⁽³²⁾.

The most common side effects include; tachycardia and hypertension. Ketamine is traditionally avoided in people with or at risk of intracranial hypertension (ICP) due to concerns about ketamine causing increased intracranial pressure. In 10-20% of patients at anesthetic doses experience adverse reactions that occur during emergence from anesthesia, reactions that can manifest as seriously as hallucinations and delirium. Tonic-clonic movements are reported at higher anesthetic doses in greater than 10% of patients⁽³³⁾.

Other less common side effects include; Transient erythema, anorexia, nausea, increased salivation, vomiting, pain or exanthema of the injection site, double vision, increased intraocular pressure, nystagmus, tunnel vision, airway obstruction, apnea, increased bronchial secretions, respiratory depression, laryngospasm, anaphylaxis, dependence and emergence reaction⁽³⁴⁾.

Conclusion:

The use of pre-operative dexamethasone and ketamine nebulization reduced the incidence and severity of POST during early post-operative period in patients receiving general anesthesia with tracheal intubation. This technique adds to the

armamentarium of the anaesthetist in management of the ‘little big problem’ of POST.

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