Journal of Cardiovascular Disease Research

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 09, 2024

**Original research article**

# Efficacy of dexamethasone versus ketamine soaked pharyngeal pack for prevention of sore throat following Oro-nasal surgeries

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**Abstract**

It is postulated that post-intubation airway related adverse effects are due to inflammation and irritation of the airway, which occur during intubation, as insertion of an endotracheal tube may irritate or damage the mucosal tissue, causing edema and inflammation. The incidence and severity of sore throat post-intubation is highly correlated to the endotracheal cuff design, in particular the cuff-trachea contact area. Patients were advised overnight fasting & were premedicated with Tab. Pantoproazole 40 mg and Tab. Ondansetron 8 mgs on the previous day of surgery and on the morning of surgery with few sips of water. A proforma was used to collect the data which includes patient's demographic parameters, indication for surgery, the anaesthetic details, intra operative and post- operative monitoring. There was a significant difference in Post-operative Sore throat Distribution at all intervals.

**Keywords:** Dexamethasone, ketamine, sore throat

## Introduction

Symptoms of post-operative discomfort such as sore throat, hoarseness and dysphagia are common and are associated to endotracheal intubation [1]. Post-operative sore throat occurs in 21-65% of patients receiving general anesthesia. It is rated as 8th most common adverse effect in the post-operative period [2].

Pharyngeal packs are commonly used in oro-nasal surgeries and are disputed to increase the incidence of post-operative sore throat but are deemed necessary to prevent tracheal contamination.

It is postulated that post-intubation airway related adverse effects are due to inflammation and irritation of the airway, which occur during intubation, as insertion of an endotracheal tube may irritate or damage the mucosal tissue, causing edema and inflammation [3]. The incidence and severity of sore throat post-intubation is highly correlated to the endotracheal cuff design, in particular the cuff-trachea contact area. Low-pressure high-volume cuffs cause a larger area of trachea mucosal erosion compared to high-pressure low-volume cuffs [4].

Over-inflation of ETT cuffs, resulting in high cuff pressures, has been associated with trachea mucosal damage, and exacerbation of post-intubation airway related adverse effects [5]. Cuff pressures above 39 cm $H_2O$ are shown to reduce trachea mucosal microcirculation [6].

As a cuffed ETT is inevitable in some cases, the potential airway irritation and inflammation may be minimized by ensuring a swift and smooth intubation, and monitoring intra-cuff pressure.

Women are almost twice more likely to suffer from sore throat than men after endotracheal intubation [7]. There could be minor injury to the tracheal mucosa due to laryngoscopy and the ETT. The female larynx with small anatomy does not permit insertion of a standard tube, ETT 7.0, without inducing symptoms within the throat [8]. Pharmacological and non-pharmacological intervention have been used to attenuate post-operative sore throat. Careful airway instrumentation, smaller sized ET tube, lubricating ET tube with jelly, gentle suctioning, reducing intra cuff pressure are some among non-pharmacological methods.

Pharmacological measures include ketamine, dexamethasone, $MgSO_4$ beclomethasone inhalation and gargling with azulene sulfonate, aspirin, benzydamine hydrochloride and licorice. Intracuff administration of alkalized lignocaine has also been used.

The inotropic glutamate receptors N-methyl-D-aspartate (NMDA), alpha amino -3 hydroxyl-5 methyl - 4

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 09, 2024

isoxazol - eprapionic acid, and the kainite receptors are found in the CNS as well as the peripheral nerves.Activation of these receptors results in nociceptive behavior and contribute to inflammatory pain. Peripherally administered NMDA receptors antagonists are involved in anti-nociception [9].
Ketamine [10] - A NMDA receptor antagonist is involved in anti-nociception and anti-inflammatory cascade by reducing nuclear factor beta (B) activity and tumour necrosis factor alpha production [9].
Dexamethasone is a potent synthetic glucocorticoid with analgesic and anti-inflammatory effects and has reported to be useful in the treatment of sore throat [12].
In recent years, various studies using ketamine and dexamethasone have come up, for the prevention of post-operative sore throat. They have been used in various modalities like inhalation, nebulization, gargling and Intravenous routes No studies exists in the literature, where drug soaked pharyngeal pack have been used for the prevention POST.

**Methodology**

**Inclusion Criteria**

1. Patients who are willing to give written /informed consent.
2. Patients aged 18-75 years of both genders.
3. Patients scheduled for elective oro -nasal surgeries under general anaesthesia.
4. Patients under Physical status ASA-1 and ASA-2.

**Exclusion criteria**

1. Patients refusing to take part in study.
2. Patients under physical status ASA-3 and ASA-4.
3. Pregnant women.
4. Patients with known allergy to study drugs.
5. Patients with history of pre-op sore throat, chronic obstructive pulmonary disease, upper respiratory tract infection.
6. Patients with anticipated difficult airway.
7. Patients with history of head injury.

**Preanaesthetic examination and preparation**

After obtaining written informed consent, participation consent and approval from institutional ethical committee, patients were be randomly allocated to one of the three groups using numbers generated from www.random.org.
Preanesthetic assessment was done one day prior to the surgery. A detail history of present and past medical illness, past h/o of anaesthetic exposure, concomitant history of drug allergy and intake of any medications in preoperative period was recorded.
General physical examination and systemic examination of the patients was done. Routine investigation and relevant specific investigations were done. Height in cms and weight in kgs were recorded.
Patients were advised overnight fasting & were premedicated with Tab. Pantoproazole 40 mg and Tab. Ondansetron 8 mgs on the previous day of surgery and on the morning of surgery with few sips of water.
A proforma was used to collect the data which includes patient's demographic parameters, indication for surgery, the anaesthetic details, intra operative and post- operative monitoring.

**Drug and Dilutions**

Patients were randomly allocated into three groups.

- **Group K:** Throat pack soaked in Ketamine 1mg/kg diluted in 15 ml normal saline.
- **Group D:** Throat pack soaked in dexamethasone 8mg diluted in 15 ml normal saline.
- **Group N:** Throat pack soaked in 15 ml Normal saline.

**Results**

**Table 1:** Post-Operative Sore Throat Distribution between three groups at different intervals of time

| | | GROUP | | | | | | p value |
|---|---|---|---|---|---|---|---|---|
| | | Ketamine | | Dexamethasone | | Normal Saline | | |
| | | Count | % | Count | % | Count | % | |
| 0 HR | 0 | 35 | 100.00% | 31 | 88.57% | 25 | 71.43% | 0.002* |
| | 1 | 0 | 0.00% | 4 | 11.43% | 10 | 28.57% | |
| 1 HR | 0 | 35 | 100.00% | 30 | 85.71% | 24 | 68.57% | 0.005* |
| | 1 | 0 | 0.00% | 5 | 14.29% | 9 | 25.71% | |
| | 2 | 0 | 0.00% | 0 | 0.00% | 2 | 5.71% | |
| 2 HR | 0 | 32 | 91.43% | 28 | 80.00% | 21 | 60.00% | 0.001* |
| | 1 | 3 | 8.57% | 7 | 20.00% | 7 | 20.00% | |
| | 2 | 0 | 0.00% | 0 | 0.00% | 7 | 20.00% | |

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 09, 2024

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 6 HR | 0 | 27 | 77.14% | 24 | 68.57% | 15 | 42.86% | 0.011* |
| | 1 | 8 | 22.86% | 7 | 20.00% | 9 | 25.71% | |
| | 2 | 0 | 0.00% | 4 | 11.43% | 10 | 28.57% | |
| | 3 | 0 | 0.00% | 0 | 0.00% | 1 | 2.86% | |
| 12 HR | 0 | 26 | 74.29% | 20 | 57.14% | 11 | 31.43% | 0.020* |
| | 1 | 6 | 17.14% | 8 | 22.86% | 11 | 31.43% | |
| | 2 | 3 | 8.57% | 4 | 11.43% | 8 | 22.86% | |
| | 3 | 0 | 0.00% | 3 | 8.57% | 5 | 14.29% | |
| 24 HR | 0 | 21 | 60.00% | 17 | 48.57% | 3 | 8.57% | < 0.001* |
| | 1 | 8 | 22.86% | 7 | 20.00% | 12 | 34.29% | |
| | 2 | 5 | 14.29% | 6 | 17.14% | 9 | 25.71% | |
| | 3 | 1 | 2.86% | 5 | 14.29% | 11 | 31.43% | |

There was a significant difference in Post-operative Sore throat Distribution at all intervals (from 0 hour to 24 hours).

**Table 2:** Post-Operative Dysphagia Distribution between three groups at different intervals of time

| | | GROUP | | | | | | p value |
|---|---|---|---|---|---|---|---|---|
| | | Ketamine | | Dexamethasone | | Normal Saline | | |
| | | Count | % | Count | % | Count | % | |
| 0 HR | 0 | 35 | 100.00% | 35 | 100.00% | 34 | 97.14% | 0.364 |
| | 1 | 0 | 0.00% | 0 | 0.00% | 1 | 2.86% | |
| 1 HR | 0 | 35 | 100.00% | 34 | 97.14% | 32 | 91.43% | 0.162 |
| | 1 | 0 | 0.00% | 1 | 2.86% | 3 | 8.57% | |
| 2 HR | 0 | 35 | 100.00% | 32 | 91.43% | 27 | 77.14% | 0.007* |
| | 1 | 0 | 0.00% | 3 | 8.57% | 8 | 22.86% | |
| 6 HR | 0 | 35 | 100.00% | 31 | 88.57% | 21 | 60.00% | < 0.001* |
| | 1 | 0 | 0.00% | 4 | 11.43% | 14 | 40.00% | |
| 12 HR | 0 | 32 | 91.43% | 26 | 74.29% | 18 | 51.43% | 0.001* |
| | 1 | 3 | 8.57% | 9 | 25.71% | 17 | 48.57% | |
| 24 HR | 0 | 29 | 82.86% | 20 | 57.14% | 15 | 42.86% | 0.002* |
| | 1 | 6 | 17.14% | 15 | 42.86% | 20 | 57.14% | |

There was significant difference in Post-Operative Dysphagia Distribution from 2 hour to 24 hours. At other intervals there was no significant difference in Post-Operative Dysphagia Distribution between three groups.

**Table 3:** Oral Secretions Distribution between three groups

| | | Group | | | | | |
|---|---|---|---|---|---|---|---|
| | | Ketamine | | Dexamethasone | | Normal Saline | |
| | | Count | % | Count | % | Count | % |
| Oral Secretions | 0 | 30 | 85.71% | 33 | 94.29% | 29 | 82.86% |
| | 1 | 5 | 14.29% | 2 | 5.71% | 6 | 17.14% |

$\chi$ 2 = 2.283, df = 2, p = 0.319

14.29% had Oral Secretions in Ketamine Group, 5.71% had in Dexamethasone and 17.14% had in Normal Saline Group.
There was no significant difference in Oral Secretions distribution between three groups.

**Table 4:** Post-Operative Disorientation Distribution between three groups

| | | Group | | | | | |
|---|---|---|---|---|---|---|---|
| | | Ketamine | | Dexamethasone | | Normal Saline | |
| | | Count | % | Count | % | Count | % |
| Post-Operative Disorientation | 0 | 33 | 94.29% | 35 | 100.00% | 34 | 97.14% |
| | 1 | 2 | 5.71% | 0 | 0.00% | 1 | 2.86% |

$\chi$ 2 = 2.059, df = 2, p = 0.357

5.71% had Post-Operative Disorientation in Ketamine Group and 2.86% had in Normal Saline Group.
There was no significant difference in Post-Operative Disorientation distribution between three groups.

**Discussion**

**Post-operative sore throat**

Rajan *et al.* (2017) [2] and Canbay *et al.* (2008) [11] used four point scale for evaluating post-operative sore throat that was used in our study.

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 09, 2024

Parameters observed include incidence and severity of post-operative sore throat and dysphagia at 0, 1, 2, 6.12 and 24 hours.

**Post at 0 hour (immediate post op)**

In our study, there was no sore throat in Group K. The incidence of mild sore throat in Group D was 11.43%% compared to Group N 28.57% and the results were statistically significant. (p 0.002).

Canbay *et al*. (2008), reported the incidence of mild, moderate and severe POST in ketamine group as 25%, 10% and 0% respectively at 0 hour [11].

Our study did show significant reduction in incidence in sore throat similar to Canbay *et al*.

**Post at 1 hour**

In our study, there was no sore throat in Group K at 1 hour. The incidence of mild sore throat in Group D was 5.71% compared to Group N where incidence of mild and moderate sore throat was 25.71% and 5.71% respectively. The results were statistically significant. (p0.005).

According to the POST study by Bagchi *et al*., intravenous injection of 0.2 mg/kg dexamethasone reduced the incidence of POST at 1 hour was 18.8% of mild grade compared to mild and moderate sore throat of 42.26% and 6.4% respectively in control group [12].

**Post at 2 hour**

In our study, there was mild sore throat in Group K 8.57%, in Group D 20.00% and in Group N, incidence of mild and moderate sore throat were 20.00% each. The results were statistically significant. (p0.001).

Canbay *et al*. (2008) [11], reported the incidence of mild, moderate and severe POST in ketamine group as 40%, 0% and 0% respectively at 2 hour compared to control group 57%, 17% and 0% respectively and the difference was significant.

Our study did show significant reduction in POST similar to other studies at 2 hours.

**Post at 6 hour**

In our study, there was mild sore throat in Group K 22.86%, in Group D incidence of mild and moderate sore throat was 20.00% and 11.43% respectively and Group N, the incidence of mild, moderate and severe sore throat were 25.71%,28.57% and 2.86% respectively. The results obtained were statistically significant (p 0.011).

Canbay *et al*. (2008), reported the incidence of mild, moderate and severe POST in ketamine group as 40%, 0% and 0% respectively at 4 hour compared to control group 22%, 13% and 22% respectively. More patients in control group suffered severe POST compared to ketamine group [11].

Shresta *et al*. [13], reported the incidence of mild, moderate and severe POST in ketamine gargle group as 35%,0%and 0% respectively compared to normal saline group as 60%,15% and 0% respectively at 4 hours, the difference not being statistically significant ($p$>0.05).

In a study by Bagchi *et al*., incidence of POST at 6 hour in injection dexamethasone group was 25% mild and 2.1% moderate sore throat compared to mild sore throat of 51.1%% in control group [12].

Our study did show a significant difference similar to study done by above authors.

**Post at 12 hour**

In our study, there was mild and moderate sore throat in Group K 17.14% and 8.57% respectively, In Group D incidence of mild, moderate and severe sore throat were 22.86%, 11.43%and 8.57% respectively and In Group N, the incidence of mild, moderate and severe sore throat were 31.43%, 22.86% and 14.29% respectively. The results obtained were statistically significant (p 0.020).

**Post at 24 hour**

In our study, there was mild, moderate and severe sore throat in Group K 22.86%,14.29% and 2.86% respectively, In Group D incidence of mild, moderate and severe sore throat were 20%. 17.14% and 14.29% respectively and In Group N, the incidence of mild, moderate and severe sore throat were 34.29%, 25.71% and 31.43% respectively. The results obtained were statistically significant ($p$< 0.001).

Canbay *et al*. (2008), reported the incidence of mild, moderate and severe POST in ketamine group as 30%, 0% and 0% respectively at 24hour compared to control group 22%, 13% and 26% respectively. More patients had severe sore throat in control group compared to ketamine group [11].

In a study by Bagchi *et al*., incidence of POST at 24 hour in injection dexamethasone group was 29.2% mild sore throat compared to 29.8% in control group [12].

Our study did show a significant difference similar to study done by above authors [14].

**Conclusion**

In conclusion, our study demonstrated that ketamine and dexamethasone soaked pharyngeal packs were efficacious than normal saline in reducing the incidence and severity of postoperative sore throat and

ISSN:0975 -3583,0976-2833 VOL 15, ISSUE 09, 2024

dysphagia for the first 24 hours following extubation without causing any drug related side effects. It was found that ketamine soaked pharyngeal pack was more effective in preventing POST compared to dexamethasone.

**References**


1. McHardy FE, Chung F. Postoperative sore throat: cause, prevention and treatment. Anaesthesia. 1999 May;54(5):444-453.
2. Rajan S, Malayil GJ, Varghese R, Kumar L. Comparison of usefulness of ketamine and magnesium sulfate nebulizations for attenuating postoperative sore throat, hoarseness of voice, and cough. Anesthesia, essays and researches. 2017 Apr;11(2):287.
3. Ayoub MC, Ghobashy A, McGrimely L, *et al*. Wide spread application of topical steroids to decrease sore throat, hoarseness and cough after tracheal intubation. Anesth. Analg 1998;87(3):714-716.
4. Mandoe H, Nikolajsen L, Lintrup U, Jepsen D, Moolgaard J. Sore throat after endotracheal intubation. Anesth. Analg 1992;74(6):897-900.
5. Combes X, Schauvliege F, Peyrouset O, *et al*. Intracuff pressure and tracheal morbidity: Influence of filling with saline during nitrous oxide anesthesia. Anesthesiology. 2001;95(5):1120-1124.
6. Loeser EA, Hodges M, Gliedman J, Stanley TH, Johansen RK, Yonetani D, *et al*. Tracheal pathology following short term intubation with low and high pressure endotracheal tube cuffs. Anesth. Analg 1978;57(5):577-579.
7. Myles PS, Hunt JO, Moloney JT. Postoperative minor complications. Comparison between men and women. Anaesthesia. 1997;52:300-306.
8. Randestad A, Lindholm CE, Fabian P. Dimensions of the cricoid cartilage and the trachea. Laryngoscope. 2000;110:1957-1961.
9. Rajkumar G, Eshwori L, Konyak PY, Singh LD, Singh TR, Rani MB, *et al*. Prophylactic ketamine gargle to reduce post-operative sore throat following endotracheal intubation. Journal of Medical Society. 2012 Sep 1;26(3):175.
10. James P, Rathmell, Carl E, Rosow Intravenous Sedatives and Hypnotics In: Flood P, Rathmell JP, Shafer S, editors. Stoelting's Pharmacology and Physiology in Anesthetic Practice. 5th ed. New Delhi Wolters Kluwer; c2017. p. 186-193.
11. Canbay O, Celebi N, Sachin A, Celiker V, Ozgen S, Aypar U, *et al*. Ketamine gargle for attenuating postoperative sore throat. British Journal of Anaesthesia. 2008 Apr 1:100(4):490-493.
12. Bagchi D, Mandal MC, Das S, Sahoo T, Basu SR, Sarkar S, *et al*. Efficacy of intravenous dexamethasone to reduce incidence of postoperative sore throat: A prospective randomized controlled trial. Journal of Anaesthesiology, clinical pharmacology. 2012 Oct;28(4):477.
13. Shrestha SK, Bhattarai B, Singh J. Ketamine gargling and postoperative sore throat. Journal of the Nepal Medical Association, 2010 Oct 1, 50(180).
14. Rajkumar G, Eshwori L, Konyak PY, Singh LD, Singh TR, Rani MB, *et al*. Prophylactic ketamine gargle to reduce post-operative sore throat following endotracheal intubation. Journal of Medical Society. 2012 Sep 1;26(3):175.