

# A study on the effectiveness of ketamine gargle in postoperative sore throat

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## Abstract

**Background and aims:** Postoperative sore throat (POST) is a complication in patients undergoing endotracheal intubation for general anaesthesia. Avoiding POST symptoms is a major priority for these patients. This study was done to primarily assess the incidence and severity of POST in the distilled water gargle group and compare it with Ketamine gargle group in patient undergoing elective surgical procedures performed under GA with tracheal intubation. **Methods:** Patients were randomly allocated in to two groups of 30 Patients each. Group K For 30 patients, 50mg Ketamine diluted in 29 ml of distilled water was given. Group C-For 30 patients, 30 ml of distilled water was given. all Patients were made to gargle for 30 seconds, 5minutes before induction. In the postoperative period the incidence, duration and severity of sore throat was evaluated at 4, 8 and 24 hours. **Results:** Demographic characteristics such as age, height, sex, weight, duration of surgery were comparable, Incidence of postoperative sore throat was higher in control group at all the time compared to the Ketamine group. Most of the patients were complaining of mild sore throat in both the groups at 4hr, 8hr and 24 hr. But none had severe sore throat in Ketamine group where as in control group 23.3% at 4hr, 10% at 8hr and 3.3% at 24hr complained of severe sore throat. At 24<sup>th</sup> hour the incidence and severity of sore throat was significantly reduced in both the groups 4 (13.3) in group K and 14(46.7%) in group C. **Conclusion:** The incidence of POST in the patients undergoing GA with endotracheal intubation for routine surgical cases is quite common and this throat discomfort remains for next 24 hrs and Ketamine gargle significantly reduces the incidence and severity of POST.

**Key Word:** post operative sore throat, ketamin, gargle, endotracheal tube.

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## INTRODUCTION

Postoperative sore throat (POST) is a well recognized complication that remains unresolved in patients undergoing endotracheal intubation for general anaesthesia with reported incidence of 28% to 80%.<sup>1-5</sup> Avoiding POST symptoms is a major priority for these patients because preventing postoperative complications contributes to patient satisfaction. POST had been rated by patients as the 8<sup>th</sup> most undesirable outcome in the

postoperative period.<sup>6</sup> It also increases the duration of hospital stay and delays discharge, especially in day care surgeries. Routine tracheal intubation for elective surgical procedures can result in inadvertent trauma to the airway which accounts for POST symptoms. Numerous non-pharmacological and pharmacological measures have been used for attenuating POST with variable success. There is increasing amount of experimental data showing that NMDA receptors are found not only in the CNS but also in the peripheral nerves.<sup>17,18</sup> Ketamine being an NMDA receptor antagonist, its topical administration involved in anti-nociception and anti-inflammatory cascade. Thus helps in prevention of POST.<sup>10</sup> In this study we plan To compare the effectiveness of ketamine (K) gargle with placebo(C) with water gargle before induction of anaesthesia, in preventing POST after endotracheal intubation, and Severity of throat discomfort in 2-groups- ketamine (K) and control (C) Ketamine is easily available and a gargle may be a simple, cost-effective method to decrease POST symptoms.

**METHODS**

After approval from the institutional ethical committee, 60 adult patients of American society of Anaesthesiologists physical status 1 and 2 scheduled for elective surgery under General anaesthesia were enrolled. Patients were randomly allocated into two groups.

**Group(C):** control group, distilled water 30ml

**Group(K):** ketamine 50 mg in 29ml of water

Patients with a recent history of preoperative sore throat, More than two attempts at intubation, Mallampatti grade >2, Use of gum elastic bougie or stylet to facilitate intubation, Known allergies to ketamine, Known case of bronchial asthma, Patients having oropharyngeal procedures or bronchoscopy, patients who remained intubated after discharge from recovery room, Head and neck surgeries, anticipated rapid sequence induction or airway difficulty were excluded from the study. Written informed consent was obtained from all the patients who filled the inclusion criteria and were willing to participate in the study. After shifting patient to the operating room, IV access was obtained on the forearm with 18G IV cannula and ringer lactate started. Patients were monitored for HR, NIBP, SpO2.

In Group-K and Group-C all Patients were made to gargle for 30 seconds, 5 minutes before induction. Premedicated with intravenous inj. Glycopyrolate 0.02 mg/kg, inj. Midazolam 0.05 mg/kg and inj. Fentanyl 2µg/kg. Induction with intravenous inj. Propofol 2mg/kg and Inj. Vecuronium bromide 0.1mg/kg. Trachea was intubated with a soft seal cuffed sterile poly vinyl chloride endotracheal tube. In males 8mm or 8.5mm internal diameter endotracheal tube was used and in females 7mm or 7.5mm internal diameter endotracheal tube was used. Endotracheal tube cuff was filled with the minimal volume of room air required to prevent an audible leak.

Anaesthesia was maintained using 70% Nitrous oxide in Oxygen, Isoflurane and maintenance dose of Vecuronium bromide 0.05mg/kg with intermittent positive pressure ventilation. Adequate depth was maintained to prevent bucking during perioperative period.

At the end of surgery, the muscle relaxation was reversed with a combination of Neostigmine 0.05 mg/kg and Glycopyrrolate 0.01 mg/kg. When all the extubation criteria were met (full reversal of neuromuscular blockade i.e. sustained head lift for 5 second, sustained hand grip for 5 second, spontaneous ventilation and the ability to follow verbal commands with eye opening), tracheal extubation was immediately done following gentle suctioning of oral secretions by a 12F soft suction catheter, and patients were transferred to the postanaesthesia care unit.

At arrival of patients in the postanaesthesia care unit at 4, 8 and 24 h, POST was assessed. POST was graded on a 4-point verbal analog scale (VAS) pain score (0–3):

0 = no sore throat,

1 = mild sore throat (complains of sore throat only on asking)

2 = moderate sore throat (complains of sore throat on his/her own)

3 = severe sore throat (change of voice or hoarseness, associated with throat pain)

In the postoperative ward patients were also monitored for any drug related side effects.

**RESULTS**

60 patients, 30 patients in Group K (Ketamine) and 30 patients in Group C (Control) were enrolled. To compare the effectiveness of ketamine (K) gargle with placebo (C) with water gargle before induction of anaesthesia, in preventing POST after endotracheal intubation and Severity of postoperative sore throat in 2-groups- ketamine (K) and control (C). Demographic characteristics such as age, height, sex, weight, duration of surgery were comparable

**Table 1:** Comparison of Incidence of Sore throat in two groups studied

| Sore throat   | 4 hour    | 8 hour    | 24 hour   | % change |
|---------------|-----------|-----------|-----------|----------|
| Group K(n=30) | 12(40.0%) | 7(23.3%)  | 4(13.3%)  | 26.7%    |
| Group C(n=30) | 27(90.0%) | 21(70.0%) | 14(46.7%) | 43.3%    |
| P value       | <0.001**  | <0.001**  | <0.001**  | -        |

Table 1 shows the incidence of Sore throat in the two comparison groups after 4<sup>th</sup>, 8<sup>th</sup> and 24 hour of anaesthesia. In Group K 40% individuals and 90% in Group C developed Sore throat at 4<sup>th</sup> hour. Similarly 23.3% and 70% at 8<sup>th</sup> hour and 13.3% and 46.7% at 24 hour developed sore throat in Group K and Group C respectively. This difference in development of sore throat between the two groups was found to be statistically significant (P<0.001).

**Table 2:** Comparison of Incidence of Sore throat in two groups studied

| Sore throat          | 4 hour    | 8 hour    | 24 hour   | % change |
|----------------------|-----------|-----------|-----------|----------|
| <b>Group K(n=30)</b> |           |           |           |          |
| Score 0              | 18(60%)   | 23(76.7%) | 26(86.7%) | +26.7    |
| Score 1              | 10(33.3%) | 6(20%)    | 4(13.3%)  | -20.0    |
| Score 2              | 2(6.7%)   | 1(3.3%)   | 0(0%)     | -6.7     |
| Score 3              | 0(0%)     | 0(0%)     | 0(0%)     | 0.0      |
| <b>Group C(n=30)</b> |           |           |           |          |
| Score 0              | 3(10%)    | 9(30%)    | 16(53.3%) | +43.3    |
| Score 1              | 11(36.7%) | 12(40%)   | 10(33.3%) | -3.4     |
| Score 2              | 9(30%)    | 6(20%)    | 3(10%)    | -20.0    |
| Score 3              | 7(23.3%)  | 3(10%)    | 1(3.3%)   | -20.0    |
| P value              | <0.001**  | <0.001**  | 0.014*    | -        |

Table 2 shows the incidence of Sore throat in the two comparison groups after 4<sup>th</sup>, 8<sup>th</sup> and 24 hour of anesthesia and severity defined in score 0,1,2,3. In Group K 60% individuals have not complained of sore throat at 4hour, 76.7% at 8hour, 86.7% at 24 hour. Maximum number (33.3%) of patients complained of mild sore throat at and no patient complained of severe sore throat in Group k. Similarly 40% in Group C have complained of mild sore throat at 8<sup>th</sup> hour. 23.3% at 4<sup>th</sup> hour, 10% at 8<sup>th</sup> hour and only 3.3%at 24 hour complained of sore throat. This difference in development of sore throat between the two groups was found to be statistically significant ( $P<0.001$ ).

## DISCUSSION

The present study compared the effectiveness of preoperative gargle of the study drugs (ketamine) versus a placebo (distilled water) in reducing the incidence and severity of post-operative sore throat following general anaesthesia with endotracheal tube for elective surgical procedures. In our study we did not find any significant difference between the groups in terms of age, gender, weight, duration of anaesthesia, ASA grade and MP grade. Several contributing factors for POST after surgery have been reported, including patient sex, age, type of surgery, use of succinylcholine, large tracheal tube, cuff design, and intracuff pressure.<sup>3,21,29</sup> In our study, no correlation was observed between incidence of POST, age, gender, weight and duration of intubation. Similar results were found by studies of Canbay *et al.*<sup>10</sup> They observed no correlation between POST and age, gender, smoking habit, duration of surgery and intubation. Rudra *et al.* also did not find any correlation between the incidence of POST and age, gender, duration of surgery, duration of intubation in their study. In our study, in the control group the incidence of POST at 4 hr was 90% and 46.7% at 24 hr. The reported incidence of POST is between 28% to 80%.<sup>1-5</sup> Our results in the control group was consistent with previous findings. In the study by Canbay *et al.*<sup>10</sup>, the incidence of POST in the control group was 56.5% (13/23) and 60.9% (14/23) at 0 hr and 24 hr respectively. Rudra *et al.*<sup>30</sup> found the incidence of POST in control group to be 85% (17/20) and 60% (12/20) at 4 hr and 24 hr respectively. In our study, in the K group the incidence of POST was 40% at 4 hr and 13.3% at 24 hr. Rudra *et al.*<sup>30</sup> (2009) found a similar result, the incidence of POST at 4 hr being 40% and 5% at 24 hr. But Canbay *et al.*<sup>10</sup> (2008) observed a small reduction in the incidence of POST in K gargle group at 24 hr which was 30% compared to 4 hr where it was 40%. We observed that the incidence of POST was significantly more frequent in the control group compared to both the study groups at all time points (Table 1) ( $P<0.001$ ). Canbay *et al.*<sup>10</sup> noticed the incidence of POST to be significantly more in the

normal saline gargle group compared to K gargle group at 0, 2 and 24 hr, but there was no difference at 4 hr. Rudra *et al.*<sup>30</sup> also observed a significant increase of incidence of POST in the control group compared to ketamine group at 4, 8 and 24 hr. In our study significantly more number of patients suffered from mild POST in the control group at 0 and 2 hr compared to the study groups K (Table 2 with ) ( $P < 0.001$ ). Sore throat related to orotracheal tube might be consequence of localized trauma, leading to aseptic inflammation of pharyngeal mucosa. It may also be associated with edema, congestion, and pain.<sup>21</sup> Reduction of this inflammation by ketamine gargling may be the reason for decrease in the incidence and severity of POST in our study.

## CONCLUSION

The incidence of POST in the patients undergoing GA with endotracheal intubation for routine surgical cases is quite common and this throat discomfort remains for next 24 hrs it has no statistical significant relation with the age, gender and weight of the patient and Ketamine gargle is safe, simple and reduces the incidence and severity of POST compared to distilled water gargle, upto 24 hrs. However Ketamine has slight bitter taste, which is uncomfortable to the patients

## REFERENCES

1. Ahmed A, Abbasi S, Ghafoor HB, Ishaq M. Postoperative sore throat after elective surgical procedures. J Ayub Med Coll Abbottabad 2007; 19: 12-4
2. Biro P, Seifert B, Pasch T. Complaints of sore throat after tracheal intubation: a prospective evaluation. Eur J Anaesthesiol 2005; 22: 307-11
3. Higgins PP, Chung F, Mezei G. Postoperative sore throat after ambulatory surgery. Br J Anaesth 2002; 88: 582-4
4. Kloub R: Sore throat following tracheal intubation. Middle East J Anesthesiol 2001;16:29-40
5. Kadri AK, Khanzada TW, Samad A, Memon W. Post-thyroidectomy sore throat. A common problem. Pak J Med Sci 2009;25:408-12
6. Marcario A, Weinger M, Truong P, Lee M. Which clinical anesthesia outcomes are both common and important to avoid? The perspective of a panel of expert anesthesiologists. Anesth Analg 1999;88:1085-91.
7. Sumathi PA, Shenoy T, Ambareesha M, Krishna HM. Controlled comparison between Betamethasone gel and Lidocaine jelly applied over tracheal tube to reduce postoperative sore throat, cough and hoarseness of voice. British Journal of Anaesthesia 2008; 100:215-18.
8. Elhakim M. Beclomethasone prevents postoperative sore throat. Acta Anaesthesiol Scand 1993;37:250-2.
9. Ogata J, Minami K, Horishita T., Shiraishi M, Okamoto T, Terada T *et al.* Gargling with Sodium Azulene Sulfonate reduces the postoperative sore throat after intubation of the trachea. Anesth Analg 2005;101:290-3.

10. Canbay O, Celebi N, Sahin A, Celiker V, Ozgen S, Aypar U. Ketamine gargle for attenuating postoperative sore throat. *Br J Anaesth* 2008;100: 490-3.
11. Agarwal A, Gupta D, Yadav G, Goyal P, Singh PK, Singh U. An evaluation of the efficacy of Licorice gargle for attenuating postoperative sore throat. A prospective randomized, single- blind study. *Anesthesia Analgesia* 2009;109: 77-81.
12. Agarwal A, Nath SS, Goswami D, Gupta D, Dhiraaj S, Singh PK. An evaluation of the efficacy of aspirin and benzydamine hydrochloride gargle for attenuating postoperative sore throat. A prospective, randomized, single-blind study. *Anesth Analg* 2006; 103:1001-3
13. Estebe JP, Delahaye S, Le Corre P, Dollo G, Le Naoures A, Chevanne F *et al.* Alkalinization of intra-cuff lidocaine and use of gel lubrication protect against tracheal tube-induced emergence phenomena. *Br J Anaesth* 2004 Mar;92:361-6.
14. Navarro LH, Lima RM, Aguiar AS, Braz JR, Carness JM, Modolo NS. The effect of Intracuff alkalinized 2% lidocaine on emergence coughing, sore throat and hoarseness in smokers. *Rev Assos Bras* 2012 Apr;58: 248-53.
15. Tanaka Y, Nakayama T, Nishimori M, Sato Y, Furuya H. Lidocaine for preventing postoperative sore throat. *Cochrane Database Syst Rev.* 2009 Jul 8;(3):CD004081.doi: 10.1002/14651858.CD004081.pub2. Review.
16. Soltani HA, Aghadavoudi O. The effect of different Lidocaine application methods on postoperative cough and sore throat. *Journal of Clinical Anesthesia* 2002;14:15-18.
17. Carlton SM, Coggeshall RE. Inflammation- induced changes in peripheral glutamet receptor populations. *Brain Res* 1999;820:63-70.
18. Carlton SM, Zhou S, Coggeshall RE. Evidence for the interaction of glutamet and NK1 receptors in the periphery. *Brain Res.* 1998;790:160-9.
19. Victor F B, Tremblay NAG. The complications of tracheal intubation: A new classification with a review of the literature. *Anesthesia Analgesia* 1974;53:202-13.
20. Keane WM, Denny JC, Rowe LD, Atkins JP, Jr. Complications of intubation. *Ann Otol Rhinol Laryngol* 1982; 91: 584-7.
21. McHardy FE, Chung F: Postoperative sore throat: cause, prevention and treatment. *Anaesthesia* 1999; 54: 444-53.
22. Peppard SB, Dickens JH. Laryngeal injury following short-term intubation. *Ann Otol Rhinol Laryngol* 1983;92:327-30.
23. Alexopoulos C, Lindholm CE. Airway complaints and laryngeal pathology after intubation with an anatomically shaped endotracheal tube. *Acta Anaesthesiol Scand* 1983;27:339-44.
24. Loeser EA, Bennett GM, Orr DL, Stanley TH. Reduction of postoperative sore throat with new endotracheal tube cuffs. *Anesthesiology* 1980; 52:257-59.
25. Jensen PJ, Hommelgaard P, Sondergaard P, Eriksen S. Sore throat after operation: Influence of tracheal intubation, intracuff pressure and type of cuff. *British Journal Of Anaesthesia* 1982;54: 453-56.
26. Brimacombe J, Keller C, Giampalmo M, Sparr HJ, Berry A. Direct measurement of mucosal pressures exerted by cuff and non-cuff portions of tracheal tubes with different cuff volumes and head and neck positions. *British Journal Of Anaesthesia* 1999; 82: 708-11.
27. Suzuki N, Kooguchi K, Mizobe T, Hirose M, Takano Y, Tanaka Y. Postoperative hoarseness and sore throat after tracheal intubation: effect of a low intracuff pressure of endotracheal tube and the usefulness of cuff pressure indicator. *Masui* 1999; 48: 1091-5.
28. Joh S, Matsuura H, Kotani Y, Sugiyama K, Hirota Y. Kiyomitsu. Change in tracheal blood flow during endotracheal intubation. *Acta Anaesthesiol Scand* 1987;31:300-04.
29. Stout DM, Bishop MJ, Dwersteg JF, Cullen BF. Correlation of endotracheal tube size with sore throat and hoarseness following general anesthesia. *Anesthesiology* 1987; 67: 419-21.
30. Rudra A, Suchanda R, Chatterjee S, Ahmed A, Ghosh S. Gargling with ketamine attenuates the postoperative sore throat. *Indian Journal Of Anaesthesia* 2009;53: 40-3.

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