

GARGLING WITH KETAMINE ATTENUATES POST-OPERATIVE SORE THROATTejashwini¹, Jagadish M. B²**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: INTRODUCTION: Postoperative Sore Throat (POST) is a common complication that is unresolved in patients undergoing endotracheal intubation, which is the foremost cause of trauma to the air way mucosa. The reported incident of POST varies from 21% to 65%. We compared the effectiveness of ketamine gargle with placebo in preventing POST after endotracheal intubation. **METHODS:** A prospective randomized controlled single blind study was conducted involving 60 patients of ASA grade I and II in the age group of 18-60 years of either sex undergoing elective surgeries under general anaesthesia, after obtaining informed, written consent. Patients were randomly allocated in to two groups of 30 patients each. Group C, water 30ml; Group K, ketamine 50mg in water 29ml. Patients were asked to gargle this mixture for 30 seconds, 5 minutes before the induction of anaesthesia. In the post anaesthesia care unit at 4, 8 and 24 h, POST was graded on a four-point scale (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), **RESULTS:** Incidence of POST was higher in Group C compared with Group K, at 4, 8 and 24hr. significantly more patients suffered severe POST in Group C, 23.3% at 4hr, 10% at 8hr and 3.3% at 24hr compared to Group K (P<0.05). **CONCLUSION:** Ketamine gargle significantly reduces the incidence and severity of POST after endotracheal intubation.

KEYWORDS: ketamine gargle, endotracheal intubation, postoperative sore throat.

INTRODUCTION: Tracheal intubation results in inadvertent trauma to the airway which accounts for postoperative sore throat (POST) symptoms, with reported incidence of 28% to 80%.¹⁻⁵ POST had been rated by patients as the 8th most undesirable outcome in the postoperative period.⁶

Numerous non-pharmacological and pharmacological measures have been used for attenuating POST with variable success. Among the non-pharmacological methods, smaller sized endotracheal tubes, lubricating the endotracheal tube with water soluble jelly, careful airway instrumentation, minimizing the number of laryngoscopy attempts, experienced laryngoscopist, intubation after full relaxation of larynx, gentle oropharyngeal suctioning, minimizing intra cuff pressure, and extubation when the tracheal tube cuff is fully deflated, have been reported to decrease the incidence of POST.⁷ Pharmacological measures for attenuating POST are inhalation of beclomethasone,⁸ fluticasone and gargling with azulene sulfonate,⁹ aspirin, ketamine¹⁰ and licorice,¹¹ local spray and gargle of benzydamine hydrochloride¹² and intra cuff administration of alkalinized lignocaine.^{13,14}

There is an increasing amount of experimental data showing that NMDA receptors are found not only in the CNS but also in the peripheral nerves.^{15,16} Ketamine being an NMDA receptor antagonist, its topical administration involved in anti-nociception and anti-inflammatory cascade. Thus helps in prevention of POST.¹⁰

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This study was done to compare the effectiveness of ketamine gargle versus a placebo in decreasing the incidence & severity of POST. Ketamine, a NMDA receptor antagonist, is easily available & a gargle may be a simple, cost-effective method to decrease POST symptoms.

METHODS: After approval from the institutional ethical committee, 60 Inpatients of Kidwai Memorial Institute of Oncology aged between 18yrs to 60yrs with ASA 1 & ASA 2 scheduled for elective surgery under GA after informed written consent from patients. The study was conducted in a prospective, randomized, placebo-controlled, and single-blinded manner. Patients with a recent history of pre-operative sore throat, More than two attempt 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 remained intubated after discharge from recovery room, Head and neck surgeries, anticipated rapid sequence induction or airway difficulty were excluded from the study.

Premedication consisted of tablet alprazolam 0.5mg previous night. Patients were randomly assigned into one of two groups according to the agent used for gargle. Group C received drinking water 30 ml and Group K received ketamine 50 mg (1ml) in 30 ml drinking water for gargling for 30 seconds, 5 minutes before the induction of anaesthesia.

Monitoring consisted of ECG, non-invasive arterial pressure, pulse oximetry, and end-tidal carbon dioxide. Anaesthesia was induced with fentanyl 2µg/ kg and propofol 2 mg /kg. Tracheal intubation was facilitated by vecuronium bromide 0.1 mg/ kg and 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 66% 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 & the ability to follow verbal commands with eye opening), tracheal extubation was immediately done following gentle suctioning of oral secretions under direct vision by a 12F soft suction catheter, and patients were transferred to the post anaesthesia care unit.

At arrival of patients in the post anaesthesia 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).¹⁰ Other side effects, if any, were also noted.

The patients were also compared for demographic profile and duration of surgery. POST was compared in both the group using Student t- test, Chi-square test and Fisher exact test and p value of <0.05 was considered to be statistically significant. Statistical analysis was done by statistical package for social sciences (SPSS) version 15.0 for windows.

RESULTS: The study population consisted of 60 patients; 30 patients gargled with ketamine (Ketamine group) and 30 patients gargled with only water (Control group). There were no significant

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differences in the groups in terms of age, body weight, gender distribution, or duration of anaesthesia (Table 1).

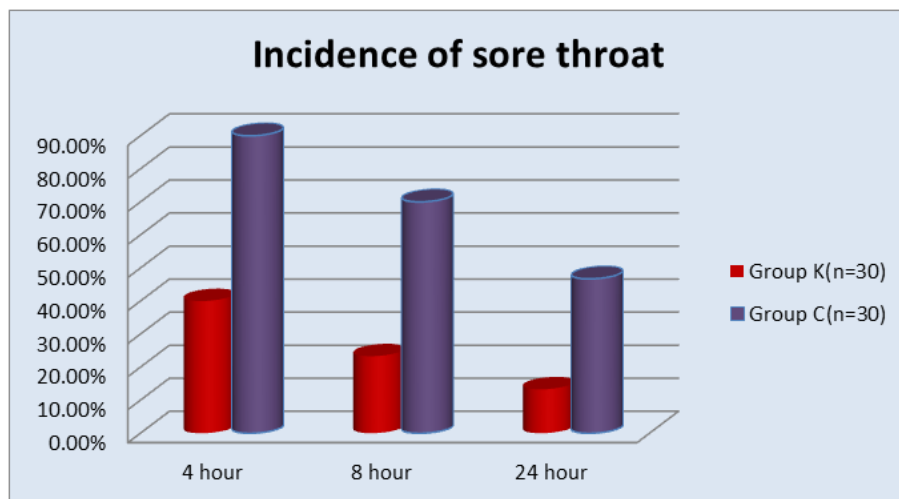
	Control (n=30)	Ketamine (n=30)
Male: Female	11:19	13:17
Age (yr)	46.90±10.71	45.67±11.21
Weight (kg)	55.23±7.99	58.70±10.42
ASA physical status(I/ II)	18/12	16/14
Duration of surgery (min)	83.70±23.42	84.80±21.54
Duration of anaesthesia (min)	91.30±23.29	95.60±21.83

Table 1: Patients characteristics in the control and Ketamine Groups (Mean± SD)

In Group C 27(90%) patients complained of POST at 4 hours, out of them 21 (70 %) patients had POST at 8 hours, which remained for 24 hours in 14 (46.7%) patients (Table 2). However in Group K, 12 (40%) patients complained of POST at 4 hours. Out of them 7(23.3%) patients complained of POST at 8 hours and which remained in 4 (13.3%) patients for 24 hours, $P < 0.05$. No local or systemic side effects were observed.

Groups	4Hr		8Hr		24Hr	
	C (n=30)	K(n=30)	C (n=30)	K(n=30)	C (n=30)	K(n=30)
Grading Of discomfort						
Mild	11(36.7%)	10(33.3%)	12(40%)	6(20%)	10(33.3%)	4(13.3%)
Moderate	9(30%)	2(6.7%)	6(20%)	1(3.3%)	3(10%)	0(0%)
Severe	7(23.3%)	0(0%)	3(10%)	0(0%)	1(3.3%)	0(0%)
Total no of patients having POST	27(90.0%)	12(40.0%)	21(70.0%)	7(23.3%)	14(46.7%)	4(13.3%)

Table 2: Comparison of POST at 4, 8 and 24 hrs. Data are presented as number (%) of patients



DISCUSSION: In the Control group, the incidence of POST at 4, 8 and 24hrs after surgery was 90%, 70% and 46.7% respectively (table 2). The reported incidence of POST is between 45 and more than 90%.^{3,4,10} Our results in the control group was consistent with previous findings. In the study by

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Canbayet al,¹⁰ 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 al¹⁹ found the incidence of POST in control group to be 85% (17/20), 75% (15/20) and 60% (12/20) at 4hr and 24 hrs respectively. 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.^{3,17,18} In our study, no correlation was observed between incidence of POST, age, gender, weight and duration of intubation.

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.^{19,20} Reduction of this inflammation by ketamine gargling may be the reason for decrease in the incidence and severity of POST in our study.

In recent years, studies have shown that ketamine plays a protective role against lung injury, by means of its anti-inflammatory properties.^{21,22} Additionally, ketamine has been shown to attenuate symptoms of endotoxaemia in alipoplysaccharide (LPS)-induced rat model of sepsis, by reducing NF kappa B activity and TNF-alpha production²³ and diminishing the expression of inducible nitric oxide synthase.²⁴

In this study, we identified POST as clinical outcome associated with routine surgery that is common and important to avoid. Furthermore, we demonstrated that Ketamine gargle significantly reduces the incidence and severity of POST compared to distilled water gargle, up to 24 hrs.

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