Research Paper

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# Ketamine gargles and post operative sore throat after laryngeal mask airway use.

Anaesthesiology

KEYWORDS : gargles; ketamine; laryngeal mask airway; sore throat.

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## ABSTRACT

*The aim of the study was to compare the effectiveness of ketamine gargles with placebo in attenuating POST after LMA. Fifty female patients for elective surgery were enrolled in this prospective and randomized trial and were randomly allocated in to two groups of 25 each. Group K received 50mg preservative free ketamine (1ml) in 29 ml of saline, while group C received 30 ml of saline for gargling for 30 seconds, five minutes before induction. POST was graded at 0, 4 and 24 hours after surgery on a four point scale (0-3). The incidence of POST was higher in group C as compared with group K ($p<0.001$) at all times. Two patients had severe POST at 4 and 24 hours in group C as against none in group K.*

*Conclusion: Gargling with ketamine decreases the incidence and severity of POST in female patients under general anaesthesia with LMA use.*

**Introduction**

Post operative sore throat (POST) has been rated as the eighth most adverse effect in the post operative period.[1] The method used for airway management has the strongest influence on the occurrence of POST.[2] The highest incidence of POST is seen after endotracheal intubation, however, studies have confirmed a alarming incidence of POST with the use of laryngeal mask airway (LMA) too. [3,4]

Among the contributing factors for POST after LMA are female sex, young patients, posted for gynaecological procedures and use of succinyl choline.5 Inserting partially inflated LMA, decreasing the intracuff pressure are few of the techniques studied to decrease POST with variable success.[6] Many pharmacological measures have been evaluated to attenuate POST after endotracheal intubation like beclomethasone inhalation, magnesium nebulisation, intravenous dexamethasone and ketamine and azulenesulphonate gargles.[7-10] Out of these, preoperative gargling with ketamine appears to be a promising remedy in attenuating POST. [9]

So far to the horizon of our knowledge, no study has been done to evaluate the efficacy of ketamine gargles in attenuating POST after LMA use. In this study we investigated whether preoperative ketamine gargles reduced POST after LMA use and compared it with placebo.

**Methods:**

A prospective, randomized and placebo controlled study was conducted on 50 ASA I and II patients after obtaining written and valid consent abiding to ethical principles and GCP guidelines, permitted by ethical committee. Female patients posted for elective surgical procedures ( fibroadenoma excision, dilatation and curettage, dilatation and evacuation, lymph node excision, secondary suturing etc) under general anaesthesia using LMA were recruited for the study. Patients with restricted mouth opening, known sensitivity to study drug, recent sore throat, asthmatic patients, recent NSAID medication and patients on steroid therapy were excluded from the study.

Patients were randomly assigned using a computer generated random number table into two groups according to the agent used for gargles. Patients allocated to Group K received 50mg preservative free ketamine (1ml) in 29 ml of saline, while group C received 30 ml of saline for gargling for 30 seconds, five minutes before induction. Monitoring consisted of electrocardiogram (ECG), blood pressure (BP), pulse oximetry (SPO2) and end tidal carbon dioxide. Premedication was given in the form of midazolam, glycopyrrolate and ondansetron in conventional doses. Anaesthesia was induced with fentanyl 2mcg/kg and propofol 2 mg/kg sufficient enough to abolish the eyelash reflex. A completely deflated and lubricated (with 2% lignocaine jelly) LMA no. 3 was placed by a qualified and experienced anaesthetist. Cuff was inflated with the recommended 20 cc volume of air and the cuff pressure was monitored. Anaesthesia was maintained on circle system with air oxygen mixture supplemented with isoflurane on spontaneous ventilation. Anaesthesia was tapered at the end of procedure and LMA cuff was taken out after oropharyngeal suctioning and cuff deflation. All patients received diclofenac 75 mg intravenous infusion started towards the end of procedure. Patients were immediately questioned for POST at their arrival in post operative recovery room (time 0) and then at 4 and 24 hours by a blinded investigator. Following four point grading system was used:

Grade 0 – no sore throat
Grade 1 – mild sore throat (complains of sore throat only on asking)
Grade 2 – moderate sore throat (complains of sore throat by self)
Grade 3 – severe sore throat (change of voice/hoarseness, presence of throat ache)

**Other side effects, if any, were also noted.**

Differences in the incidence of POST among the two groups were compared with the help of Mann-Whitney U-test. The severity of POST was analyzed by Fischer's exact test. Demographic profile and duration of surgery were compared by one way analysis of variance (ANOVA). All analysis was done by SPSS 11.5 for windows, $p<0.05$ was considered as significant.

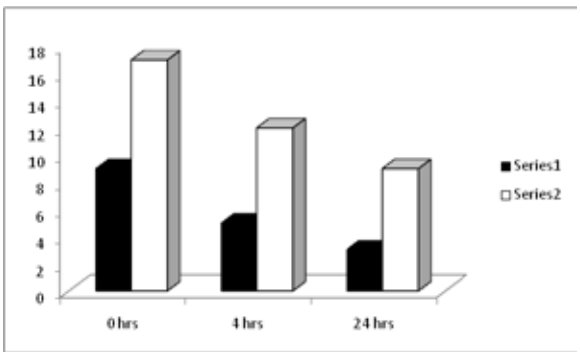
**Results**

We enrolled 25 patients in each group. Two patients in group C and one patient in group K could not gargle properly and were excluded. In addition, one patient in group C was excluded due to study protocol violation. So total of 22 patients in group C and 23 patients in group K were studied. Patients' demographic profile in either group was comparable and the difference in duration of surgery was not statistically significant (table 1).

**Table 1: Patient's demographic profile and duration of surgery (NS: Not significant)**

| | Group K (n=23) | Group C (n=22) | p value |
|---|---|---|---|
| Age (years) | 34.6 (7.4) | 36.4 (11.0) | NS |
| Weight (kg) | 55.2 (9.6) | 54.8 (9.8) | NS |
| ASA I/II | 12/11 | 10/12 | NS |
| Duration of surgery (min) | 24.4 (4.6) | 22.6 (5.3) | NS |

The incidence of POST was higher in group C as compared with group K ($p<0.001$) at all times as depicted in figure 1.




Two patients had severe POST at 4 and 24 hours in group C as against none in group K (table 2).

**Table 2: Incidence and severity of POST (* p < 0.05)**

| | 0 hours | | 4 hours | | 24 hours | |
|---|---|---|---|---|---|---|
| POST Grades | Group K | Group C | Group K | Group C | Group K | Group C |
| 0 | 14 | 5 | 18 | 10 | 20 | 13 |
| 1 | 6 | 12 | 5 | 6 | 3 | 5 |
| 2 | 3 | 5 | 0 | 4 | 0 | 2 |
| 3 | 0 | 0 | 0 | 2 | 0 | 2 |
| Incidence (%) | 39.13 | 77.27* | 21.73 | 54.54* | 13.04 | 40.90* |

The difference was statistically significant ($p<0.05$). No adverse effects were recorded in either group.

**Discussion**

In our study, we observed that both the incidence and severity of POST were reduced after ketamine gargling in patients undergoing surgery under general anaesthesia using LMA.

POST is a parsimonious description representing a broad constellation of signs of symptoms of laryngitis, tracheitis, hoarseness, cough or dysphagia. Studies have been conducted to compare the incidences of POST after intubation and LMA.[3,5] Interestingly, the results have been conflicting. A study by Higgins5 and another one by Joshi et al3 have demonstrated a higher incidence of POST post intubation as compared to LMA. However in a study by Mizutamari, it was concluded that the LMA insertion worsened POST compared to tracheal intubation.11 Whatever the incidence, POST after LMA is a proven entity and measures need to be taken to prevent its occurrence and improve the quality of post operative care.

Several dimensions influence the occurrence of POST in patients subjected to general anaesthesia. Lack of airway humidity, trauma during insertion, suctioning, high anaesthesia gas flow are the possibly causative factors for POST. 3,5 Furthermore laryngeal trauma with mucosal dehydration due to the cuff results in aseptic inflammation that gradually leads to congestion and pain. 9,12 This could explain the higher incidence of delayed onset of severe sore throat in the control group as against ketamine group in our study.

The anti inflammatory action of ketamine has been extensively studied in past. Consequently, it has been shown to play a protective role against lung injury and asthma.13 There is a growing amount of experimental data presenting that NMDA receptors are present not only in the CNS but also in the peripheral nerves. 14,15 Peripherally administered NMDA antagonist like ketamine accelerates the anti nocciception and anti inflammatory cascade by reducing NFκβ activity, TNF α production, diminishes expression of inducible nitric oxide synthase, serum C reactive protein, interleukin 6 and 10. 16-19 It is thus plausible that peripheral action of ketamine plays an important role in attenuating sore throat. Notably, Chan et al had examined serum concentrations of ketamine and nor ketamine after gargles and suggested that it was unlikely that systemic absorption played a major role for reduction of POST and attributed the effects of ketamine to topical action.20 We propose all these properties of ketamine to be responsible for attenuating sore throat after LMA use.

**Conclusion**

Gargling with ketamine decreases the incidence and severity of POST in female patients undergoing surgery under general anaesthesia with LMA use.

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