

Intravenous Ketorolac Tromethamine for Prevention of Postoperative Sore Throat.

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ABSTRACT

Background: Postoperative sore throat is a complication associated with endotracheal intubation. Many pharmacological methods have been employed to treat and prevent it. Ketorolac has been shown to be effective for treatment of pain of surgery. Here we have tried to study its efficacy in prevention of sore throat caused by endotracheal intubation. **Methods:** With permission from the ethics committee, a double blind random study was conducted on forty consenting adult patients of both sexes belonging to ASA I or II. They were divided into two groups K and C containing twenty each. Group K patients were given Inj. Ketorolac intravenously 10 minutes before induction. Group C was the control group. Both the groups were premedicated with Inj. Glycopyrrolate, Inj. Midazolam and Inj. Pentazocin; induced with Inj. Propofol and intubated following Inj. Vecuronium. At the end of surgery muscle paralysis was reversed with Inj. Neostigmine combined with Inj. Glycopyrrolate. The incidence of sore throat and severity were graded at 0, 2, 6 and 24 hours following recovery from anaesthesia with the help of Verbal Rating Scale and statistical analysis was done. **Results:** Ketorolac decreases post-intubation sore throat. Incidences of sore throat was 35% after extubation with Ketorolac premedication, which decreased to 5% by 6 hours. Whereas the same was 80% and 45% respectively in the control group with 35% still suffering from sore throat 24hrs post-operatively. The severity of sore throat ranged from mild to moderate in Group K patients, but varied from mild to severe in the control group. Ketorolac premedication delayed the demand for post-surgery rescue analgesia. **Conclusion:** Intravenous premedication with the anti-inflammatory drug Ketorolac tromethamine can prevent sore throat induced by laryngoscopy and endo-tracheal intubation and delay post-surgical analgesic requirements.

Keywords: Postoperative sore throat, Ketorolac, Intravenous.

INTRODUCTION

Soreness of throat, hoarse voice and cough are unpleasant irritating complications that follows endotracheal intubation. Incidences of post-operative sorethroat (POST) are reported to vary from 28% to as high as 80%.^[1-5] In a study conducted by Macario et al in 1999, patients rated Postoperative sore throat (POST) as their 8th most undesirable experience in the post-operative period^[6]. Increased hospital stay periods and delayed discharges in day-care cases have also been attributed to development of post-operative sore throat^[6]. It has been reported that the maximum intensity of POST is experienced between 2 to 6 hours after tracheal extubation^[7-9].

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Many techniques have been experimented with to treat and prevent sorethroat. The non-pharmacological methods used are minimal instrumentation of the airway, intubation when vocal cords are fully relaxed, smaller-sized endo-tracheal tubes^[8], high-volume-low-pressure cuffs, Spiral-embedded tubes, Micro-cuffed tubes. The pharmacological techniques tried are: gargling with warm saline/ Lignocaine/ Aspirin/ Azulesulfonate/ Benzidamine hydrochloride/ Ketamine, smearing Lignocaine or Cinchocaine jelly/K-Y jelly/ Betamethasone gel on the surface of the endotracheal tube, sucking Amethocaine Lozenges and inhaling steam/ Beclomethasone/ Fluticasone.^[9-12] However, search is still on for a proper remedial procedure.

Ketorolac tromethamine is a drug that has been used to treat postoperative pain. De Andrade J R et al and Cassinelli EH et al have advocated Ketorolac for treatment of pain following surgery.^[13,14] 'Soreness' being a synonym for 'pain', the aim of this study was to evaluate the efficacy of 'Ketorolac tromethamine' premedication in preventing post-

operative sore throat in patients who had endotracheal intubation under direct laryngoscopy for surgery under general anaesthesia.

MATERIALS AND METHODS

Double blinded random study was undertaken on forty adult patients between the ages 18 and 60 years after getting permission from the ethics committee of our institution and informed written consent from the patients. Both male and female patients having average body built and belonging to ASA Grades I or II, that were posted to undergo elective surgery under General Anaesthesia with endotracheal intubation under direct laryngoscopy during the period 2014 to 2015 were enrolled in this study. Patients who were anticipated to pose difficulty during intubation were excluded from this study. So too were those suffering from respiratory tract infection, or having history of Bronchial asthma, Cardiac/Hepatic/Renal impairment, Acid peptic disease, or allergy to NSAID group of drugs. Patients were randomly divided into two groups of 20 each by draw of cards.

Group K - received Inj. Ketorolac tromethamine (30mg) I.V. 10 minutes before induction of anaesthesia.

Group C - This was the control group and so was not given Ketorolac.

Patients in both the groups were premedicated with Inj. Ranitidine(50mg) I.V., Inj. Glycopyrrolate (0.2mg), Inj. Midazolam (0.05 mg/kg b.w.) and Inj. Pentazocin (0.3 mg/kg b.w.) intravenously. After preoxygenation for 3 minutes, they were induced with Inj. Propofol (2 mg/kg b.w.), I.V. Trachea was intubated under direct laryngoscopic vision, facilitated by intravenous Inj. Vecuronium bromide (0.1mg/kg b.w.). Proper sized Portexoral endotracheal tubes having high-volume-low pressure cuff of the single-use type were used for intubation. Tubes were not lubricated with any local anaesthetic gels or any other lubricants neither was any local anaesthetic sprayed on the tubes or mucosa before attempting intubation and following extubation. Tube placement was confirmed. Cuff was inflated with air. The tube was fixed. Intra cuff pressure was kept between 20 to 25cm H₂O. Patients were manually ventilated with Bain's co-axial circuit. Anaesthesia was maintained with Nitrous Oxide : Oxygen in the ratio 60:40 along with Isoflurane (0.4%) and intermittent incremental doses of intravenous Inj. Vecuronium. At the end of surgery patients were reversed with Inj. Neostigmine 0.05mg/kg b.w.) and Inj. Glycopyrrolate (0.4mg). The incidence and severity of 'Postoperative sorethroat' were graded at 0, 2, 6 and 24 hours after recovery from anaesthesia with the help of Verbal Rating Scale.

Verbal Rating Score:

Grade 0 = No Pain

Grade I = Mild/Slight Pain

Grade II = Moderate Pain

Grade III= Severe Pain

Grade IV = Very Severe Pain.

Patients requiring more than 2 attempts at intubation were excluded from this study.

Observations:

The following parameters were observed:-

1. Incidences of sorethroat,
2. Severity of sorethroat,
3. Time of requirement of postoperative rescue analgesia,
4. Gastro-intestinal side effects like nausea, vomiting, pain abdomen, haematemesis, melena and others if any.

The data obtained were tabulated and statistically analysed. Test for significance was studied by using SPSS software. Chi square test was used for qualitative analysis and unpaired t test for quantitative analysis. The 'p' value ≤ 0.05 was considered statistically significant and $p \leq 0.001$ as highly significant.

RESULTS

The patients studied across the group did not vary much with respect to age, sex, height and body weight. The time of surgeries performed were almost identical in both the groups [Table 1].

Table 1: Comparison of Demographic Variables (Mean $\pm$ SD)

Parameter	Group K (n=20)	Group C (n=20)
Age (yrs)	36.7 $\pm$ 8.64*	38.10 $\pm$ 7.87
Body weight (kg)	54.85 $\pm$ 8.54*	52.60 $\pm$ 11.90
Male/Female	12 / 8*	11 / 9
ASA Grade I / II	14 / 6*	15 / 5
Mean duration of Intubation (minutes)	115.75 $\pm$ 25.67*	118.25 $\pm$ 23.57

* 'p' ≥ 0.05

The demographic data between the two groups was comparable. No statistically significant difference was detected.

Table 2: Incidences of Postoperative Sorethroat

Time Interval (in Hours)	Group K (n=20)	Group C (n=20)
0 hr	7 * (35 %)	16 (80 %)
2 hr	3 ** (15 %)	12 (60 %)
6 hr	1 ** (5 %)	9 (45 %)
24 hr	0 ** (0 %)	7 (35 %)

* $p \leq 0.05$, ** $p \leq 0.001$

An incidence of sore throat was significantly less in Ketorolac group at all the observed time periods. Only 35% cases in the Ketorolac group complained of sorethroat immediately after extubation whereas

it was obtained in 80% of patients in the control group. It decreased to 15% and 5% in Group K by 2hrs and 6hrs respectively with no complains after 24hrs. But in Group C, 60% and 45% patients

respectively suffered from sorethroat 2hrs and 6hrs post-extubation with 35% complaining of the same 24hrs afterwards.

Table 3: Grades of Severity of Sore throat

Time Grades	0 hour		2 hour		6 hour		24 hour	
Groups (n=20)	K	C	K	C	K	C	K	C
Grade 0	0	0	0	0	0	0	0	0
Grade I	6*	9	2*	7	1**	6	0**	4
Grade II	1*	5	1*	4	0	2	0	2
Grade III	0*	2	0	1	0	1	0	1
Grade IV	0	0	0	0	0	0	0	0
Total	7	16	3	12	1	9	0	7

*p' ≤ 0.05, **p' ≤ 0.001.

Severity of sorethroat was mild to moderate in Group K patients. Among the 7 out of 20 patients who had sore throat at 0 hrs, it was mild(Grade I) in 85.71% cases and Grade II(moderate) in 14.28% of patients. At 2 hrs 66.66% had Grade I severity and 33.33% Grade II severity sore throat. At 6hrs the only patient that had sore throat, it was of Grade I severity. None in this group complained of sorethroat by 24 hrs following extubation.

Whereas in Group C patients, Grade I to Grade III severity sorethroat was obtained. Of the 16 patients out of 20 that complained of sorethroat, 56.25% had Grade I, 31.25% Grade II and 12.5% Grade III sorethroat immediately after extubation. After 2hrs, 58.33% complained of mild(Grade I) while 33.33% had Grade II and 8.33% had Grade III (severe) sorethroat. After 6hrs, 66.66% suffered from Grade I, 22.22% from Grade II and 11.11% from Grade III sorethroat. In this group, 24hrs after extubation 57.14% patients continued to complain of mild sorethroat, while 28.57% and 14.28% had moderate and severe sorethroat respectively.

Table 4: Time For Rescue Analgesia (in Hours) [Mean ± SD]

	Group K (n=20)	Group C (n=20)
Time for Rescue Analgesia (hr)	6.85 ± 1.63**	2.95 ± 0.83

When compared to Control group, patients in Group K had significantly longer period of relief from pain ** (p ≤ 0.001).

Table 5: Cardiovascular Parameters & G.I. Side effects (Mean ±SD)

Parameters	Group K (n=20)	Group C (n=20)
Mean Pulse Rate (min)	85.70 ± 9.03*	88.15 ± 5.40
Mean SBP (mmHg)	120.70 ± 7.98*	123.40 ± 7.11
Mean DBP (mmHg)	78.10 ± 6.20*	78.30 ± 7.26
G.I. Side effects	None	None

*p ≥ 0.05

The Mean Pulse Rate, Systolic as well as Diastolic Blood Pressures in both the groups were comparable with no statistically significant difference. None of the patients exhibited any Gastro-intestinal side effects.

DISCUSSION

Both intubation and extubation as well as laryngoscopy can injure the airway. In an article published in Anaesthesia way back in May 1999^[15], McHardy and Chung in their analysis of aetiology of post-intubation sore throat have noted that laryngoscopy and intubation causes mucosal trauma with loss of epithelium, submucosal tear of pharynx and larynx, haematoma and oedema of the glottis, formation of ulcerating contact granuloma and damage to the laryngeal and tracheal cartilages. Though prolonged intubation is commonly associated with mucosal injury, they observed similar injuries even patients intubated for short period of time. Injury leads to inflammation and pain. Other authors have also claimed pharyngo-laryngo-tracheal inflammation as reasons of sore throat^[10,16,17]. Yang and Liu et al succeeded in decreasing sore throat by use of Ketorolac spray^[18].

In this study we found that intravenous premedication with the Non-steroidal anti-inflammatory drug Ketorolac tromethamine decreased both the incidence as well as severity of postoperative sore throat in patients subjected to endotracheal intubation.

While 35% patients premedicated with Ketorolac complained of sore throat immediately after extubation, the incidence was very high (80%) in the non-premedicated group. By 6 hrs and 24hrs, this incidence decreased to 5% and 0% respectively in patients given Ketorolac. But, 45% and 35% patients continued to complain of sore throat at 6 and 24 hrs respectively in the control group.

Severity of sorethroat was mild to moderate in Ketorolac premedicated patients, with none

complaining of soreness at 24hrs post-extubation. Whereas in non-premedicated patients it ranged from mild to severe; while 7(35%) patients still presented with sore throat after 24hrs.

We found that Ketorolac premedication also significantly delayed the patient's demand for rescue analgesia not only for sorethroat, but also for the surgical procedure - which was an added benefit.

The major drawback while prescribing Ketorolac is its effect on the gastro-intestinal system. However, none of our patients in the present series exhibited any signs or symptoms of GI side effects associated with Ketorolac. This was probably due to their being premedicated with Inj. Ranitidine, and the limited number of patients studied.

However, further study with larger number of patients and comparison with other techniques are recommended for better evaluation.

CONCLUSION

Intravenous premedication with the anti-inflammatory drug Ketorolac tromethamine can prevent sore throat induced by laryngoscopy and endo-tracheal intubation and delay post-surgical analgesic requirements.

Limitations:

The limitations in the present study are:

- Small sample size.
- Impact of throat-pack on development of sore throat was not considered.
- Post-operative opioid requirement was not studied.
- Comparison with similar drugs not done.

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