Original Article ISSN (O):2395-2822; ISSN (P):2395-2814

An Evaluation of the Efficacy of Ketamine Gargle and Benzydamine Hydrochloride Gargle for Attenuating Post Operative Sore Throat: A Prospective Randomized, Placebo Controlled Single- Blind Study

Arun Kumar[1], Sasmita Panigrahy[2], Daityari Routray[3]

[1]Assitant Professor,Department of Anaesthesiology, M.K.C.G Medical college, Berhampur, odisha
[2]Senior Resident, Department of Anaesthesiology, A.I.I.M.S, Bhubaneswar, Odisha.
[3]Proffessor& HOD, Department of Anaesthesiology, S.C.B Medical college, Cuttack, Odisha.

Received: August 2019
Accepted: August 2019

ABSTRACT

Background: Post-operative sorethroat (POST) is a well-recognized complication in patients with endotracheal intubation for general anaesthesia. Many pharmacological measures for attenuating POST are being used during anaesthesia. In our study we compared the effectiveness of ketamine and benzydamine hydrochloride versus a placebo as preoperative gargle in decresing the incidence and severity of POST in patients undergoing endotracheal intubation for general anaesthesia. **Methods:** A total of 90 patients aged between 18-60 years of ASA I-II of either sex were randomly assigned into three groups of 30 patients each. Group 1(C) received distilled water,group2(BH) received 15 ml of benzydamine hcl(0.15%) and group 3(K) received preservative free ketamine 40 mg as preoperative gargle 10 min before induction. The incid- ence of POST was recorded at 2,4 and 24 hr post operatively. **Results:** The three groups were comparable in term of demographic characteristics. The incidence and severity of POST is much more in group 1(C) i.e control group (30%) after 24 hr compared to group 2 (BH) 0% and group 3(K)3.5%. There was no significant difference of POST in group 2(BH) and group 3(K). **Conclusion:** From our study it can be concluded that both benzydamine and ketamine gargle significantly reduces the incidence and severity of POST compared to ditilled water gargle up to 24 hr in the patients undergoing general anaesthesia with endotracheal intubation. Both the Benzydamine and ketamine gargles are safe, simple and equally effective in reducing POST.

Keywords: Benzydamine Hcl, Endotracheal tube (ET tube), Ketamine and Post-operative sorethroat (POST).

INTRODUCTION

Post-operative sorethroat (POST) is well recognized complication that remains unresolved in patients undergoing endotracheal intubation for general anaesthesia with reported incidence of 28% to 80%1-5.POST had been rated by patients as the 8th most undiserable outcome in postoperative period. It also increases the duration of hospital stay and delays discharge, especially in day care surgeries.Routine tracheal intubation for elective surgeries can results in advetent trauma to the airway which accounts for POST symptoms. Numerous non-pharmacological and pharmacological measures have been used for attenuating POST with variable success.

Name & Address of Corresponding Author
Dr. Arun Kumar,
Assitant Professor,
Department of Anaesthesiology,
M.K.C.G Medical College,
Berhampur, Odisha.

Among the non-pharmacological methods, smaller sized ET tubes, lubricating the ET tubes 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 in tracuff pressure and extubation after fully deflation of tracheal cuff have been reported to decrease the incidence of POST. Pharmacological attempts for attenuating POST are inhalation of beclomethasone, fluticasone and gargling with azune sulfonate, aspirin and licorice, local spray of benzydamine hcl and intracuff administation of alkanizes lignocaine. In this regards Ketamine (phencyclidine derivative) and Benzydamine hcl (topical NSAID) have been used independently as preoperative gargle and have been noted to decrease the incidence and severity of POST.

In our study we plan to compare the effectiveness of these two agents vs a placebo in decreasing the incidence and severity of POST. Both the drugs are

easily available and a gargle may be simple, cost-effective method to decrease POST symptoms.

MATERIALS AND METHODS

The present study was conducted at M.K.C.G MEDICAL COLLAGE AND HOSPITAL, after obtaining clearance from the institutional ethical committee & scientific committee 90 adult patients between18-60 years of ASA gradw I-II of either sex undergoing elective abdominal surgery under general anaesthesia were enrolled in this study .We excluded patients with a recent H/O preoperative sore throat, more than two attempt at intubation, mallampati grade>2,use of gum elastiv bougie or stylet to facilitate intubation, k/c of bronchial asthama and known allergies to ketamine and benzydamine hcl.

Using a prospective, randomized, placebo-controlled, single-blind study, these patients were devided into three groups of 30 patient each as group 1(C) received distilled water,group2(BH) received 15 ml of benzydamine hcl (0.15%) and group 3(K) received preservative free ketamine 40 mg as preoperative gargle 10 min before induction.

Depending upon the results of randomization, all the medication were made to a final volume of 25ml after adding required amount of distilled water. It was placed in a opaque container by a staff nurse who asked these patients to gargle this mixture for 30 sec in a preinduction room. Patients were strictly instructed not to swallow the medication. This nurse was not invoved in the subsequent mamagement of these patients. Induction of anaesthesia was commenced 10 min later.

Valid informed written consent was taken from each patient and all patients were kept fasting overnight. On arrival in the OT, the routine monitoring devices (pulse oximetry. NIBP, ECG) were placed and baseline HR, BP, SPO2 were recorded. An I.V line was secured. Anaesthesia was induced with inj. Fentanyl 2mic/kg and inj. Thiopentone 5mg/kg. Tracheal intubation was facilitaed by inj. Vecurinium bromide 0.1mg /kg and the trachea intubated with a soft seal cuffed sterile pvc (Portex ltd, CT 21,UK) ET tube with7mm ID for female and 8mmID for male patients. The ET tube cuff was lubricated with distilled water. The ET tube cuff was inflated with air until no air leakage could be heard with peak airway pressure with 20 cm of H2O.The cuff pressure was checked using cuff pressure monitor(portex cuff inflator/ pressure gauge, SIMS portex, Hythe, Kent, UK) every half hourly till end of surgery and mentained between18 to 22 cm of H2O.Anaesthesia was maintained with N2O:O2(60%:40%), Isoflurane1% and intermittent dose of inj. vecuronium as required. No nasogastric tube was inserted. At the end of surgery residual neuromuscular blockage was antagonized using i.v inj. Glycopyrrolate and inj. Neostigmine and trachea was extubated following a gentle oral suction by a12F soft suction catheter after signs of adequet neuromuscular reversal. Patients were transferred to PACU and postop analgesia was maintaind with inj. Tramadol-75 mg IV B.D for next 24 hrs.

At arrival of patients in PACU (0h) and thereafter at 2,4and24h POST was assessed by a investigator who was unaware of group allocation. POST was graded on a 4 point verbal analogue scale(VAS) pain score (0-3) with 0= no sorethroat,1=mild sorethroat (complains of sorethoat only on asking), 2= moderate sorethoat(complains of sorethoat only on his/her own), 3=severe sorethoat (change of voice or hoarseness, associated with throat pain).

Statistical Analysis

Data were expressed as mean 95% confidence interval of mean for height, weight, age, duration. Categorical data (sex, ASA grade, POST score) were expressedas frequency of occurrence. Comparison of continuous data between groups were done using ANOVA of means P value of < 0.05 was considered statistically significant. Comparisons of categorical data between groups wsa done using Chi-square test, P value of <0.05 considered statistically significant. SPSS 13.0(SPSS Inc, Chicago,IL) was used for statistical analysis.

RESULTS

Out of 90 patients, 88 completed the study. Two patients (1 each from the group BH & K) could not gargle properly and were therefore excluded. There was no significant difference among the groups in term of age, gender, height, weight, ASA grade and duration of intubation [Table 1]. The mean duration of intubation was146.60, 138.86 and 148.28 mins in group C, group BH and group K respectively. No statistical correlation was observed between the incidence of POST at different time interval and age, gender, height, weight and duration of intubation [Table 2]. The incidence of POST in control group was more frequent compared to group BH and group K at all the time ($P<0.05$). There was no difference in the incidence of POST between group BH and group K at any time ($P>0.05$) [Table 3]. Regarding severity of POST, moderate POST was significantly high in group C at 0Hr & 2Hr compared to group BH & Group K ($P<0.05$). Mild POST was significantly more in group C compared to group BH at 24Hr.The severity of POST was similar between group BH & group K at all the time ($P>0.05$) [Table 4].

Table 1: Dermographic data presented as either mean with 95% confidence interval for mean or as number

Variables	Group-C(n=30)	Group-BH(n=29)	Group-K(n=29)	P-value
Age(yr) mean&95%C.I	37.67	42.38	38.93	0.22
Gender(M/F)	17/13	16/13	18/11	0.85
Weight(kg)mean&95%C.I	58.43	58.24	59.28	0.85
Height(cm)mean&95%C.I	161.73	160.69	161.90	0.71
Duration Intubation (min) mean&95%C.I	146.60	138.86	148.28	0.25
ASA grade (I/II)	24/6	20/9	21/8	0.61

Table 2: Specimen's coefficients(r) for age, gender, height, weight and duration of intubation with POST.

Variables	0Hr	2Hr	4Hr	24Hr
Age	0.042	0.062	0.016	0.018
Gender	0.048	0.040	0.032	0.058
Height	-0.058	-0.046	0.002	0.015
Weight	-0.026	-0.062	0.082	-0.011
Duration of intubation	-0.042	-0.090	-0.111	0.015

Table 3: Incidence of POST in the groups at various time intervals.

Time interval	Groups			p- values(inter group comparison)		
	C n=30	BH n=29	K n=29	Between C & BH	Between C & K	Between BH & K
0Hr	23(76.&%)	7(24.2%)	8(27.6%)	0.000	0.000	0.764
2Hr	19(63.4%)	4(13.8%)	6(20.7%)	0.000	0.001	0.487
4Hr	14(46.7%)	2(6.9%)	4(13.8%)	0.001	0.006	0.389
24Hr	9(30%)	0	1(3.5%)	0.001	0.007	o.313

Table 4: Severity.

	0Hr			2Hr			4Hr			24Hr		
Groups	C	BH	K	C	BH	K	C	BH	K	C	BH	K
Groups	30	29	29	30	29	29	30	29	29	30	29	29
Mild	14	7	8	11	4	6	8	2	4	6	0*	1
Moderate	7	0*	0*	6	0*	0*	5	0	0	2	0	0
Severe	2	0	0	2	0	0	1	0	0	1	0	0

Severity POST.* denotes P<0.005 during inter group comparison between group C vs BH, ** denotes P<0.05 during inter group comparison between group C vs K.

DISCUSSION

The present study compared the effectiveness of preoperative gargle of the study drugs (either benzydamine hydrochloride or 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 abdominal surgery.

In our study we did not find any significant difference between the groups in terms of age, gender, height, weight, duration of intubation and ASA grade [Table 1]. Several contributing factors for POST after surgery have been reported, including patient sex, age, gynecological surgery, use of succinyolcholine, large tracheal tube cuff design, and intracuff pressure.[3,11,13] No correlation was observed between incidence of POST, age, gender, height, weight and duration of intubation. [Table 2] Similar results were found by studies of Canbay et al.[6] They obsevered no correlation between POST and age, gender, smoking habit, duration of surgery and intubation. Rudra et al,[26] also did not find any correlation between the incidence of POST and age, gender, duration of surgery, duration of intubation in their study.

In the control group the incidence of POST at 0 hr was 76.7% and 30% at 24 hr. the reported incidence of POST is between 28% to 80%.[1-5] Our results in the control group was consistent with previous findings. Agarwal et al7 observed the incidence of POST in the control group at 0 hr and 24 hr to be 80% (16/20) and 20% (4/20) respectively.

In the BH group the incidence of POST at 0 hr was 24.2% and 0% at 24 hr. similar results were found by Agarwal et al.[7] In the K group the incidence of POST was 27.6% at 0 hr and 3.5% at 24 hr. Rudra et al26 (2009) found a similar result, they observed a small reduction in the incidence of POST in K gargle group at 24 hr which was 30% compared to 0 hr where it was 35%.

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 (P<0.05). Agarwal et al,[7] also notived the incidence compared to BH gargle group, for 24 hr. Huang et al,[24] observed the control group at 0,2,4 and 24 hr, postextubation. Similarly Hung et al,[23] noticed a significant reduction in the incidence of POST at

1,6,12 and 24 hr postextubation in BH group compared to normal saline.

Canbay et al,[6] 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,[26] also observed a significant increased of incidence of POST in the control group compared to ketamine group at 4,8 and 24 hr. We did not find any difference in the incidence of POST between the BH and K group at any time [Table 3], (P>0.05).

In our study significantly more number of patients suffered from moderate POST in the control group at 0 and 2 hr compared to both the study groups (P<0.05) and more number patients in control group complained of mild POST compared to BH group at 24 hr (P<0.05) [Table 4]. There was no significant difference between severity of POST between BH and K group. Agarwal et al,[7] noticed that significantly more number of patients had severe POST in group C at 0 and 2 hr compared to BH and aspirin group. The severity of POST was similar between aspirin and BH group. In Canbay et al,[6] study, the incidence of severe POST in the control group was 21.7% (5/23) at 4 hr and 26.1% (6/23) at 24 hr which was significantly more compared to the ketamine group. But in this study, we observed the incidence of severe POST in the control group to be 3.4% at both 4 and 24 hr which was not significantly high compared to group BH and group K.

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.[11,20] Reduction of this inflammation by benzydamine as well as by ketamine gargling may be the reason for decrease in the incidence and severity of POST in our study. In Agarwal et al,[7] (2006) study, 2 patients out of 19 complained of numbness of mouth and dysgeusia following BH gargle. Similar side effects were observed by Kati et al,[8] when they applied Bh spray to posterior pharyngeal wall before introducing LMA. But no serious complications were noticed. In our study none of the patients complained of such side effect in BH group.

Erhan et al,[25] infiltrated the tonsillar region with ketamine which reduced the postoperative pain score without any systemic side effects of ketamine. In our study 2 patints complained of bitterness of the ketamine gargle. Out of these two patients one could not gargle properly and hence was excluded from the study group. No systemic side effects of ketamine were noticed. Park et al,[27] (2010) suggested that topical application of ketamine, and not systemic ketamine, may influence POST, reduce local inflammation, and mediate the peripheral anti-nociceptive effect. The systemic effect of BH in reducing POST was ruled as systemic absorption of the durg is very low when it is used as a topical application51.

CONCLUSION

To conclude, the result of the present study indicates the fact that 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.Both Benzydamine and Ketamine gargle significantly reduces the incidence and severity of POST compared to distilled water gargle, up to 24 hrs.Both BH and K gargles are safe, simple and equally effective in reducing POST symptoms. However BH has an added advantage of better taste thank K, which has slight bitter taste.

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. B 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: 408-412.
6. Canbay O, Celebi N, Sahin A, Celiker V, Ozgen S, Aypar U: Ketamine gargle for attenuating postoperative sore throat: a prospective, randomized, single-blind study. Anesth Analg 2006; 103: 1001-3.
7. 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.
8. Kati I, Tekin M Silay E, Huseyinoglu UA, Yildiz H: Does benzydamine hydrochloride applied preemptively reduce sore throat due to laryngeal mask airway? Anesth Analg 2004; 99: 710-2, table of contents.
9. Keene WM, Dnneny JC, Rowe LD, Atkins JP, Jr Complications of intubation. Ann Otol Rhinol Laryngol 1982; 91: 584-7.
10. McHardy FE, Chung F: Postoperative sore throat: cause, prevention and treatment. Anaesthesia 1999; 54: 444-53.
11. Peppard SB, Dickens JH: Laryngeal injury following short-term intubation. Ann Otol Rhinol Laryngol 1983; 92: 327-30.
12. Chen KT, Tazeng JI, Lu CL Liu KS, Chen YW, Hsu CS, Wang JJ Risk factors associated with postoperative sore throat after tracheal intubation: an evaluation in the postanesthetic recovery room. Acta Anaesthesiol Taiwan 2004; 42: 3-8.
13. Stout DM, Bishop MJ, Dwersteg JF, Cullen BF: Correlation of endotracheal tube size with sore throat and hoarsencess following general anesthesia. Anethesiology 1987; 67; 419-21.
14. Loser EA, Bennet GM, Orr DL, Stanley TH: Reduction of postoperative sore throat with new endotracheal tube cuffs. Anethesiology 1980; 52: 257-9.
15. Loeser EA, Kaminsky A, Diaz A, Stanley TH, Pace NL: the influence of endotracheal tube cuff design and cuff lubrication on postoperative sore throat. Anethesiology 1983;58: 376-9
16. Loeser EA, Stanley TH, Jordan W, Machin R: Postoperative sore throat: influence of tracheal tube lubrication versus cuff design. Can Anesth Soc J 1980; 27: 156-8.

17. Mandoe H, Nikolajen L, Lintrup U, Jepsen D, Molgaard J: Sore throat after endotracheal intubation. Anesth Analg 1992; 74: 897-900.
18. Jensen PJ, Hommelgaard P, Sondergaard P, Eriksen S: Sore throat after operation: influence of tracheal intubation, intracuff pressure and type of cuff. Br J Anaesth 1982; 54: 453-7.
19. 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.
20. Elhakim M, Siam A, Rashed I, Hamdy MH: topical tenxicam from pharyngeal pack reduces postoperative sore throat. Acta Anaesthesiol Scand 2000; 44: 733-6.
21. Turnbull RS: Benzydamine Hydrochloride (Tantum) in the management of oral inflammatory conditions. J Can Dent Assoc 1995; 61: 127-34.
22. Baldock GA, Brodie RR, Chasseaud LF, Taylor T, Walmsley LM, Catanese B: Pharmacokietics of benzydamine after intravenous, oral, and topical doses to human subjects. Biopharm Drug Dispos 1991; 12: 481-92.
23. Hung NK,Wu CT,Chan SM,Lu CH,Huang YS,Yeh CC,Lee MS,Herng CH: Effect on postoperative sore throat of sprayin the endotracheal tube cuff with Benzydamine hydrochloride,10% Lidocaine and 2% Lidocaine.Anaesth Analg 2010.
24. Huang YS,hung NK,Lee MS, Kau CP,Yu JC, Huang GS,Cherng CH,Wong CS,Chu CH,Wu CT: The effectiveness of Benzydamine hydrochloride spraying on the endotracheal tube cuff or oral mucosa for post operative sorethroat.anaesth Analg 2010.
25. Erhan Ol,Goksu H,Alpay C,Bestas:Ketamine in post tonsillectomy pain.Int J Pediatr Otorhinolaryngol 2007;71:735-9.
26. Rudra A, Ray S, Chatterjee S,Ahmed A,Ghosh S: Gargling with Ketamine attenuates the post operative sore throat. Indian J Anaesth 2009;53:40-3.
27. Park Sy,Kim SH,Noh JI,Lee SM,Kim MG,Kim SH,Ok SY<Kim SI: The effects of intravenous low dose ketamine for reducing postoperative sore throat.Korean J Anaesthesiol;59:22-6.

How to cite this article: Kumar A, Panigrahy S, Routray D. An Evaluation of the Efficacy of Ketamine Gargle and Benzydamine Hydrochloride Gargle for Attenuating Post Operative Sore Throat: A Prospective Randomized, Placebo Controlled Single- Blind Study. Ann. Int. Med. Den. Res. 2019; 5(5):AN32-AN36.

Source of Support: Nil, **Conflict of Interest:** None declared