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Original Research Article

A PROSPECTIVE, RANDOMIZED DOUBLE BLIND STUDY ON EFFECTIVENESS OF ZINC LOZENGES FOR POSTOPERATIVE SORE THROAT

Dr. Shraddha Mehta[1*], Dr. Jotika Singh[2], Dr. Rashpal Singh Gil[3]

[1*]Anaesthetist, PGMO, MGM Medical College, Indore, M.P, India.
[2]Senior Resident, GTB Hospital, New Delhi, India.
[3]Assistant Professor, MGM Medical College, Indore, M.P, India.

Corresponding Author: Dr. Shraddha Mehta, Anaesthetist, PGMO, MGM Medical College, Indore, M.P, India.

Abstract:
Background: Post operative sore throat (POST) is a common issue encountered in patients undergoing surgery under general anaesthesia with endotracheal tube. Our study aimed to evaluate efficiency of Zn lozenges on post operative sore throat by comparing it with placebo.
Method: Total 80, ASA I and ASA II, patients of age group 20 to 60 years, posted for surgery lasting for 1 to 4 hours under general anaesthesia with endotracheal intubation were randomly allocated in two groups, group Zn (patients receive Zn lozenges in preoperative period) and group P (received placebo preoperatively). Incidence rate and severity score of POST at 0, 2, 4 and 24 hr postoperatively were observed. SPSS17.0 version used. Student's T test and Mann Whitney U test used for continuous variables. Nominal categorical data compared using Chi-square and Fisher's exact test. $P<0.05$ considered statistically significant.
Result: The overall incidence of POST in group Zn and group P was 15% and 37.5%, respectively ($p <0.05$). We found statistically significant difference in incidence of mild POST between groups at 0, 2, 4 hours postoperative. The incidence of moderate POST, at different interval of time, was found to be more in group P but the difference was statistically insignificant. No incidence of severe POST reported in both the groups.
Conclusion: Zn lozenges helps to alleviate POST.

Keywords: sore throat, zinc, placebo, lozenges.

1. INTRODUCTION

POST is one of the most common adverse effects observed in post operative period in patients undergoing surgery under general anaesthesia with endotracheal tube (ETT). Its incidence ranges from 14.5 to 50%. Female preponderance is also noticed for POST [1].

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Many factors like mechanical injury of the airway mucosa caused by forceful or prolonged laryngoscopy, use of stylet loaded ETT and number of attempts increases its occurrence. It may be the result of airway mucosal irritation and Inflammation. The cuff of endotracheal tube continuously exerts pressure on the mucosal wall leading to POST [2,3]. Therefore, one should regularly check endotracheal tube cuff pressure and maintain it less than 20cm of water.

In addition to non-pharmacological measures, various pharmacological options with variable results can be explored in literature [3,4]. Use of steroids, NSAIDS, lidocaine, NMDA antagonist and other anti-inflammatory drugs via different modes of administration were mentioned in previous studies for prevention and treatment of POST [5,6,7]. Despite all these efforts, patients are not completely satisfied.

A micronutrient Zn has profound anti-oxidant and anti-inflammatory property. Zinc has been proving its effectiveness in the prevention of oral mucositis, xerostomia, and chemotherapy associated pain][8,9]. In previous studies, topical use (to avoid systemic side effects) of Zn for reduction of incidence] and severity of POST were described. Thus, in our study we are comparing Zn lozenges in terms of efficacy on incidence and severity on POST.

2. METHOD

Our study is a prospective, randomised, double blinded, comparative study done at tertiary hospital during January 2021 to 2022 after taking permission from ethical committee. Written and informed consent was taken from the study participants. All the patients who underwent surgery under general anaesthesia with ETT in supine position lasting for more than 1 hour and less than 4 hours were included in the study. ASA grade III or more, pregnant patients, smokers, asthmatics, patients allergic to Zn were not included in the study. Based on previous studies, we have taken sample size of 100 patients which were equally divided in two groups.

Group Zn: Zinc (Zn) lozenges in the form of zinc sulphate (40 mg elemental zinc) given 30min before induction of general anaesthesia.

Group P: A matched placebo (P) lozenges given 30min before induction of general anaesthesia.

In preoperative room, lozenges were given to patient and made the patient completely dissolve it 30 min before the induction of general anaesthesia.

After this, patient was transferred to operating room, where standard monitors were attached and hemodynamic parameters were recorded in every 5 minutes interval. Similar induction protocol of induction with intravenous fentanyl (2mcg/kg) and intravenous propofol (2mg/kg) was followed for every patient. All intubations were performed by trained anaesthetists with experience of more than three years using direct laryngoscopy with intravenous atracurium (0.5mg/kg) in single attempt. Those patients in which we encountered prolonged (> 50 sec), difficult (CLG grade >/=3, number of attempts >2), or assisted intubation (use of bougie or stylet) were excluded from the study. Adequate size of ETT was secured and cuff pressure was maintained <20cm of water. Controlled mechanical ventilation and maintenance of anaesthesia was done using isoflurane (MAC 1.2), oxygen 50% and nitrous oxide 50%,

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intravenous atracurium (0.1mg/kg), intravenous diclofenac (75mg), intravenous ondansetron 4mg given 15 minutes before completion of surgery. Before extubation, gentle oral suctioning was done. Intravenous 5ml myopyrrolate was given to reverse neuromuscular block after gaining spontaneous respiration. Patient was transferred to post operative recovery unit (PACU) in awake state with ability to follow commands and movement of all limbs. Immediately after entering PACU, observations for incidence and severity of POST were recorded at 0,2,4,24 hour postoperatively. The incidence of POST was defined as its presence at the given time while the severity was graded on a four-point scale ranging as follows-

Score 0: no sore throat

Score 1: mild sore throat (patient complains sore throat only on questioning)

Score 2: moderate sore throat (patient complains sore throat on its own)

Score 3: severe sore throat (associates with hoarseness and/or throat pain)

Statistical analysis: Statistical testing was conducted with the statistical package for the social science system version SPSS 17.0. The comparison of normally distributed continuous variables between the groups was performed using Student's t test. Nominal categorical data between the groups was compared using Chi-squared test and Fisher's exact test. Non-normal distribution continuous variables were compared using Mann Whitney U test. For all statistical tests, a P value less than 0.05 was considered statistically significant.

3. RESULT

80 patients were included in the study and randomly equally allocated in two different groups of 40 patients each – Group Zn and Group P.

The two groups were demographically comparable, there was no statistically significant difference between two groups with $P > 0.05$.

The mean age in group Zn was 49.1+/-9.1 years while the mean age of group P was 35.21 + 13.48 years. The mean BMI in both groups were 24.24 +/- 1.40 and 24.72 +/- 1.30 respectively. The mean intra-operative HR in both groups was 79.1 +/-6.8and 77+/-5.3 bpm respectively. The mean intra-operative MABP in both the groups was 81+/-7.12 and 83+/-6.89 mm of hg respectively. The mean duration of laryngoscopy in both groups were 26 +/-5.1secs and 24.5+/-4.38 secs respectively. The mean duration of surgery was 136+/-21.4 and 133+/-19.6 minutes respectively (**Table 1**).

Table 1: Demographic parameters

Parameter	Group Zn	Group P
Age (years)	49.1 +/- 9.1	46.9 +/- 10.32
Sex (Male/Female)	12/18	16/14
BMI	24.24 +/- 1.40	24.72 +/- 1.30
Duration of surgery (minutes)	136 +/- 21.4	133 +/- 19.6
ASA (I/II)	21/9	23/7
Duration of laryngoscopy in	26 +/- 5.1	24.5+/-4.38

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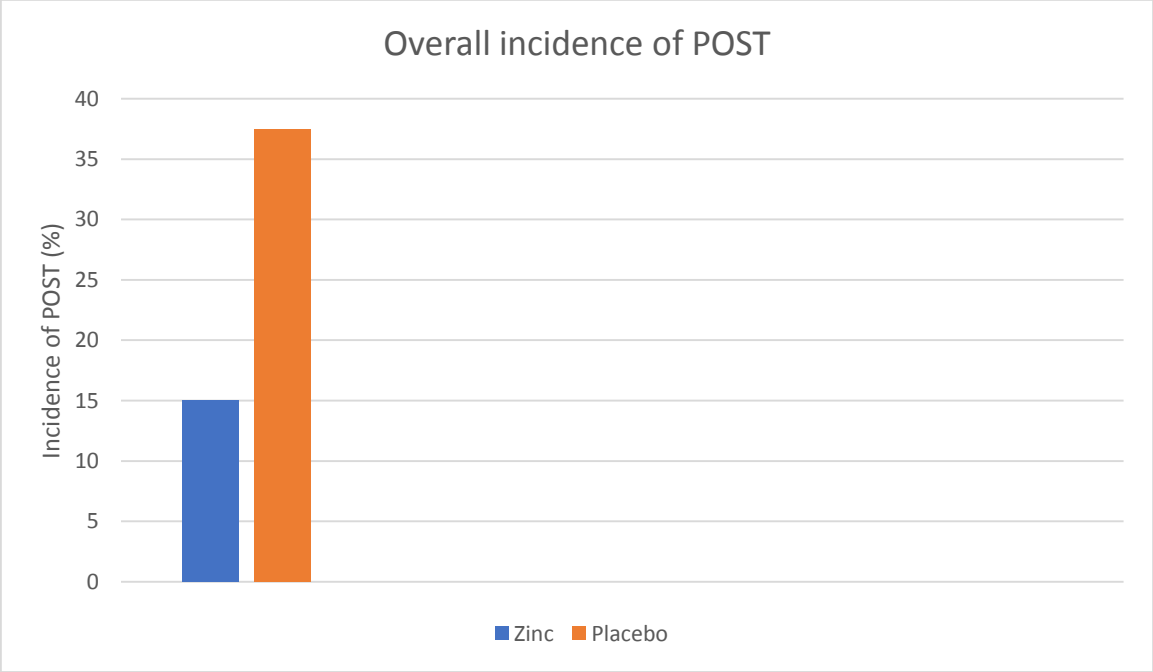
sec		
Laryngoscopy attempts (1/2)	90%/10%	88%/12%
Duration of surgery in min	125.3 +/- 11.2	121.8+/-15.9
Mean Intra-op HR	79.1+/-6.8	77+/-5.3
Mean Intra-op MABP	81+/-7.12	83+/-6.89

The overall incidence of POST (**Chart 1**) in group Zn was 15% whereas it was 37.5% in group P (p value = 0.003).

Chart- 1



Post operative time in hours	Group Zn (in %)	Group P (in %)	P value
0	2.5	25	0.003
2	12.5	37.5	0.049
4	10	30	0.041
24	15	27.5	0.31

Table 2: Incidence of POST in percentage at different time intervals

Post operative time in hours	Group Zn (40)	Group P (n= 40)	P value
0	2.5	20	0.002
2	10	32.5	0.002

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4	5	25	0.001
24	12.5	22.5	0.003

Table -3: Incidence of mild POST in percentage at different time interval

Post operative time in hours	Group Zn	Group P	P value
0	0	5	0.18
2	2.5	5	0.76
4	5	5	1
24	2.5	5	0.76

Table -4: Incidence of moderate POST in percentage at different time interval

The incidence of POST at 0 hour in group Zn was 2.5% whereas it was 25% in group P. At time 2 hour, 12.5% patients of Zn group complained POST and 37.5% of the group P reported POST (adjusted P = .049). 10% of Zn group and 30% of group P reported POST (adjusted P = .041) at time 4 hour postoperatively. At time interval 24 hours postoperatively, 15% of Zn group and 27.5% of group P reported POST (adjusted P = 0.31) (**Table-2**).

We observed statistically significant difference in incidence of mild POST between both the groups at 0,2,4 and 24 hours postoperatively ($p<0.05$). We noted that 2.5% of Zn group patients and 20% of group P patients had mild POST at 0 hour. At 2 hours, 10% of group Zn and 32.5% of group P had mild POST. 5% of group Zn and 25% of group P patients reported mild POST at 4 hours postoperatively. At 24 hours postoperatively, 12.5% of group Zn and 22.5% of group P had mild POST (**Table-3**).

At 0 hour postoperatively, no patients in group Zn had moderate POST whereas 5% of group P patients had moderate POST. The incidence of moderate POST at 2 hours in group Zn and P were 2.5% and 5% respectively. There was equal incidence of moderate POST (5%) in both the groups at 4 hours postoperatively. 2.5% of group Zn and 5% of group P had moderate POST at 24 hours postoperatively. The incidence of moderate POST was found to be more in group P but the difference was statistically insignificant (**Table -4**). No incidence of severe POST reported in both the groups.

4. DISCUSSION

Our study is a prospective, randomised, double blinded, comparative study conducted in eighty patients to compare efficacy of Zn and placebo lozenges on POST in patients undergoing surgery lasting for the duration of one to four hours under general anaesthesia with endotracheal tube. Demographically both the groups were found to be comparable. Factors affecting incidence and severity of POST such as duration of surgery, attempts and duration of laryngoscopy, were found to be comparable in both the groups. We maintained endotracheal cuff pressure <20 cm of water throughout the surgery in both the groups.

The total incidence rate of POST in group Zn and P were 15% and 37.5% respectively. This difference is statistically significant ($p <0.05$). We found statistically significant difference in

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incidence of POST between groups at 0, 2, 4 hours postoperative. The results of our study are similar to the study done by Tanmay Sarkar et al, who observed that, the overall incidence of POST in Zinc group was 20.5% and Placebo group was 45.5% (P = 0.01), resulting in greater than 50% reduction in incidence of POST [10]. The antioxidant and anti-inflammatory property of zinc is responsible for such significant difference in incidence of POST between the groups. Zinc prevents cytokine release, decreases cyclooxygenase-2 (COX-2) expression, and prostaglandin-E2 (PGE-2) release [8,9]. In contrast to our observation Arman Parvizi et al concluded that applying topical zinc as a pack to the throat had no significant effect on reducing sore throat [11]. This study focused more on the effect of packing on sore throat after septo-rhinoplasty, which could be a reason for its different opinion.

We observed statistically significant difference in incidence of mild POST between both the groups at 0,2,4 and 24 hours postoperatively ($p<0.05$). The incidence of moderate POST was found to be more in group P but the difference was statistically insignificant. No incidence of severe POST reported in both the groups. In the study done by Borzoo Farhang et al, comparing efficacy of zinc over placebo for incidence and severity of POST, found similar results [12].

We have also observed that there was peak in the incidence of POST at 2nd post operative hour in group P. This could be explained by the fact that patients are usually become more awake and responsive by this time after the surgery as compared to immediate weaning from the general anaesthesia and so they are more cooperative to participate in the study. The incidence of POST peaks at 24 hours in group Zn. This can be explained by the fact that in our study lozenges were not repeated in postoperative period and thus the effect of zinc lozenge is probably weaning down by this time.

Limitation:

The results of our study may differ with a different preparation of study drugs (lozenges or nebulisation) or in other study populations (e.g. paediatric, geriatric, airway surgery, etc.). Higher sample size and multicentric study would have strengthened our results.

5. CONCLUSION

We can conclude that significant reduction in the incidence and severity of POST can be achieved with a single dose of 40 mg oral zinc lozenge, administered 30 minutes preoperatively, in the first 4 hours after endotracheal intubation.

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