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Role of Prophylactic Oral Zinc Tablet in the Management of Sore Throat Following Endotracheal Intubation

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ABSTRACT

Background: This study was intended to evaluate the role of dispersible zinc tablet in the management of sore throat following endotracheal intubation.

Materials & Method: This study included sixty-three patients who underwent surgical intervention with endotracheal intubation. All the patients were randomly assigned into two groups. Group I (test group) included patients who received dispersible zinc tablet 40 mg prophylactically 30 minutes before endotracheal intubation while Group II (control group) included patients who received placebo tablet 30 minutes before endotracheal intubation. Patients were evaluated for the incidence and severity of sore throat in the postoperative phase following endotracheal intubation, on a 4-point scale (0–3) at 0, 30 min, 2, 4, and 24 h postoperatively. The primary outcome variable was incidence of postoperative sore throat at 4 h postoperatively. Secondary outcome variable was severity of postoperative sore throat at the 5 evaluation time points postoperatively. Mann–Whitney U test, Fisher's exact, and Chi-square test were used as applicable.

Results: At 4 h, there was a significantly lower incidence of postoperative sore throat in test group than the control group with a P value of 0.003. Three patients in control group complained of severe postoperative sore throat compared to none in the test group. The severity of postoperative sore throat was significantly lower in the test group than the control group at 0 min ($P = 0.003$), 30 min ($P = 0.002$), 2 h ($P < 0.001$), and 4 h ($P = 0.001$).

Conclusion: Prophylactic administration of 40 mg dispersible zinc tablet effectively reduces the incidence and severity of postoperative sore throat following endotracheal intubation.

Keywords: Zinc, postoperative sore throat, endotracheal intubation.

INTRODUCTION

Conventionally orotracheal intubation is employed in all clinical scenarios for surgical interventions under GA. In majority of the trauma involving the maxillofacial region, the airway is secured by nasotracheal intubation to prevent interference to the maxillomandibular fixation and surgical

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approach.[1] In the repair of cleft lip and palate, nasotracheal intubation would hinder with closure of muscle and mucosa.[2] Hence, oral intubation becomes more favorable in such clinical situations. In complex craniomaxillofacial trauma, the airway is secured through a tracheostomy.[3]

In clinical scenarios where there is trismus secondary to temporomandibular joint (TMJ) ankylosis or oral submucous fibrosis, a blind awake intubation or a retrograde intubation needs to be employed. In pediatric patients with dysmorphic syndromes, especially those with retrognathism or micrognathia, obstructive breathing and difficulty in intubation are frequently encountered.[4] Literature is replete with articles that have evaluated the various intubation techniques for difficult clinical situations, with relevancy to the maxillofacial region.[5,6,7]

Sore throat in the immediate postoperative period is a common complaint noted in patients receiving general anesthesia.[8,9] Zinc is a micronutrient with anti-inflammatory and antioxidant properties which promotes growth, tissue repair and modulates immune system.[10] As a topical agent zinc has been used for prevention of oral mucositis in patients receiving high dose chemotherapy.[11] Hence, this study was intended to evaluate the role of dispersible zinc tablet in the management of sore throat following endotracheal intubation.

MATERIALS & METHOD

This was a prospective, randomized, double-blinded placebo control trial conducted on 63 patients belonging to the age group of 18 to 60 years. Randomization was done with the aid of a computer-generated random number table and sealed envelope method to receive either dispersible zinc tablet or a placebo. All patients belonged to ASA I / II. All patients in whom the surgical intervention was more than 1 h and less than 6-h duration were included in this study. This specific surgical duration was chosen to ensure that the patient was intubated long enough to cause irritation of oropharyngeal mucosa. Smokers, pregnant patients, patients with a recent history of sore throat or upper respiratory tract infection, Malampatti grade (MPG) greater than II and patients with allergy to zinc were excluded from the study. Traumatic or more than one attempt made for intubation is also excluded from the study.

Institutional ethics committee clearance was obtained. Following written informed consent from the patient a sealed and coded envelope with either zinc or placebo tablets was given to the patient, with instruction to dissolve the tablet in mouth by sucking on it 30 min prior to surgery. The test group received two dispersible zinc sulfate tablets (equivalent to 40 mg elemental zinc) while the control group received two placebo tablets with no active ingredient but were indistinguishable in appearance and taste from the test drug. The investigators and the patients were blinded about the content of the envelope and the code was maintained until the completion of the study.

All patients underwent standard nasotracheal intubation by an experienced anesthesiologist. The laryngoscope view of glottis was classified using Cormack–Lehane classification as follows: grade 1––full glottic view, grade 2––only posterior extremity of glottis visible, grade 3––only epiglottis visible, and grade 4––no recognizable structure visible without laryngeal manipulation. Duration of laryngoscopy (time from opening mouth to the placement of the endotracheal tube) and the intubation time (the interval between the insertion of the laryngoscope blade into the mouth to the inflation of the endotracheal tube cuff) was recorded in all patients.

Anaesthesia was maintained with 2% sevoflurane in 60% N2 O and 40% O2 mixture, intermittent fentanyl and atracurium at 0.15 mg/kg was used when required. The cuff pressure of the endotracheal tube was adjusted every 30 min, using a handheld pressure gauge and maintained between 20 and 22 cm of H2 O to limit nitrous oxide related increase in the cuff pressure. The use of steroids and anti-inflammatory drugs was recorded

During emergence from anaesthesia, any coughing or bucking was duly noted. The presence of traumatic intubation in form of blood in the oropharynx was visually confirmed and such cases were excluded from the study. Upon completion of the surgery, the patients were extubated following careful suctioning of the oropharynx and were transferred to the ICU. The severity of sore throat in the immediate postoperative period was graded on

a 4-point scale ranging from 0 to 3; 0 being no sore throat, 1 being mild discomfort (complaints only upon questioning), 2 being moderate sore throat (complains of his/her own), and 3 being severe sore throat (change in voice, hoarseness and throat pain). The evaluation of the incidence 7 the severity of sore throat in the immediate postoperative period was done at 30 min, 2, 4, and 24 h. Any side effects such as nausea, vomiting, metallic taste, and diarrhea associated with drug were also noted.

All analyses were performed using Statistical Package for the Social Sciences (SPSS) software program, version 23.0 (SPSS, Chicago, Illinois). All categorical variables were expressed as number and percentage, whereas the continuous variables were expressed as mean ± standard deviation. During the 24 h evaluation period in ICU, the incidence of sore throat between groups was compared using the Chi-square test. The P value for the primary outcome and secondary analysis was set at 0.01 (0.05/5; Bonferroni correction). The analysis for severity of sore throat at 0, 30 min, 2, 4, and 24 h was done using Mann–Whitney U test with Bonferroni correction and a value of $P < 0.01$ was considered significant (0.05/5 = 0.01). Patient demographics and intraoperative variables were analyzed with the Mann–Whitney U test for continuous variables and Fisher's exact or Chi-square tests for categorical variables.

RESULTS

This study included 63 patients belonging to the age group of 18 – 60 years with a mean age 34.5 years. Amongst them 37 were males and 26 were females. Amongst the 63 patients, 33 patients belonged to the test group while 30 patients belonged to the control group. The mean duration of laryngoscopy in the test group was 15.34±3.66 seconds while in the control group was 14.09±3.72 seconds. The mean duration of anaesthesia in the test group was 131.29±22.58 minutes while in the control group was 140.68±27.19 minutes. The mean surgery duration in the test group was 117.38±28.79minutes while in the control group was 128.98±30.31minutes.

The overall incidence of sore throat in test group was 17% while in the control group was 39% (P = 0.01). The incidence of sore throat in the immediate postoperative period between two groups at 0, 30 min, 2, 4, and 24 h is shown in Graph 1. A statistically significant difference was found between groups in our primary outcome with a P of 0.003. The incidence of POST between groups was also found to be statistically significant at 30 min ($P < 0.001$) and 2 h (P = 0.002); however, incidence of sore throat at 24 h postoperative was found to be comparable between the two groups with a P = 0.05.

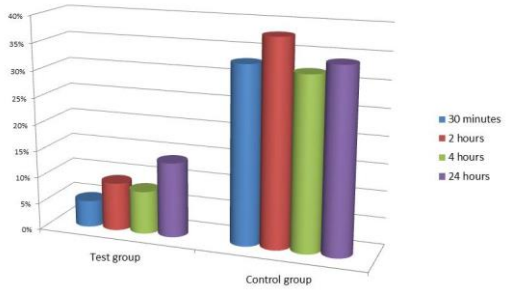

Fig 1: Graph depicting the incidence of sore throat in the immediate postoperative period between the two groups

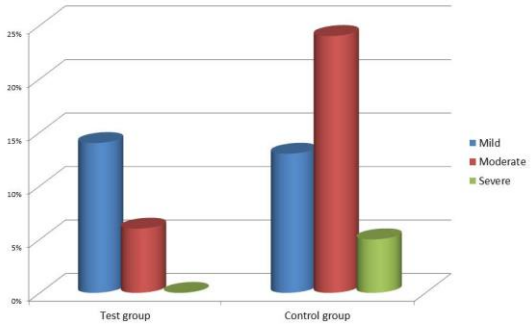

Fig 2: Graph depicting the severity of sore throat in the immediate postoperative period between the two groups

The severity of sore throat in the immediate postoperative period is shown in Graph 2. The severity of sore throat in the immediate postoperative period was significantly lower in the test group than the control group at 30 min (P = 0.002), 2 h ($P < 0.001$) and 4 h (P = 0.001). No statistically significant difference was found in severity of sore throat between groups at 24 h (P =

0.02). Three patients in control group complained of severe POST compared to none in the test group. When comparing overall severity of sore throat between both the groups, the incidence of moderate sore throat was found to be statistically significant. In terms of side effects, no difference in incidences of postoperative nausea, vomiting and diarrhea between both the groups was observed.

DISCUSSION

Airway management is considered to be the most critical intervention required for saving a life.[12] Failure in securing the airway is considered to be the most common cause of serious morbidity and mortality, accounting for up to 0.13%–0.3%.[13] The incidence of difficult intubation for oral and maxillofacial surgical interventions, ranges between 15.4% and 16.9%.[14] Nasotracheal intubation still remains the preferred technique in the majority of oral and maxillofacial surgical interventions. This intubation technique provides airway control through nose, securely facilitating the surgeon with more scope for surgical maneuver for surgical interventions in the head-and-neck region.[15]

Etiology of sore throat in the immediate postoperative period following nasotracheal intubation is multifactorial. Any pharyngeal, laryngeal, or tracheal irritation may lead to inflammation resulting in postoperative sore throat. NSAID's and steroids are generally employed in the management of this clinical scenario.[16] Recent studies have employed magnesium and zinc lozenges to reduce the incidence of this clinical scenario. [17,18]

In this study it was observed that the administration of dispersible zinc tablet orally, 30 min before intubation lead to reduced incidence and severity of sore throat in the immediate postoperative period. The overall incidence of sore throat was also less in the test group which could be attributed to the prevention of cytokine release, decrease in reactive oxygen species, and a subsequent decrease in cyclooxygenase-2(COX-2) expression, and prostaglandin-E2 (PGE-2) release.[19] The findings of our study are very much similar to the previous studies.[16,18]

The limitations of this study include the small sample size and the study not being multicentric. In addition to this, the pharmacokinetic data regarding local effects of oral dispersible zinc tablets was unavailable and hence the dosage and administration time was empirically based on previous studies. Further studies are required to be conducted on larger sample size to ascertain the exact dosage, timing and frequency of administration. Future studies may also compare lozenges with oral dispersible tablets and zinc with other agents that have been previously used to resolve the sore throat in the immediate postoperative period following nasotracheal intubation.

CONCLUSION

Prophylactic single dose of 40 mg zinc dispersible tablet given 30 min before surgery effectively reduces the incidence and severity of sore throat in thee immediate postoperative period following nasotracheal intubation.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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