Postoperative sore throat occurs in up to 90% of intubated patients and is the most common complaint of patients after endotracheal intubation. A recent study suggested that the use of lidocaine to inflate the endotracheal tube cuff would decrease the incidence of postoperative sore throat. The purpose of this prospective randomized study was to compare the incidence and severity of sore throat after using lidocaine, saline, or air to inflate the endotracheal tube cuff.

Variables typically associated with postoperative sore throat, including endotracheal cuff design, endotracheal tube size, intubation technique, laryngoscopy blade, airway placement, suctioning technique, and anesthetic technique, were controlled. The participants were all ASA physical status I, II, or III, female, adult patients undergoing general endotracheal anesthesia for gynecological procedures.

The researcher administered the verbal analogue scale, Melzack's Present Pain Intensity Scale of the McGill Pain Questionnaire, to the 75 participants at two intervals, 1 to 3 hours postoperatively and 22 to 25 hours postoperatively, to assess postoperative sore throat.

Analysis using the Kruskal-Wallis test suggested that there was no statistical difference in postoperative sore throat among the 3 groups. Lidocaine, saline, and air had similar effects on postoperative sore throat.

Key words: Anesthesia complication, endotracheal tube, lidocaine, sore throat.

Introduction

Postoperative sore throat occurs in up to 90% of intubated patients and is the most common airway-related complaint of patients after endotracheal intubation. Many contributing factors have been studied, including the material and design of the endotracheal tube (ETT), lubricants on the tube, the equipment utilized for intubation and airway management, the relaxant or anesthetic administered, hypotension, trauma at laryngoscopy or intubation, and the experience of the practitioner. At present, the most widely accepted theory in the literature is that postoperative sore throat results from tracheal mucosal irritation or damage caused by the ETT.

Lidocaine, an amide local anesthetic, is commonly administered topically or intravenously to attenuate the reflexes associated with intubation, as well as to decrease the incidence and severity of postoperative sore throat. Several in vitro studies have studied the diffusion of intracuff lidocaine and have suggested the use of the ETT cuff as a lidocaine reservoir. Baughman and Navarro hypothesized that the lidocaine would diffuse across the cuff to produce topical anesthesia on the trachea, preventing a sore throat. Their results indicated a significant decrease in the incidence of post-
operative sore throat 24 hours postoperatively. Lidocaine’s elimination half-life, however, is only 1.4 to 1.8 hours, making topical anesthesia unlikely 24 hours postoperatively. Some other mechanism was most likely involved.

In addition to providing anesthesia, lidocaine attenuates the cough reflex by acting on afferent nerve endings in the trachea. The diffusion of the lidocaine could have decreased coughing and bucking on the ETT, which decreased tracheal irritation and damage, resulting in decreased postoperative sore throat.

It is also possible that any fluid, when used to inflate the cuff, could have decreased postoperative sore throat. It has been recommended that saline be used to inflate the cuff to eliminate changes in the volume and pressure of the cuff. The constant volume and pressure could result in decreased sore throat. There also could be other factors associated with the use of saline that might decrease sore throat.

This study was designed to compare the incidence and severity of postoperative sore throat after using lidocaine, saline, or air to inflate the ETT cuff. The research hypothesis was that 2% lidocaine solution without preservative, when used to inflate the endotracheal tube cuff, would decrease the incidence and severity of postoperative sore throat.

Materials and methods

This study was prospective and randomized. Approval was obtained from the institutional review board, and informed consent was obtained from study participants. All adult women scheduled to receive general anesthesia for gynecologic surgery were considered for inclusion in the study. Exclusion criteria included ear, eye, nose, or throat procedures; history of facial or neck surgery; history of chemotherapy or radiation therapy; history of liver disease, cardiac dysrhythmias, or heart block; sensitivity or allergy to lidocaine; prior lidocaine, anticholinergic, or steroid therapy; known difficult airway; difficult intubation; intubation less than 30 minutes; nasogastric tube placement; upper respiratory tract infection or preoperative sore throat; pregnancy; weight less than 35 kg.

Patients who met the criteria for this study were randomly assigned to 1 of 3 groups: to have the endotracheal tube cuff inflated with (1) lidocaine, (2) saline, or (3) air (control group). Randomization was performed by using a random number table; participants were not informed of their group assignments.

All of the enrolled participants were anesthetized. All of the participants received propofol and fentanyl for induction. Relaxation, if required, was obtained with mivacurium, rocuronium, or vecuronium. Anesthesia was maintained with volatile anesthetics, desflurane, isoflurane, or sevoflurane, with or without nitrous oxide. Intubations were accomplishedatraumatically on the first attempt. All patients were intubated with a 6.5-mm or 7.0-mm Sheridan ETT tube, using a MacIntosh 3 laryngoscope blade. The ETT cuffs were inflated to minimal occlusive pressure by inflating the cuff until no air leak could be heard over the trachea. Minimal occlusive pressure was obtained on intubation and checked every 30 minutes for the duration of the procedure. A bite block was placed unless the participant was edentulous. A peripheral nerve stimulator was used to monitor neuromuscular function. At the completion of the surgical procedure, the anesthetics was fully reversed with neostigmine and glycopyrrolate, and the participants were suctioned with a soft suction catheter and extubated when they followed commands.

The instrument used for this study was Melzack’s Present Pain Intensity Scale of the McGill Pain Questionnaire (MPQ). Since its introduction in 1975, many studies have been conducted that support the validity and the reliability of the MPQ. Melzack’s Present Pain Intensity Scale is one part of the MPQ that measures the intensity of pain on the following scale: 0, no pain; 1, mild; 2, discomforting; 3, distressing; 4, horrible; and 5, excruciating.

The verbal analogue scale was administered to the participants to assess postoperative sore throat. The scale was administered at two intervals: 1 to 3 hours postoperatively and 22 to 25 hours postoperatively. Inpatients were questioned in person, whereas outpatients were questioned the first time in person and the second via telephone.

The demographic data were analyzed by using the Fischer exact test (categorical data) and the t-test (parametric data). The present pain intensity scores were statistically analyzed by using the Kruskal-Wallis test.

Results

The final sample included 75 participants. There were no differences among the three groups with regard to ASA physical status, age, height, weight, height, length of anesthesia and intubation, type of premedication and anesthetic, and equipment used to provide anesthesia (Table 1 and Table 2).

The present pain intensity scores are shown in Table 3. The total incidence of postoperative sore throat in this study was 49%, which was less than the 60% average found in the literature. The results of analysis of the present pain intensity
scores for the three groups were not significant \((P = .36)\). This suggests that there was no difference among the groups with respect to the experimentally applied treatment. Although not statistically significant, only 4 of the 75 participants reported scores greater than 3, and all 4 were in the air group.

**Discussion**

Two recent studies have examined the use of a special ETT that allows for topical application of lidocaine to the upper airway. In one study, the topical application of lidocaine was more effective than intravenously with respect to decreased coughing, decreased time to extubation, and no complications.\(^4\) In the second study, a 75% decrease in coughing and bucking on emergence was reported.\(^4\)

Theoretically, using the cuff of an endotracheal tube as a lidocaine "reservoir" should exhibit similar results. As reflected by the results of the present study, however, the use of lidocaine to inflate the endotracheal tube cuff does not appear to be effective in decreasing the incidence or severity of postoperative sore throat compared with the use of saline or air.

These results differ from those of another study that compared the use of lidocaine with the use of air.\(^9\) Differences in methodology included the use of 4% lidocaine and presoaked tubes. Also, cuff pressures were not controlled.

Limitations of this small study must be considered. Positioning of the patients was not kept constant, and the effect of patient positioning on postoperative sore throat is unclear. Also, longer intubations may have allowed greater diffusion of lidocaine and may have shown different results. Another consideration should include the fact that the study was not blind.

No changes in clinical practice can be recommended by the results. In this study, lidocaine, saline, and air had similar effects on postoperative sore throat. Further research is needed to determine whether the use of lidocaine in the endotracheal tube cuff has a significant effect on bucking.

**REFERENCES**


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