

# Comparison between Betamethasone Gel, Lidocaine Jelly and Lubricating Jelly Applied Over Endotracheal Tube to Reduce Post Operative Sore Throat, Cough and Hoarseness of Voice”- Randomised Prospective Study

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**Abstract:** *Introduction:* General anaesthesia is commonly performed procedure in Anaesthesiology practice. The artificial maintenance of airway is the essence of airway maintenance since anesthetized patients are unable to maintain an adequate airway voluntarily. All the patients who were intubated for long term or short term operations, experience some degrees of airway injury. Post-operative sore throat, cough and hoarseness of the voice are often common, uncomfortable sequelae after tracheal intubation. The prevalence of these complications were reported to be around 21% - 65% as per the literature available. Even though these complications are minor they contribute significantly to the post-operative morbidity, patient dissatisfaction and may decrease the patient satisfaction with their anaesthetic and surgical experience. *Methodology:* One fifty three ASA I or II patients scheduled for elective surgery under endotracheal general anaesthesia were randomly allocated into three groups. Tracheal tubes were lubricated with either 2% lidocaine jelly (LJ) or betamethasone gel or lubricating gel for the groups and the patients were interviewed at 1,6, 12 and 24 hours post extubation. *Results:* Water based lubricating jelly group had lower incidence of sore throat, cough and hoarseness of voice in comparison to Betamethasone gel group which had lower incidence in comparison to lidocaine jelly group. *Conclusion:* Hence water based jelly group could be a better lubricating agent for Endotracheal intubation in comparison with 2% lidocaine jelly group and 0.05% Betamethasone gel group

**Keywords:** General Anaesthesia, Endotracheal tube, betamethasone gel, Lidocaine jelly, Water based Jelly, post-operative sore throat, cough and Hoarseness

## 1. Introduction

Despite the developments in anaesthesia and surgery, major surgical operations are still associated with undesirable postoperative sequelae. These represent a significant negative aspect of surgical care, which may in no small way reduce the patient's confidence in the healthcare system. Some of these postoperative sequelae are as a result of endotracheal intubation which is an integral part of anaesthetic practice to protect the airway from regurgitation and aspiration and provide a means of ventilation. Postoperative sore throat, cough and hoarseness of voice are common, uncomfortable, distressing sequelae after tracheal intubation. Throat irritation in the presence of an abdominal or thoracic incision can be very distressing especially in the presence of inadequate analgesia since any attempt to cough causes severe pain.

It has been postulated that these effects are due to mucosal injury with resulting inflammation caused by the process of airway instrumentation or the irritating effects of foreign objects like endotracheal tubes on the airway. Parts of the airway affected include the pharynx, larynx and trachea. Sore throat and hoarseness in the first 24 hours after surgery are among the most common complications of endotracheal intubation. Edomwonyi and colleagues reported that 63% of the general adult surgical population had postoperative throat complications. A higher incidence (72.5%) of postoperative airway complications was reported among obstetric and gynaecological population by Kolawole and

Ishaq. A number of studies have shown that different factors correlate 6-9 with the occurrence of these complications.

These include: age, gender, season, anaesthetic drugs and gases, number of intubation attempts, duration of intubation, size and type of endotracheal tube, endotracheal tube cuff type and size, and site of surgery. Different measures including lubrication of endotracheal tubes with different types of gel are currently being tried to prevent or reduce the occurrence and severity of these throat complications following tracheal intubation.

Betamethasone, a water-soluble steroid that has been used topically for the treatment of inflammatory lesions of the oral mucosa has been consistently proven to reduce these airway complications. Lidocaine hydrochloride gel, 2% is indicated for prevention and control of pain in procedures. It is widely available and often used for lubrication of the endotracheal tubes before insertion, but it has not been found to be very helpful in the prevention of postoperative throat complications when used in the gel form. However, studies have revealed that intravenous lidocaine and lidocaine spray reduce these complications. Water-soluble lubricant which is biologically inert and contains no colour or perfume additives. Water soluble is widely used in medical practice as it does not stain and is easily cleaned up. This study was done to compare the effects of 2% lidocaine, water based jelly and betamethasone jelly on the incidence and severity of sore throat, cough and hoarseness of voice following endotracheal anaesthesia. It was a prospective, randomized, double-blind study carried at Father muller medical college in Mangalore over a period of six months.

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## 2. Patients and Method

One fifty three consenting ASA physical status I or II adult patients scheduled for elective surgery under endotracheal general anaesthesia at Father muller medical college, Mangalore over a period of four months were recruited for the study. Patient with upper respiratory tract infection or preexisting history of throat pain, hoarseness and cough, those on steroid therapy and those who had nasogastric tube or throat packs inserted were excluded. Also excluded were patients in the following category: prolonged surgery (lasting more than 240 minutes), nasotracheal intubation, anticipated difficult intubation, need for rapid sequence induction or re-intubation, head and neck surgery, operation in prone or lithotomy positions and patients with hyperactive airways such as asthmatics, smokers.

Following Institutional Ethics approval, the patients were randomly assigned to 3 groups of 51 patients each using paper balloting. The tracheal tubes of one group were lubricated with 2% lidocaine jelly (LJ) while the tubes for the second group were lubricated with water based jelly and the third group were lubricated with betamethasone. The low-pressure, high-volume single use cuffed polyvinyl chloride (PVC) tracheal tubes (Portex ) were lubricated from the distal end of the cuff to a distance of 15 cm from the tip using 2.5 ml of 2% lidocaine jelly or water based jelly or betamethasone jelly spread uniformly while sterility was maintained. Size 8.0mm or 7.0mm internal diameter were used for male or female patients respectively. The name of the jelly used was not recorded on the anaesthesia chart, but was recorded separately with the patient's code number.

Anaesthesia was induced with intravenous sodium thiopentone, and intubation facilitated with intravenous suxamethonium. Analgesia was provided with fentanyl 2µg/kg. All intubations were performed by experienced physician anaesthetists. The tracheal tube cuff was inflated with just enough room air to prevent an audible leak. Correct tube placement was confirmed by auscultation and the tube was secured with an adhesive tape. A single use oropharyngeal airway (size 3 or 4) was inserted and left in-situ throughout surgery. Anaesthesia was maintained with halothane 0.5–1% in oxygen/air mixture, and muscle relaxation was provided with intravenous vecuronium bromide 0.5mg/kg followed by top up doses as required. Ventilation was mechanically controlled . Noninvasive monitoring including pulse oximetry, blood pressure, electrocardiography and temperature was performed on each patient . At the end of surgery, residual neuromuscular paralysis was reversed with a combination of neostigmine 0.05mg/kg and atropine 0.02mg/kg, the airway was gently suctioned under direct vision and extubation performed after return of the patient's protective airway reflexes and satisfactory spontaneous tidal exchange. The patients were recovered in the post anaesthesia care unit and later transferred to the ward. A blinded anaesthetist interviewed all patients at 1,6, 12 and 24 hours post extubation.

Data collected included demographic details, perioperative vital signs, type of surgery, patient position during surgery, number of intubation attempts, duration of intubation, size and type of tube used and anaesthetic drugs used. Other data

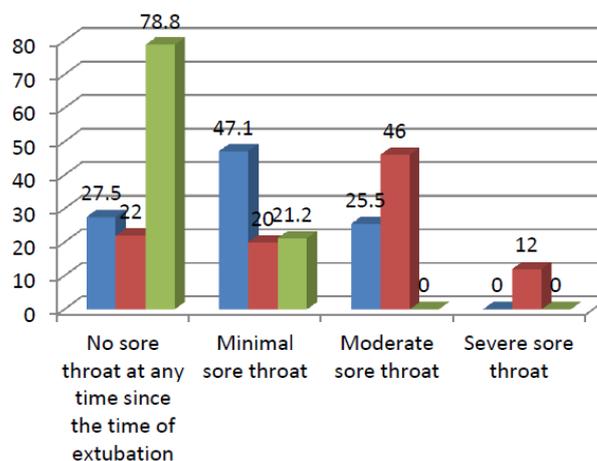
obtained were specific respiratory symptoms (sore throat, cough and hoarseness of voice) at 1 ,6, 12 and 24 hours post extubation and patient satisfaction after endotracheal intubation. Specific respiratory symptoms were scored on a four point Verbal Numerical Rating Scale (None = 0, Mild = 1, Moderate = 2, Severe = 3), and patient satisfaction was assessed with a four point verbal rating scale of Not satisfied, Slightly satisfied, Moderately satisfied and Very satisfied.

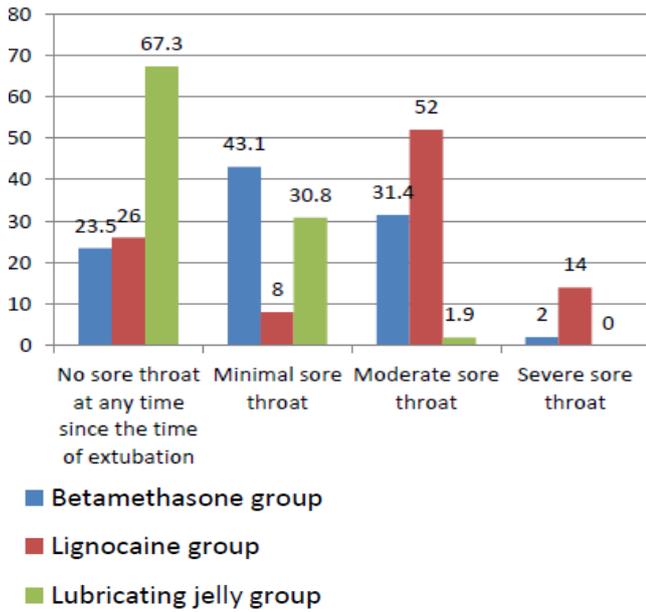
Data were presented as frequencies or proportions of total, means and standard deviations. Tests of significance were calculated using the chi-square for categorical data and student t-test for numerical data with the Statistical Package for the Social Sciences (SPSS). A p-value less than 0.05 was considered statistically significant.

## 3. Results

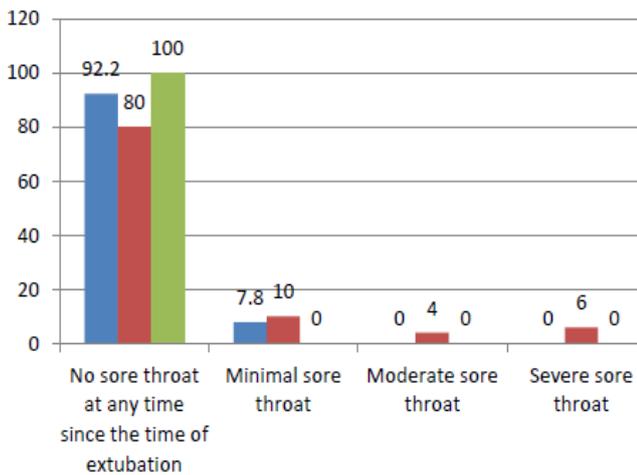
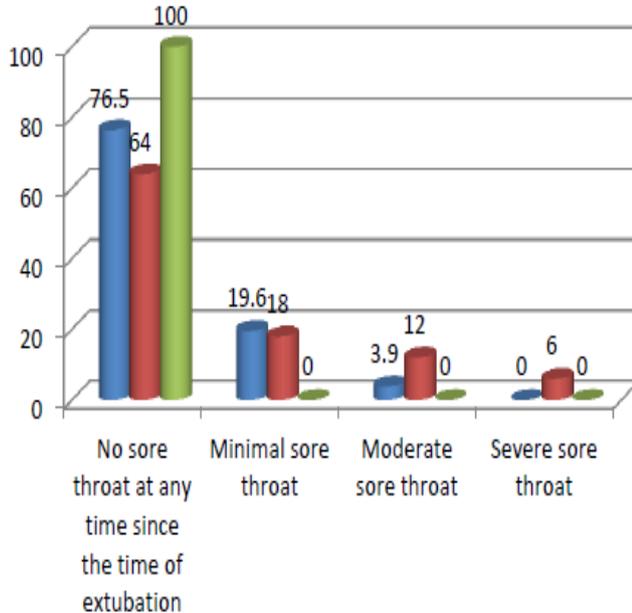
One fifty three patients who met the inclusion criteria were recruited for the study. Six of these were excluded from analysis; four on account of prolonged surgery, and one each on account of intra-operative insertion of nasogastric tube and administration of lidocaine at induction for attenuation of pressor response to laryngoscopy and intubation. Baseline and intraoperative vital parameters of these three groups were similar. The mean sore throat score was generally lower in the water based jelly group compared to the lidocaine jelly group and betamethasone jelly and the difference was statistically significant at 12 hours post-extubation ( $p = 0.02$ ) as shown in Figures. The mean scores for hoarseness and cough for the three groups were similar. The incidence of sore throat, hoarseness and cough is shown in figures. For sore throat, the incidence was generally lower in the water based jel group though not significantly ( $p = 0.000$ ). The highest incidence of sore throat occurred at lidocaine group. In this study ,water based lubricating jelly group had lower incidence of sore throat, cough and hoarseness of voice in comparison to Betamethasone gel group which had lower incidence in comparison to lidocaine jelly group.

### 3.1 Distribution of the study group according to Sore throat at 1,6 hours

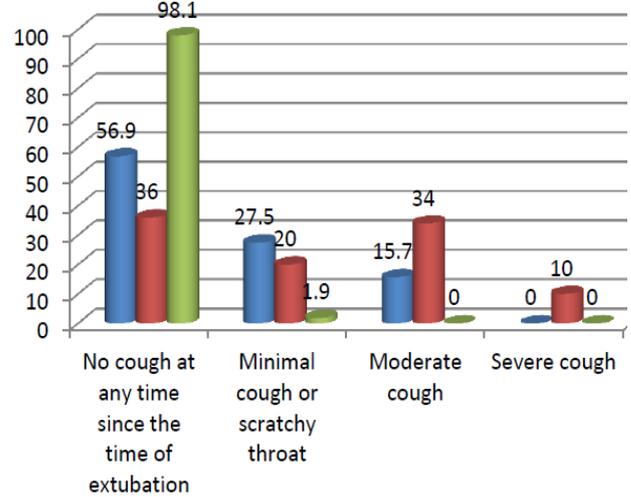
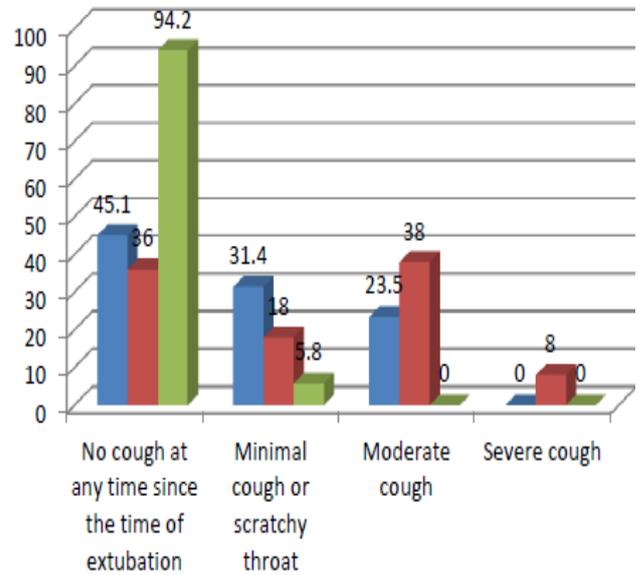




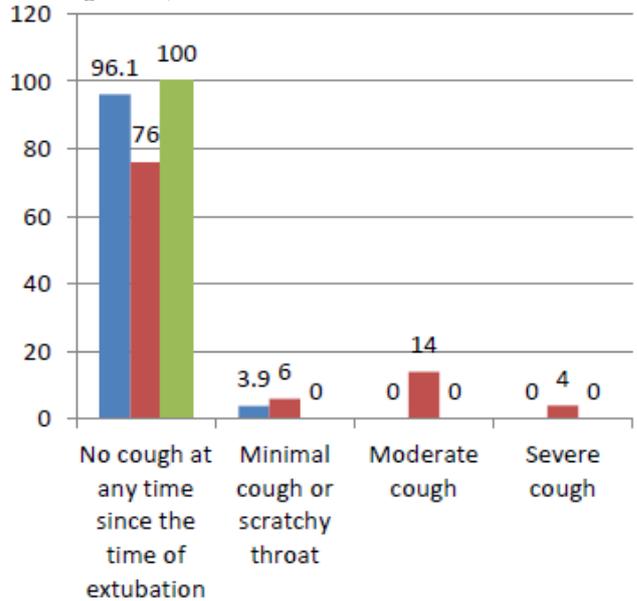
**3.2 Distribution of the study group according to Sore throat at 12,24 hours**

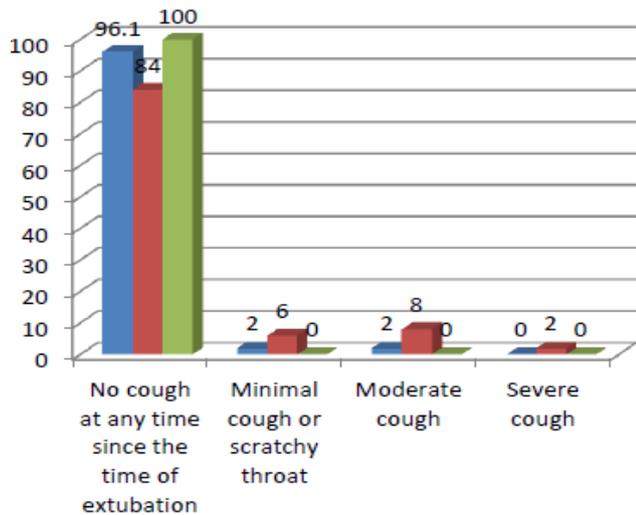


**3.3 Distribution of the study group according to cough at 1,6 hours**

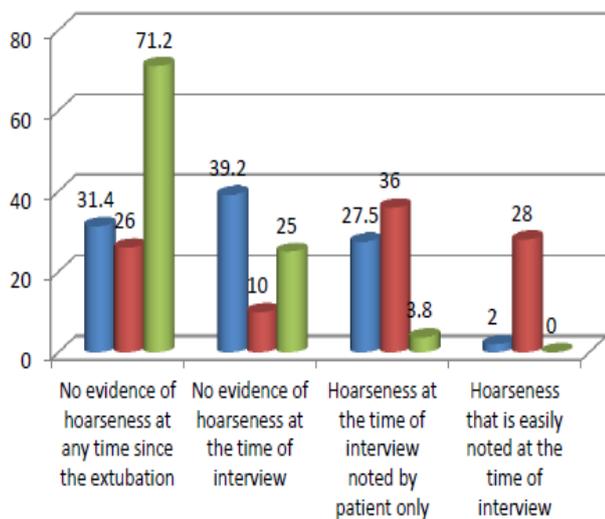


**3.4 Distribution of the study group according to cough at 12, 24 hours**

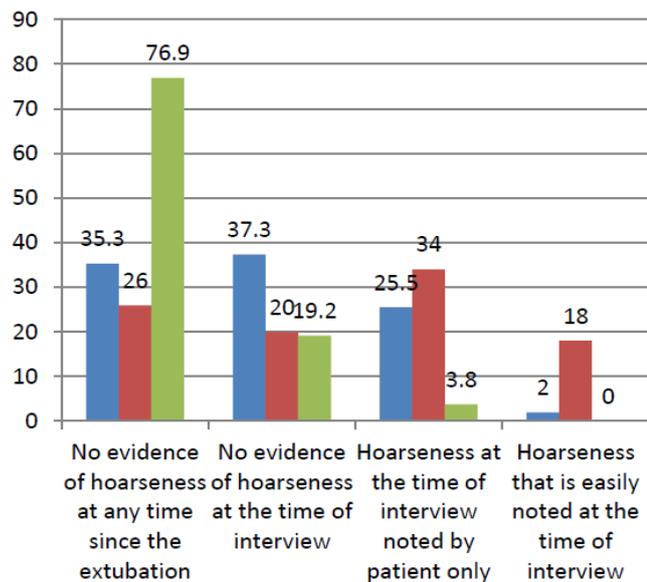
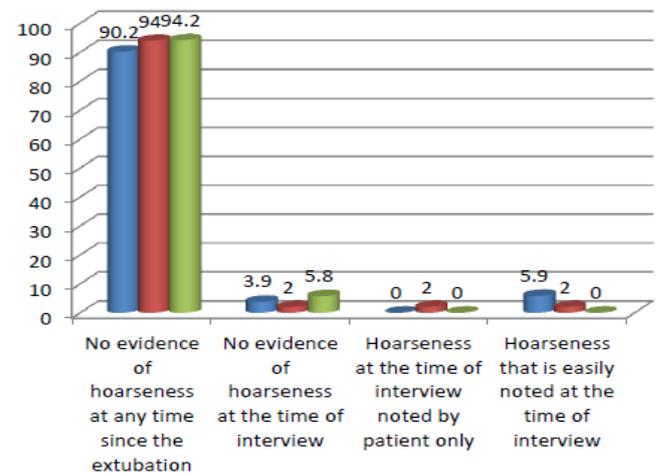
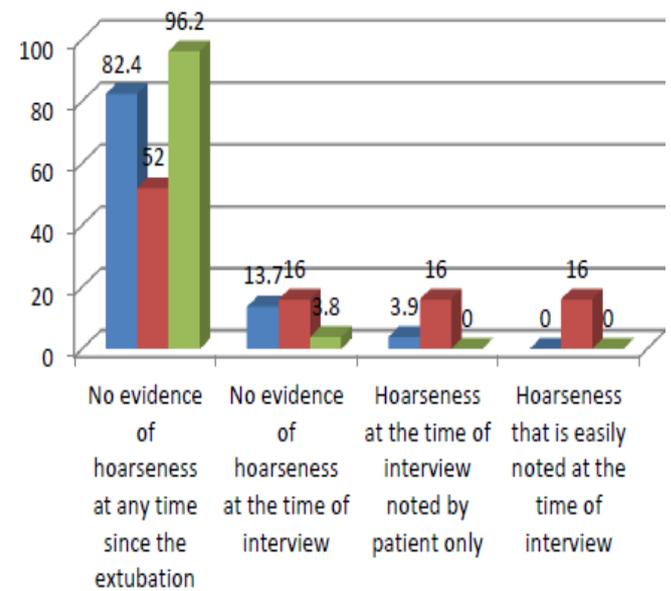




3.5 Distribution of the study group according to hoarseness of voice at 1,6 hours



3.6 Distribution of the study group according to hoarseness of voice at 12,24 hours



#### 4. Discussion

The finding of this study suggests that 2% lidocaine jelly offers no advantage over water based jelly in preventing postoperative airway complications. Water based jelly was associated with a significantly lower mean sore throat scores at 12 hours postoperatively compared with lidocaine jelly and betamethasone gel. The incidence of sore throat at 1,6 , 12, and 24 hours after surgery were lower in the water based group compared with the lidocaine group. Although the differences were not statistically significant, a study involving a larger number of patients may be able to show some significant differences .

Selvaraj and Dhanpal compared steroid gel with lidocaine jelly and a control group with nothing applied to the tube and found the incidence of sore throat to be 33.3% in the steroid gel group versus 73.3% in the other two groups. They reported that the incidence of cough and hoarseness was 23.3% in the steroid gel group, 63.3% in the lidocaine gel group and 50% in the control group. Their study also suggested that lidocaine jelly increased the incidence of these symptoms when compared with the control group and demonstrated that steroid gel reduced the incidence of the

symptoms significantly when compared with lidocaine gel. A similar finding was reported by Kori and colleagues who studied the influence of endotracheal tube cuff lubrication with lidocaine jelly on postoperative sore throat and hoarseness. Their finding suggested that lidocaine jelly reinforced the severity of sore throat compared to their no intervention group in agreement with the 13 report of Selvaraj and Dhanpal, and that lidocaine sprayed to the trachea did not reduce postoperative sore throat. The effect of lidocaine on postoperative airway complications is summarised by McHardy and Chung in their review on postoperative sore throat where they noted that no study has categorically demonstrated that the use of lubricating jelly containing a local anaesthetic is beneficial in the reduction of postoperative sore throat after tracheal intubation.

Kazemi and Amini studied the effects of betamethasone gel in reducing airway complications after endotracheal anaesthesia, using K-Y jelly as control. They reported a significant reduction in incidence and severity of sore throat, hoarseness and cough postoperatively in the betamethasone group compared with the K-Y gel group. The same beneficial effect has been reported by other researchers concerning betamethasone and other steroids including their inhalational 13,15,16 preparations. Steroid gel has been found to be far superior to local anaesthetic jelly because of the anti-inflammatory property but steroids do not abort all the throat complications. This suggests that the causative factors of postoperative throat complications are multifactorial. These other factors should therefore be considered. In conclusion, this study has demonstrated that K-Y jelly is superior to lidocaine jelly in preventing postoperative sore throat and reducing the incidence of hoarseness of voice and cough particularly in young adults. Lidocaine jelly is associated with increased incidence of postoperative throat complaint elucidated in order to find measures aimed at reducing them.

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