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# Sore throat incidence with the laryngeal mask: A comparison with orotracheal intubation

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**Abstract:** The incidence of sore throat was evaluated among 80 healthy (ASA 1 and 2) nonpremedicated adult patients undergoing general anesthesia for general, plastic, urologic, gynecologic, and orthopedic surgery. The patients were randomly allocated in two groups: group one ($n = 39$) consisted of patients in whom the airway was maintained by a laryngeal mask, and in group 2 ($n = 40$), orotracheal intubation was performed. Both groups were similar in age, gender, site of surgery, and time of airway cannulation. Intraperitoneal surgery of the upper abdomen, and insertion of a nasogastric tube were exclusion criteria. The severity of sore throat was graded by the patients themselves using a visual analogue 100 mm scale, varying from 0 (no sore throat) to 10 (extremely sore). The sore throat incidence, severity and duration were significantly lower in the laryngeal mask group in comparison with the endotracheal intubation group.

**Key Words:** Anesthesia methdods—Complications—Laryngeal mask—Sore throat—Tracheal intubation

## Introduction

Sore throat is a common complaint after airway manipulation, and its incidence varies widely from 6% [1] to 90% [2] in intubated patients and from 0% to 20% in nonintubated patients [3–4]. It is assumed that tracheal intubation increases the incidence of sore throat in the first postoperative 24 h in comparison with face mask anesthesia [5]. Moreover, either the tracheal tube itself or the laryngoscopy per se can cause laryngeal trauma and sore throat [6–7]. Sometimes sore throat, although quoted as a minor complication of tracheal intubation, can be so distressing as to affect the postoperative recovery period [8]. Therefore, efforts should be directed to decrease its incidence.

Since the use of laryngeal mask provides good airway control without laryngoscopy or endotracheal intubation, the sore throat incidence could perhaps be decreased with this newer form of airway manipulation. This study was undertaken to compare the incidence of sore throat among two similar groups undergoing surgery and having airway control with endotracheal intubation or with the laryngeal mask.

## Methods

After the approval of the Hillel Yaffe Medical Center Ethics Committee and informed consent from the patients were obtained, we studied 80 healthy (ASA 1 and 2) nonpremedicated adults undergoing general anesthesia for general, plastic, urologic, gynecologic, and orthopedic surgery (Fig. 1). Patients submitted to intraperitoneal surgery of the upper abdomen, or those in whom a nasogastric tube was inserted were not included in the study. Patients were randomly allocated into two groups: Group 1 consisted of patients in whom the airway was maintained by a laryngeal mask ($n = 39$) while in group 2 orotracheal intubation was performed ($n = 40$).

Five minutes of 100% $O_2$ preoxygenation preceded the anesthetic, which was induced with thiopental 2.5% in small increments until two of the following criteria were observed: (1) centralized eyeballs, (2) absent eyelash reflex or (3) reduced jaw tone [9]. In all patients, airway manipulation was performed after the administration of vecuronium 0.1 mg·kg$^{-1}$, and anesthesia was maintained with 70% $N_2O$ and isoflurane 1%. Controlled ventilation was established with a tidal volume of 10 ml·kg$^{-1}$, and a rate directed to maintain an end expiratory $Peco_2$ of 35 mmHg. Heart rate, noninvasive blood pressure, expiratory $CO_2$, pulse oximetry, and

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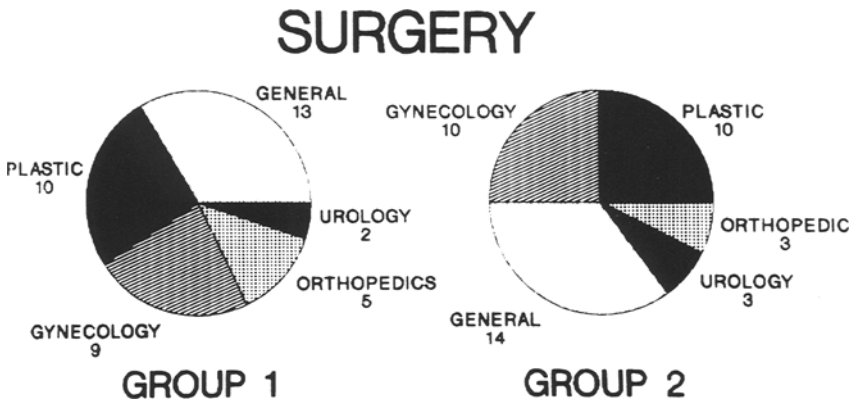


**Fig. 1.** Breakdown of patient groups according to type of surgery

esophageal temperature were continuously monitored using a Cardiocap (Datex Instrumentation, Helsinki, Finland). For oxygen concentration monitoring, we used the Oxygen Monitor 143 (Medix, Rehovot, Israel), attached to the inspiratory limb of the anesthetic circuit. At the end of surgery, neostigmine 0.05 mg·kg$^{-1}$ and atropine 0.02 mg·kg$^{-1}$ were given for reversal of muscular relaxation [10]. When the negative inspiratory force, measured with the Boehringer Inspiratory Force Manometer (Boehringer Laboratories, Wynnewood, PA, USA) was at least $-25$ cm$H_2O$, the artificial airway was removed [11] after careful suctioning of the mouth with a soft suction catheter.

The day after surgery, an anesthetist not involved in the study visited each patient, and asked directly if he/she had a sore throat. In addition, the patient was requested to grade its severity by a visual analogue 100 mm scale, varying from 0 (no sore throat) to 10 (extremely sore). In patients with positive findings the duration of sore throat was assessed daily either during the anesthetist's visit for inpatients or by telephone interview for outpatients.

Patients with signs suggestive of pulmonary complications such as pyrexia, cough, and sputum production had a chest radiogram performed to search for radiological evidence of pulmonary aspiration of gastric contents. Student's *t*-test was used for statistical comparison of age, the Mann-Whitney u-test for time of airway cannulation, and intensity of sore throat, while the chi-square test and McNemar's test were used for comparison of sex distribution and sore throat incidence, respectively. A $P$ value <0.05 was considered statistically significant.

## Results

Both groups were similar in age and sex distribution (Table 1), as well as in type of surgery. One patient in group 1 was excluded from the study because the laryngeal mask could not be maintained in a satisfactory position. The time of airway intubation was similar for both groups, varying from 77 ± 53 min in group 1 to 72 ± 47 min in group 2 ($P = 0.64$).

**Table 1.** Patients characteristics

| | Group 1 | Group 2 |
|---|---|---|
| Age (years) | 39.0 ± 10.11 | 37.9 ± 10.8 (NS) |
| Male/female ratio | 0.56 | 0.73 (NS) |

N.S., not significant.

A significant difference in sore throat incidence was found between the two groups. While only 6 group 1 patients complained of sore throat, 16 group 2 patients had sore throat ($P = 0.02$). A significant difference was also found in the mean sore throat grading and duration between the groups. The sore throat grading was 0.3 = 0.1 (range 0–4) for group 1, compared to 2.4 = 1.5 (range 0–8) in group 2 ($P < 0.05$). The duration of sore throat varied from 1.6 ± 1.2 days (range 0–4 days) in group 1, compared to 3.2 ± 1 days (range 0–5) in group 2 ($P < 0.05$). No patient showed any clinical evidences of pulmonary complications; thus, no postoperative chest roentgenological examination was performed.

## Discussion

Sore throat is a well-known complication of tracheal intubation, even when it is of short duration. Its incidence has been reported to be as high as 90% [2]. While sore throat can occur in nonintubated patients [12], endotracheal intubation is the major factor determining its appearance, increasing both the severity and the incidence of this complication [2,16].

Tracheal intubation can induce more severe complications such as trauma and hematoma of the larynx [7–8], perforation of the pharynx and mediastinitis [13], and arytenoid dislocation causing alteration in phonation [14] or airway obstruction [15]. Nevertheless, sore throat is the most common complication of tracheal

intubation and it can be severe enough to induce considerable discomfort and inconvenience during the postoperative period.

Moreover, the use of lubricants and local anesthetics over the endotracheal tubes did not affect the incidence or severity of this complaint [6]. Causal factors other than endo-tracheal intubation included the use of succinylcholine [16], the presence of a nasogastric tube [17], and pharyngeal trauma caused by non-vented suction tubes [18]. For these reasons, patients with nasogastric tubes were not included in this study, succinylcholine was avoided, and the suction maneuvers were done carefully with soft and vented catheters.

Since both groups were similar in the distribution of gender, age, and type of surgery, the only difference in sore throat genesis was the presence of an orotracheal tube or the laryngeal mask. The incidence and severity of sore throat was significantly lower in the laryngeal mask group than in the trancheal tube group, and thus the laryngeal mask may represent an additional advantage for airway maintenance over conventional endotracheal intubation.

The use of a subjective evaluation of sore throat may give rise to some criticism. However, both direct inquiry and the visual scale are well accepted for assessment of the incidence and severity of sore throat [19].

One potential drawback with the use of a mask is that applying controlled ventilation through the laryngeal mask may induce gastric distension and increase the likelihood of pulmonary aspiration of the gastric contents. However, the laryngeal mask was previously used during controlled ventilation without evidence of pulmonary aspiration [20,21]. John et al. [22] demonstrated that the laryngeal mask provides an efficient airway protection against dye placed in the pharynx.

The use of routine radiologic chest examination seems to be unnecessary in the absence of clinically detectable pulmonary pathology [23]. We therefore chose to perform chest X-rays on that basis, avoiding unnecessary exposure of the patients to radiation and decreasing the cost of the treatment.

Our incidence of sore throat was very similar to that described by others [24–25]; however, unlike the present study, no efforts were made to isolate the airway manipulation as the sole variable in the genesis of sore throat.

In conclusion, we found a significantly lower incidence and severity of sore throat with the laryngeal mask as compared to orotracheal intubation.

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