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Postoperative sore throat after ambulatory surgery

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Background. Sore throat is a common complication of anaesthesia that affects patient satisfaction after surgery.

Methods. We studied 5264 ambulatory surgical patients prospectively to determine the patient, anaesthetic, and surgical factors associated with sore throat.

Results. In 5264 patients, 12.1% reported a sore throat. Patients with tracheal tube had the greatest incidence, 45.4%, followed by patients with laryngeal mask airway, 17.5%, while patients with a facemask had a lower incidence of sore throat, 3.3%. Female patients had more sore throats than male patients (13.4 *vs* 9.1%). Airway management had the strongest influence on the incidence of sore throat. Sore throat in ambulatory surgical patients was associated with female sex, younger patients, use of succinylcholine, and gynaecological surgery.

Conclusion. Airway management, female sex, younger patients, surgery for gynaecological procedure, and succinylcholine predicts postoperative sore throat. Increased awareness of the predictive factors can help to avoid this combination and improve patient satisfaction.

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Sore throat is a common complication after surgery. It affects patient satisfaction and can affect the patient's activities after leaving hospital.[1–3]

Several factors contribute to postoperative sore throat. Reporting of a sore throat can be affected by whether this symptom is asked about directly or indirectly.[4] The incidence varies with the method of airway management. Tracheal intubation (ETT) is associated with a greater incidence of sore throat than laryngeal mask airway (LMA[†]) or facemask (FM).[2] Studies of postoperative sore throat have not distinguished ambulatory surgical patients from inpatients. We set out to determine which patient characteristics and operative factors predict sore throat in ambulatory surgical patients.

Methods and results

We enrolled 17 638 consecutive ambulatory surgical patients in a prospective observational study over 3 yr with ASA physical status I, II, and III, aged 12 yr and older. The hospital's ethics committee approved the study.

We recorded the patients' age, sex, weight, height, and ASA physical status on a standardized information sheet. The type and duration of surgery, operative airway management (ETT, LMA, or FM) tracheal tube size, patient position during surgery, drugs given, and duration of stay in

[†]LMA® is the property of Intavent Limited.

Table 1 Multiple logistic regression—stepwise backward elimination. Predictors of sore throat

	OR	95% CI	*P* value
Age, 10-yr increments	0.92	0.85–0.98	<0.05
Sex, male/female	0.76	0.59–0.99	<0.05
ASA III *vs* I/II	0.45	0.21–0.94	<0.05
Postoperative stay, increments of 30 min	1.05	1.01–1.10	<0.05
Suxamethonium	1.67	1.25–2.23	0.0005
ETT *vs* FM	12.40	8.83–17.39	0.0001
LMA *vs* FM	5.26	3.79–7.29	0.0001
Ophthalmology	0.58	0.40–0.84	0.01
Gynaecology	1.52	1.14–2.03	0.01

the postanaesthetic care unit and ambulatory surgical unit (ASU) were also recorded.

An aqueous lubricant was applied to the tracheal tube and LMA airway cuffs. A standard method was used for placement of tracheal tubes and LMA. After ETT, patients lungs were mechanically ventilated, and patients with LMA breathed spontaneously. After intubation or placement of an LMA, anaesthesia was maintained with an inhalation agent in a mixture of oxygen and nitrous oxide. Patients with an FM received oxygen only. Airway devices were removed when patients were able to open their eyes to command.

The clinical management of the patients was left to the discretion of the anaesthetist. Postanesthesia Discharge Score (PADS) was used to decide when to discharge the patient.[5] All patients were discharged on the same day as the surgery. An ASU nurse interviewed the patient by telephone after 24 h and the incidence of sore throat was noted by using standardized direct questions. Patients were asked directly whether they had a sore throat, and whether they had any hoarseness of voice.

Statistical analysis

The incidence of sore throat was compared between different patient groups using chi-squared statistics. Continuous variables were compared between patients with and without sore throat using Student's *t*-test. We used multiple logistic regression modelling with backward stepwise variable selection to identify factors associated with sore throat. Variables with $P>0.1$ were eliminated from the model. Statistical analysis was with SAS statistical software, version 6.12 (SAS Institute Inc., Cary, NC, USA).

During the study period, 17 877 patients were to undergo ambulatory surgery. A total of 239 patients were excluded as a result of cancellation or incomplete data. Of the remaining 17 638 patients, a successful telephone interview was conducted with 5264 patients (29.84%). Of the non-respondents, 5878 (33.3%) refused to give an interview, 2169 (12.3%) did not speak English, and 4327 (23.6%) could not be contacted. There was no significant difference between respondent and non-respondent in mean age or duration of anaesthesia. The response rate was greater for patients after procedures for urology (38%), general surgery (37%), ENT or dental surgery (33%), orthopaedic surgery (32%), or ophthalmology (31%): patients after gynaecological procedures were less likely to give an interview (27%).

The mean age was 47 yr (range 16–85). Two-thirds of the patients were female, one-third of the patients were male. Most of the patients had procedures for ophthalmological, gynaecological, or orthopaedic conditions (38, 31, and 19%, respectively). A tracheal tube was used in 14.3% of patients, an LMA in 19.4% of patients, an FM in 62.8%, and no airway management was used in 3.5% of the patients.

Of the 5264 patients, 12.1% (635) reported a sore throat. Patients with ETT had the greatest incidence (45.5%, 345 of 755), followed by patients with LMA (17.5%, 178 of 1020), whereas patients with FM had a lower incidence of sore throat (3.3%, 108 of 3303). In the patients with sore throat, the duration of stay in PACU was 14 min longer ($P<0.05$), the duration of ASU stay 25 min longer ($P<0.05$), and discharge time 51 min longer ($P<0.05$).

Univariate analysis showed that female patients had more sore throats than males (overall 13.4 *vs* 9.1%, ETT 50.1 *vs* 32.5%, LMA 21.6 *vs* 13.6%, and FM 3.9 *vs* 1.7%; $P<0.05$ for all comparisons).

After surgery in the lithotomy position, patients had more sore throat compared with patients after surgery in the supine position (ETT 56.0 *vs* 35.7%, LMA 25.0 *vs* 16.1%, and FM 5.9 *vs* 1.9%; $P<0.05$ for all comparisons). Patients given succinylcholine also had more sore throat than patients not given this agent (51.3 *vs* 35.8%; $P<0.05$). Ease of intubation was not associated with the development of postoperative sore throat (46.4%) compared with 47.8% in patients with difficult intubation.

After gynaecological surgery, patients had a greater risk of sore throat compared with other patients (ETT 57.4 *vs* 31.6%, LMA 25.3 *vs* 16.5%, FM 5.9 *vs* 2.0%; $P<0.05$ for all comparisons). In patients managed with an LMA, orthopaedic patients had less sore throat than other patients (15.1 *vs* 23.2%, $P<0.05$), and in patients managed with an FM, patients after ophthalmic procedures had less than other patients (1.7 *vs* 5.3%, $P<0.05$). Univariate analyses showed no other statistically significant associations.

Multiple logistic regression

A multiple logistic regression model with stepwise variable selection was set up including all subjects. Variables included in the model at the first step of variable selection were: age, sex, ASA status, BMI, duration of surgery, duration of postoperative stay, position of patient, succinylcholine use, type of airway management, and type of surgery. Table 1 shows the variables that remained in the final model.

Men had less chance of sore throat than women (odds ratio (OR) 0.76). Age was inversely associated with the risk of sore throat (OR for a 10-yr increment 0.92). Patients with ASA physical status III had a significantly smaller risk of developing sore throat compared with patients with ASA

physical status I and II (OR 0.45). The duration of postoperative stay was positively associated with the risk of sore throat development (OR for a 30-min increment 1.05). The use of succinylcholine was also a strong predictor for postoperative sore throat (OR 1.67). The method of airway management had the strongest influence on the risk of sore throat. A sore throat was 12 times more common in patients with ETT, and five times more likely with LMA than in patients with FM or no airway management. Two types of surgical procedures were significantly different from the others. Patients undergoing ophthalmic procedures had a significantly smaller risk (OR 0.58), whereas patients undergoing gynaecological procedures had a significantly greater risk (OR 1.52) of developing sore throat, as compared with other types of surgical procedures.

Comment

A previous study of 381 ambulatory surgical patients found postoperative sore throat in 22% of patients after ETT and 9% of patients managed with a LMA.[6] We found a greater incidence of 45.5 and 17.5%, respectively. There are several possible factors: we did not use humidity moisture exchangers in the gas delivery circuit, and dry airway gases have been implicated in the development of postoperative sore throat.[7] Airway suction is associated with postoperative sore throat, and this was not standardized. Tracheal and LMA were placed by both residents and staff, with a wide range of experience. Greater operator skill improves ease of placement.[8] The pressures in tracheal and LMA cuffs were not monitored during surgery and cuff volumes were not adjusted. Decreasing LMA cuff volume during surgery reduces the incidence of postoperative sore throat.[9] In conclusion, postoperative sore throat is a common adverse outcome in ambulatory patients. The method used for airway management has the strongest influence on the incidence of sore throat. Female sex, younger patients, surgery for gynaecological procedures, and succinylcholine also predict postoperative sore throat. The association between postoperative stay and sore throat could result from the discomfort of a sore throat early in the postoperative period making patients reluctant to go home. By knowing these patient characteristics and operative factors, awareness of the problem is increased and can help to avoid this combination, and improve patient satisfaction.

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