INCIDENCE OF SORE THROAT FOLLOWING ENDOTRACHEAL INTUBATION

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FROM TIME TO TIME during a busy anaesthetic practice, periods are observed during which a large number of people seem to develop sore throat postoperatively. It was during such a period that we decided to investigate in an objective manner the incidence of sore throat following general anaesthesia.

In reviewing the literature, few papers were found relating to this problem. In 1950, Wylie¹ found in a series of 100 patients that 70 per cent complained of sore throat upon direct questioning. In 1951, Baron and Kohlmoos,² two otolaryngologists, reported that everyone in a series of 80 patients complained of a mild sore throat lasting at least 24 hours following endotracheal intubation. In 1958, Wolfson,³ in a review of 521 patients, found that 18.4 per cent complained of sore throat when questioned directly. In 1960, Conway and his group⁴ found in 642 patients that the incidence of sore throat was 38.2 per cent when the patients were questioned directly.

During the discussion of how to collect the data for our study, perhaps the most debatable question involved the manner in which patients were to be interviewed. Of the papers previously mentioned, only one author was concerned with the method of interviewing the patient. Wolfson found that 10 per cent of his patients complained spontaneously of a sore throat following intubation, whereas upon direct questioning this figure rose to 18.4 per cent. It was decided in our study to question patients only indirectly, but to give them full scope to air all their complaints at the time of interview. A minimum of five minutes was spent with each patient and the trend of questioning was somewhat as noted in Table I.

METHOD

The interview was conducted 24 to 48 hours after surgery by a resident anaesthesiologist unaware of the specific factors relating to the endotracheal intubation. He began the interview with an enquiry about the general well-being of the patient. Depending upon the patient's response, further questions of a general nature were asked, concentrating primarily on any pain, soreness, or discomfort in any area of the body. Every opportunity was given the patient to complain of a sore throat, should it exist. Actually, a sore throat was rarely a primary complaint. Some interviews were quite lengthy because multiple complaints were discussed, but an interview was never terminated unless it was believed that all complaints had been elicited.

A total of 500 patients were interviewed postoperatively. 400 were exposed to

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TABLE I
DESIGN OF INTERVIEW

Initial question	Answer	Question	Answer
How are you feeling today?	Fine	Do you have any pain or discomfort?	None Sore throat Nausea
	Pain at operative site	Do you have any pain or discomfort elsewhere?	None Sore throat Nausea
	Sore throat		

TABLE II
INTUBATION DATA FORM

Date	Sex		Hist No		
Age	Race		Ward		
Name	Preop Diag		Anaesthesiologist		
Levine Tube	Yes	No	None	<i>Other</i> Short neck, stiff neck, small mouth, bleeding, extubation with full cuff, etc	
Teeth Present	All Upper	Lower			
Nasal Airway	Yes	No			
Oropharyngeal Airway	Yes	No			
Primary Agent	Ethyl Ether	Cyclopropane	Prone Other	<i>Comments</i>	
	Pentothal	Fluothane			
Position	Supine	Lateral			
	Lithotomy	Sitting			
Intubated	Yes	No			
Muscle Relaxant	Yes	No			
Scope Blade	Wis-Foregger, Eversole, Guedel, Miller, Macintosh, Other				
Topical	Yes	No			
Topical Technique	Atomizer Jack Spray Transtracheal, Swab				
Attempts to Intubate	1 2 3 4				
Intubation was	Easy Difficult				
Tube Size	6 7 8 9 10				
Type Tube	Portex	Davol	Rubber		
	Other				
Cuff	Yes	No			
No c c's to inflate cuff	1 2 3	4 5 6 7			
Pack	Yes	No			
Bucking at Intubation	Yes	No			
Bucking during Maintenance	Yes	No			
Bucking at Aspiration	Yes	No			
Bucking at Extubation	Yes	No			
Duration Tube in Place	1 2	3 4 hours			

endotracheal intubation and 100 were anaesthetized by mask. Patients under 15 years of age and those undergoing operations about the head and neck were excluded. A diversity of anaesthetic drugs was utilized for operations which lasted from 30 minutes to more than four hours. Intubations were performed by first and second-year residents in anaesthesia.

During the course of anaesthesia a data form was completed, which is illustrated in Table II. The form was designed in as simple a manner as possible to facilitate completion. Among the factors noted specifically were presence of nasogastric tube, status of teeth, utilization of nasal and oropharyngeal airways, primary anaesthetic drug, position of patient, muscle relaxant employed, laryngoscope blade used, and employment of topical anaesthetic.

Bucking during intubation, maintenance, aspiration, and extubation were of special interest. A space for other comments or factors bearing upon the intubation was included.

The interview with the patient was recorded on the opposite side of the data form, but the interviewer did not consult the data form prior to talking with the patient. The patients' throats were not examined and the severity of soreness was not classified.

RESULTS

Table III shows the over-all incidence of sore throat. Of the 400 patients who were intubated, 23 complained of sore throat, in the 100 patients who were not intubated, 2 developed sore throat. These figures are not statistically significant, although they compare favourably with previous investigations.

TABLE III
INTUBATION AND SORE THROAT

	Total patients	Sore throat
Intubated	400	23 (5.7%)
Not intubated	100	2 (2.0%)

The sex of a patient may have some bearing on the development of sore throat. Wolfson³ found that the incidence in females was almost twice that in males, but Conway⁴ found no difference. In our series, the complaint of sore throat was noted three times more frequently in females than in males (Table IV). One explanation may be the tendency to introduce too large an endotra-

TABLE IV
INCIDENCE OF SORE THROAT BY SEX

	Total patients	Sore throat	
Females	104	12 (11.5%)	$p < 0.05$
Males	296	11 (3.7%)	

cheal tube into the smaller female larynx. Our study showed that some females were intubated with No. 10 tubes, many with No. 9 tubes, and only a few with No. 8 tubes. In contrast, no males received a tube larger than No. 10. It is therefore possible that females were intubated with relatively tighter fitting tubes than males.

A nasogastric tube constitutes a foreign body which usually remains in place much longer than an endotracheal tube. Conway found that sore throat occurred twice as often in patients in whom a nasogastric tube was utilized. Others have not investigated this aspect of the problem. In this group, the incidence of sore throat also was doubled when a nasogastric tube was employed (Table V).

TABLE V
NASOGASTRIC TUBE AND SORE THROAT

	Total patients	Sore throat
Nasogastric tube	223	17 (7.6%)
No nasogastric tube	177	6 (3.3%)

However, we recently studied a small series of patients who were anaesthetized by mask only, with nasogastric tubes in place, and found no complaints of sore throat. From our results, it is difficult to assess the role of an indwelling nasogastric tube as an aetiological factor in postoperative sore throat.

Trauma at the time of intubation often is believed to be related to the development of sore throat. Trauma may be produced by laryngoscopy or by manipulation of the endotracheal tube in difficult intubations. Previous investigators have found that trauma or difficult intubation is not associated with a higher incidence of sore throat. We considered an intubation atraumatic if it was performed deftly and with ease. Intubation was considered traumatic if multiple attempts were required, bleeding was noted, or if some degree of force was required with either the laryngoscope or the endotracheal tube. Stilettes were not used to facilitate intubation. Our findings were in keeping with those of other investigators, namely, that traumatic intubation did not increase the incidence of sore throat significantly (Table VI).

TABLE VI
TRAUMA AND SORE THROAT

	Total patients	Sore throat
Traumatic intubation	56	4 (7.1%)
Atraumatic intubation	344	19 (5.5%)

Coughing and bucking might be expected to produce sore throat also. Previous investigators have not reported on this factor. Sore throat developed almost twice as frequently in patients who had bucking episodes with the endotracheal tube.

in place (Table VII) There does appear to be a cause and effect relationship in this respect

TABLE VII
COUGHING, BUCKING, AND SORE THROAT

	Total patients	Sore throat
Coughing, bucking during anaesthesia	173	14 (7.5%)
No coughing or bucking	227	9 (4.0%)

Topical analgesia of the larynx might be questioned as a possible cause of sore throat Conway found no difference when a topical analgesic was applied

In this study, we were surprised to find an increase in the incidence of sore throat among the group who received topical analgesia (Table VIII) We can offer no explanation for this finding It is interesting that the incidence of sore throat was no greater when the anaesthetic was applied by the transtracheal route than when it was instilled directly into the trachea in an atraumatic manner through the larynx

TABLE VIII
TOPICAL ANAESTHETIC TECHNIQUE AND SORE THROAT

	Total patients	Sore throat	$p < 0.01$
No topical	197	5 (2.5%)	
Atomizer	9	2 (22.2%)	
Transtracheal	28	2 (7.1%)	
Intratracheal spray	166	14 (8.4%)	

The type of laryngoscope blade used, the anaesthetic drugs employed, the presence of oropharyngeal and nasopharyngeal airways, and the time during which the endotracheal tube was in place were not significant factors in the evaluation The sterility of an endotracheal tube might be thought to influence the incidence of sore throat All the tubes utilized in this study were washed in soap and water at the end of the previous operation, soaked in a disinfectant solution, and then rinsed thoroughly They were not resterilized just prior to intubation Portex and Davol plastic catheters were used The size of the endotracheal tube inserted is a difficult factor to evaluate, but in almost all patients in this series the inflation of the cuff between the tube and the trachea was a common denominator

CONCLUSIONS

The incidence of sore throat following endotracheal intubation was sufficiently low that this technique should be employed without hesitation when indicated

There was an increased incidence in females, in patients who had a nasogastric tube in place, in those who received topical anaesthesia, and when bucking on the tube occurred during anaesthesia

SUMMARY

The incidence of postanaesthetic sore throat in 500 patients was determined by a method which attempted to avoid the element of suggestion

In 400 patients who were intubated, the incidence of sore throat was 57 per cent

Of 100 patients who were not intubated, two developed sore throat

Factors which may have contributed to the development of sore throat have been discussed

RÉSUMÉ

Nous avons essayé d'établir la fréquence des maux de gorge chez 500 malades en faisant des entrevues postopératoires au cours desquelles nous avons évité toute allusion à la possibilité de maux de gorge. Chez 400 malades qui avaient été intubés, la fréquence des maux de gorge a été de 47 pour cent. Chez 100 malades non intubés, deux ont eu mal à la gorge.

La fréquence des maux de gorge a été plus élevée chez les femmes, chez les porteurs de tube naso-gastrique, chez ceux à qui on avait fait une anesthésie locale et chez ceux qui avaient fait des efforts pour expulser le tube endotrachéal.

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