Complaints of sore throat after tracheal intubation: a prospective evaluation

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Abstract

BACKGROUND AND OBJECTIVE: Sore throat and hoarseness rank, besides pain and nausea, among the most frequent subjective complaints after tracheal intubation for general anaesthesia. Our intention was to determine the incidence of postoperative sore throat from a large sample of patients and thus to identify the most important associated factors. METHODS: We prospectively followed up 809 adult patients who underwent elective surgical interventions and examined their history, the applied anaesthetic techniques, perioperative course and the occurrence, intensity and duration of postoperative throat complaints. The assignment and professional experience of the involved intubators were also assessed. The influence of a multitude of variables on postoperative throat complaints was statistically analysed. RESULTS: Postoperative sore throat was present in 40% overall being significantly higher in female than in male (44% vs. 33%; P = 0.001). The mean pain intensity in the affected patients (n = 323) was 28 +/- 12 mm on a visual analogue scale where 0 = no pain and 100 = extreme pain. The average duration was 16 +/- 11 h. Main factors associated with throat complaints were female sex; history of smoking or lung disease, duration of anaesthesia, postoperative nausea, bloodstain on the endotracheal tube and natural teeth. We could find no influence on the occurrence or intensity of throat complaints by the professional assignment or the length of professional experience of the personnel involved. CONCLUSIONS: Postoperative throat complaints frequently arise after tracheal intubation for general anaesthesia in the first 2 postoperative days, but they are of limited intensity and duration.
Complaints of sore throat after tracheal intubation: a prospective evaluation

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Summary

Background and objective: Sore throat and hoarseness rank, besides pain and nausea, among the most frequent subjective complaints after tracheal intubation for general anaesthesia. Our intention was to determine the incidence of postoperative sore throat from a large sample of patients and thus to identify the most important associated factors.

Methods: We prospectively followed up 809 adult patients who underwent elective surgical interventions and examined their history, the applied anaesthetic techniques, perioperative course and the occurrence, intensity and duration of postoperative throat complaints. The assignment and professional experience of the involved intubators were also assessed. The influence of a multitude of variables on postoperative throat complaints was statistically analysed.

Results: Postoperative sore throat was present in 40% overall being significantly higher in female than in male (44% vs. 33%; P = 0.001). The mean pain intensity in the affected patients (n = 323) was 28 ± 12 mm on a visual analogue scale where 0 = no pain and 100 = extreme pain. The average duration was 16 ± 11 h. Main factors associated with throat complaints were female sex, history of smoking or lung disease, duration of anaesthesia, postoperative nausea, bloodstain on the endotracheal tube and natural teeth. We could find no influence on the occurrence or intensity of throat complaints by the professional assignment or the length of professional experience of the personnel involved.

Conclusions: Postoperative throat complaints frequently arise after tracheal intubation for general anaesthesia in the first 2 postoperative days, but they are of limited intensity and duration.

Keywords: POSTOPERATIVE COMPLICATIONS, sore throat, aetiology, intensity, duration; INTUBATION, INTRATRACHEAL, complications.

Tracheal intubation is a standard technique in general anaesthesia, which, despite its undisputed advantages including prevention of aspiration, reduction of dead space, accessibility of the airway for suction and controlled ventilation, is not free from side effects. Sore throat and hoarseness rank, besides pain and nausea, amongst the most frequent subjective complaints expressed by patients, after tracheal intubation [1–12]. Although post-anaesthetic throat complaints are often regarded as minor complications, they are distressing for the patient and often remain as unpleasant memories. Therefore, a lessening of the symptoms is worth striving for. Causal factors mentioned, amongst others, are size and shape of the endotracheal tube (ETT) or respectively its cuff, the use of lubricants, cuff pressure, relaxation with succinylcholine and long duration of intubation. The degree
of difficulty of laryngoscopy and/or intubation, and the course of extubation have not yet been examined as causes of postoperative throat complaints. The goal of this study was to determine the actual and prevailing incidence of postoperative sore throat after undergoing anaesthesia and intubation in a large sample of patients, and thus to identify the most important associated factors.

Methods

Over the period from December 2001 until April 2002, a total of 809 patients of both gender, aged between 15 and 94 yr, undergoing elective surgery, were recruited prospectively and questioned about the occurrence of postoperative sore throat after tracheal intubation. As this investigation was a non-randomized prospective study, the recruitment of patients was part of the everyday routine and the medical and organizational conditions remained unchanged. Patients with preoperative hoarseness or sore throat were excluded from the study. Further criteria for exclusion were inability to obtain consent, age under 15 yr, emergency operations, and operations within the area of the mouth, pharynx, larynx and throat. All included patients gave informed consent for the collection and analysis of their anonymized data. Premedication followed the routines of the respective department and no constraint was placed on the technique of general anaesthesia so that the anaesthetists were free to perform the procedures as they intended to. All patients were intubated orally under direct laryngoscopy by clinical members of the anaesthesia personnel. All the usual hypnotics, anaesthetics and muscle relaxants were used, as in previous investigations [13]. Females were usually intubated with a 7.5 mm and males with an 8.0 mm ETT (high-volume/low-pressure SilkoClear®; Willy Rüsch GmbH, D-71394 Kernen, Germany) [10]. The cuff was filled with air up to a pressure of 25 mbar until no escape of anaesthetic gases could be heard [14–16].

For the evaluation, details relating to the experience of the intubator, the course and degree of difficulty of the intubation, the application of additional devices into the pharynx, such as a temperature sensor and gastric tubing, as well as the process of the extubation were taken into consideration. In addition, biometric and medical data of the patient (e.g. smoking, prevailing airway or lung disease), duration of anaesthesia and postoperative nausea and vomiting were evaluated. Within a postoperative time period of 12–24 h, the presence, duration and degree of hoarseness and sore throat, as well as the need of medication for their relief, have been recorded. The measurement of sore throat intensity was accomplished with a visual analogue scale (VAS) with a range from 0 mm = no pain to 100 mm = extreme pain.

Continuous variables are presented as mean ± SD. The correlation between the incidence of sore throat, and the medication for its relief as a categorical variable was carried out with the χ²-test and Fisher’s exact test, respectively. The differences between continuous variables were examined with the U-test. Multivariate analysis was followed by a stepwise logistic regression. The correlation of intensity of sore throat with continuous variables was examined by means of the Spearman’s rank correlation and with categorical variables using the U-test. Statistical significance was set at the P < 0.05 level.

Results

In our study, the overall incidence of postoperative sore throat was 40% and was significantly higher in female than in male (44% vs. 33%; P = 0.001) (Table 1).

The average pain score, calculated from all 809 patients and expressed on a scale from 0 to 100 mm, was 11 ± 16. This very low result is misleading,
as the data from the 486 patients who indicated no complaints at all (value = 0 mm), have been included. More meaningful is the mean value (28 ± 12) and the median (28) of those 323 patients with complaints (Fig. 1). The mean duration of sore throat, as indicated by those patients, was 16 ± 11 h (Fig. 2).

There was a positive correlation between the intensity of sore throat and the duration of anaesthesia (Spearman’s $r = 0.12; P = 0.03$) and a negative correlation with the lowest $S_{PO2}$ during extubation ($r = -0.30; P < 0.001$). There were positive correlations between the duration of sore throat and the duration of anaesthesia ($r = 0.10; P = 0.004$), the number of postoperative vomiting episodes ($r = 0.16; P = 0.004$), the size of the ETT for male ($r = 0.34; P = 0.001$) and for female ($r = 0.14; P = 0.044$). There was a negative correlation between the duration of complaints and the lowest $S_{PO2}$ during extubation ($r = -0.36; P < 0.001$).

There was no correlation between the incidence of sore throat and the professional grade of the intuba tor. Therapies for sore throat became necessary, when the intubation had been accomplished by qualified nurses in 8% (from $n = 101$), with medical doctors in training in 7.3% (from $n = 493$) and with anaesthesia specialists in 9.5% (from $n = 190$). No correlation could be determined between the intubators experience in months and the incidence or intensity of sore throat. Medication was only needed by 64 patients (7.9%), but significantly more of these were female ($P < 0.001$). Furthermore, treatment for sore throat has been associated with the occurrence of postoperative nausea (12% vs. 5.4%; $P = 0.001$).

With gradual logistic regression of the univariate variables, the following seven characteristics have been proven as significantly associated with postoperative throat complaints: female gender (odds ratio, OR 1.66; $P = 0.003$), visible bloodstain on the ETT after extubation (OR 4.81; $P < 0.001$), natural set of teeth (OR 0.46; $P < 0.001$), pre-existing respiratory tract disease (OR 3.12; $P = 0.02$), lower age group (by year OR 0.98; $P < 0.001$), duration of anaesthesia (OR 1.27; $P < 0.001$) and postoperative vomiting (per vomiting episode OR 0.29; $P < 0.001$).

Discussion

Our incidence of post-intubation throat complaints of approximately 40% lies in the middle of ranges of comparable figures from the literature (14–75%) [2–12]. Out of these 11 investigations, however, nine had been performed with far fewer patients than in our study. The results of those two studies, which had a higher number of cases than ours ($n = 1325$ and 5264, respectively), were 14.4% [4] and 45.5% [17]. This shows clearly, that our results lie closely to those in the largest study of Higgins and colleagues, which used a similar technique of questioning. In contrast, Christiansen and colleagues did not purposely specify the questioning concerning sore throat, but merely considered the incoming reports passively, which is known to have a substantial influence on the results [18]. Likewise, our results concerning intensity and duration of sore throat corresponded well with the results found in the literature.

The average pain intensity of 28 ± 12 (including only patients indicating a pain level $> 0$ mm) is in the lower range of the 100 mm scale and the duration of a maximum of two days. Strictly speaking, this is a matter of comfort rather than perioperative
morbidity. Nevertheless, there are isolated cases with higher intensity of pain, particularly from substantially longer duration of intubation. In these cases, additional symptoms such as hoarseness or even dysphagia can occasionally be found. In this connection, Jones and colleagues stated that about 3% of intubated patients had complaints lasting longer than 1 week and on laryngoscopy had laryngeal lesions, pharyngeal haematomas or granulomas of the vocal cords [6].

The aetiology of throat complaints is multifactorial. With our evaluation using gradual logistic regression, we intended, by using a large study with many different intubators of varying professional experience and without mandating any particular anaesthetic method during the study to identify as many causal factors of postoperative throat complaints as possible.

All authors, who had examined the relevance of gender stated without exception that females are more frequently and strongly affected by intubation-related complaints, [4,5,7,11,17,19,20], which corresponds well with our results. The cause of this, however, is still unclear. In our studies, nausea and vomiting arose more frequently with female which has been confirmed elsewhere [19,20]. Beattie and colleagues examined the influence of the menstrual cycle on postoperative nausea and vomiting following gynaecological laparoscopy [21]. Postoperative nausea and vomiting occurred 2.9 times more often in female who were in the first 8 days of their menstrual cycle. We found that sore throat correlated with postoperative nausea and vomiting (r = 0.21; P < 0.001). The choice of ETT size (8.0 mm for males and 7.5 mm for females) does not fairly fit the latter complaints, more frequently and strongly affected by intubation-related complaints, which is in agreement with the results of Kloub [7] and Rieger et al [10] and is actually self-explanatory. This, however, has not been confirmed by all authors [3,4,6,18]. The limited correlation between throat complaints and the amount or length of professional experience is probably attributed to the fact that after 1 yr, no substantial improvement in intubation skills can be expected [25].

The extubation procedure has been considered in none of the comparative investigations. Furthermore, the duration of the extubation procedure and the occurrence of coughing and gagging have not previously been considered. We showed, nevertheless, that a sore throat must be expected alongside a blood-stained ETT during extubation.

Postoperative sore throat is a frequent finding after general anaesthesia with tracheal intubation, which usually is not of vital importance but remains a significant cause for discomfort. Relevant factors associated with throat complaints were female sex, natural dentition, smoking, long anaesthesia duration and postoperative nausea and vomiting. Thus further improvement in patient comfort could be expected by focusing on prevention such as choice of narrower ETTs and better prophylaxis and treatment of postoperative nausea and vomiting.

In our study, as well as in other comparative evaluations, cuff pressure was of lesser significance since cuffs of the ‘high-volume/low-pressure’ type were used. In addition, the cuffs were inflated to the minimum volume to prevent a leak up to an airway pressure of 25 mbar. An increase of the cuff pressure which may occur by diffusion of nitrous oxide was not relevant since this gas was not used. We did not apply preventive measures routinely, such as filling of the cuff with lidocaine (instead of air), topical application of local anaesthesia or beclomethasone as recommended by some authors [9,24]. Such measures should be left for special cases only, such as patients having operations on the respiratory tract and those who are professionally dependent on their voice. In particular the choice of a thinner ETT should be considered.

The number of intubation attempts as well as the duration of anaesthesia have both been proven as causative factors for throat complaints, which is in agreement with the results of Kloub [7] and Rieger and colleagues [10] and is actually self-explanatory. This, however, has not been confirmed by all authors [3,4,6,18]. The limited correlation between throat complaints and the amount or length of professional experience is probably attributed to the fact that after 1 yr, no substantial improvement in intubation skills can be expected [25].

Our finding that smoking is increasingly accompanied by a sore throat with a longer duration is not particularly surprising. This, however, cannot be verified from other sources and the two studies which found no relation between these were based only on a small number of cases (n < 200) [7,10]. Persons wearing dentures have more space in the oral cavity and a better view can be achieved during laryngoscopy when the denture is removed. Less force may need to be exerted with the blade. However, it cannot clearly be differentiated whether the throat complaints can be put down to the laryngoscopy alone or additionally to the passage and insertion of the ETT. It is interesting to note that the insertion of temperature sensors into the hypopharynx, even thought they are relatively small and flexible, still makes a contribution to the development of sore throat.

References
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