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Research Article

A Study on The Correlation Between Postoperative Sore Throat and Preoperative Anxiety in Patients Under General Anesthesia

Ting Wang, Wan Ying Li, Yaoy Wu*, Zemin Zhan, Milan Xiao

Department of Anesthesiology, Nansha Division of The First Affiliated Hospital, Sun Yat-sen University, Guangzhou, Guangdong, China

***Corresponding author:** Yaoye Wu Department of Anesthesiology, Nansha Division of The First Affiliated Hospital, Sun Yat-sen University, Guangzhou, Guangdong, China

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Abstract

Objective: To explore the correlation between postoperative sore throat and preoperative anxiety in general anesthesia patients. **Methods**: A convenience sampling method was used to select 271 general anesthesia tracheal intubation patients who underwent elective general anesthesia surgery in a tertiary-level A hospital in Guangzhou from January 2024 to May 2024 as the survey subjects. The preoperative anxiety status of patients was assessed face-to-face and preoperative sore throat scoring was performed 1 d before surgery, the general information and disease-related information of the investigation subjects were collected from the medical records, and the time period between transferring into the anesthesia recovery room and transferring out of the anesthesia recovery room was used to collect the situation of the investigation subjects in the anesthesia recovery room and the occurrence of postoperative sore throat. **Results**: Preoperative anxiety was found in 51 patients, of which 28 developed postoperative sore throats, with an incidence of 54.90%. The results showed that the risk of postoperative sore throat in patients with preoperative anxiety was 2.661 times higher than that in patients with nonpreoperative anxiety ($P < 0.05$). **Conclusion**: There is a correlation between postoperative sore throat and preoperative anxiety in general anesthesia patients, and preoperative anxiety increases the risk of postoperative sore throat in general anesthesia patients, suggesting that caregivers should strengthen the perioperative health management, effectively alleviate the anxiety of patients before surgery, and actively prevent the occurrence of postoperative sore throat and carry out effective nursing care.

Keywords: Postoperative sore throat; Preoperative anxiety; General anesthesia patients; Tracheal intubation; Perioperative care

Preamble

Tracheal intubation is one of the effective ways used to assist breathing in patients under general anesthesia. Tracheal intubation may lead to different degrees of pharyngeal injury and promote the inflammatory response of the pharyngeal mucosa, of which Postoperative Sore Throat (POST) is one of the most common complications of removing the tracheal tube after general anesthesia, which reduces the recovery effect after anesthesia and affects the satisfaction of hospitalization. [1]. According to studies, the incidence of postoperative sore throat ranges from 21-70%, and there are numerous causes of postoperative sore throat [2-3]. And preoperative anxiety is a kind of uneasiness or nervousness produced by patients before surgery, with an incidence of 25%-80% [4]. Studies have shown that there is a significant relationship between preoperative anxiety and acute postoperative pain [5], preoperative anxiety may lead to muscle tension and increase the occurrence of postoperative sore throat. In this study, we analyzed the correlation between preoperative anxiety and postoperative

sore throat in patients undergoing general anesthesia surgery to provide research support for interventions to improve the perioperative experience of general anesthesia surgery patients with preoperative anxiety and postoperative sore throat.

Objects and Methods

Subjects of the survey

This is a cross-sectional study, using convenience sampling method, selected surgical patients who underwent elective general anesthesia surgery in a tertiary-level hospital in Guangzhou City from 2024-1-1 to 2024-5-30 as the survey subjects. Inclusion criteria: (1) age ≥18 years old; (2) patients all voluntarily or in accordance with medical advice to receive tracheal intubation general anesthesia; (3) clear consciousness, normal cognitive function; (4) I am aware of my condition, and voluntarily participate in this study; exclusion criteria: (1) postoperative patients entering the ICU; (2) preoperative complication of other laryngeal diseases and discomforts, such as vocal polyps, acid reflux, etc. patients; (3) too weak to communicate; (4) patients with secondary intubation; this study was approved by the Ethics Committee of the hospital.

Survey instruments

General Information Questionnaire

The general information questionnaire was developed by the investigators themselves and consisted of two parts. Basic information: type of surgery, age, gender, BMI, history of smoking and alcohol, history of surgery, and financial worries; and Specialty information: cardiac function rating, ASA rating, presence of a difficult airway, surgical position, length of intubation, number of suctioning sessions, number of choking sessions, number of agitation sessions, delayed awakening, use of hormones or not, preoperative anxiety, type of catheterization, perioperative hypothermia, and soon (Table 1).

Hamilton Anxiety Rating Scale

The Hamilton Anxiety Scale [6] uses a 5-point scale from 0-4: (0) none (1) mild (2) moderate (3) severe (4) very severe. A total score of more than 29 is considered severe anxiety; more than 21 is markedly anxious; more than 14 is definitely anxious; more than 7 is probably anxious, and if less than 6 patients have no symptoms of anxiety. In this study, HAMA ≥ 7 points was defined as anxiety and this scale had good reliability and validity.

Faces visual analog scoring method

The Facial Visual Analogue Scale (F-VAS) was used to assess the patient's postoperative pharyngeal pain. The VAS is the most commonly used unidimensional measure of pain intensity, and consists of a 100-mm straight line, with one end of the line indicating "no pain at all" and the other end indicating "the most severe pain imaginable" or "pain to the extreme", etc. Patients were asked to mark the corresponding position on the line. The scale consists of a 100-mm straight line, with one end indicating "no pain at all" and the other end indicating "the worst pain imaginable" or "extreme pain", etc. Patients are asked to mark the corresponding position on the line, and those who score above 0 are considered to have sore throat [7]. The facial VAS (shown in the figure) is a linear VAS line to which a number of cartoon expressions (happy, neutral, painful, etc.) are added to make the scoring more intuitive and graphic. Therefore, older patients and less educated patients can be considered to use the facial VAS. In this study, we propose to use the face visual analog scoring method for postoperative sore throat.

Data Collection Methods

The researcher explained the purpose, methodology, significance, and timing of the study to the patients, obtained the consent and support of the patients and their families, and signed the informed consent form. The researcher assessed the preoperative anxiety status of the patients face-to-face and the occurrence of preoperative sore throat using the face visual simulation scoring method 1 d before the operation using a unified instruction and oral questionnaire, and collected the general information and disease-related information of the respondents from the medical records. From the time of transfer to the resuscitation room to the time of transfer out of the resuscitation room, the resuscitation status of the respondents and the occurrence of postoperative sore throat were collected by using the face visual analog scale.

Statistical Methods

SPSS25.0 software was used for data entry and data statistical analysis. (1) Statistical description: Mean±standard deviation was used to express the measurement data when they conformed to normal distribution, and median and quartile were used when they did not conform to normal distribution; the count data were expressed as the number of cases and percentage. (2) Statistical inference: □ One-way analysis of postoperative sore throat scores and count data: t-test and ANOVA were used for normally distributed data; rank sum test or Kruskal-Wallis H-test was used for data that did not meet normal distribution. □ Multifactorial analysis was performed using multifactorial logistic regression analysis with age, perioperative hypothermia, postoperative pharyngeal pain, and whether or not hormones were used as covariates, and preoperative anxiety was used as the main variable in the corrected logistic regression analysis. $p < 0.05$ was taken as the difference was statistically significant.

Results

Single Factor Analysis

A total of 271 patients after general tracheal intubation were collected with valid questionnaires. The gender was average, the age distribution was mainly from 18 to 74 years old, and most of them had no history of smoking or alcohol. The type of surgery was dominated by common abdominal surgeries, and pharyngeal surgeries were excluded from influencing the accuracy of the results, and other general information is shown in Table 1.

Preoperative anxiety was found in 51 patients, 28 of whom presented with postoperative sore throat (54.90%).220 patients without preoperative anxiety presented with postoperative sore throat in 84 patients (only 38.18%).

Sports Event		Number of cases (N=271)	Postoperative sore throat group (N=112)	Non-postoperative sore throat group (N=159)	test statistic	P-value
Type of surgery	urology	82 (30.26)	36 (32.14)	46 (28.93)	1.626	0.471
	otolaryngology	47 (17.34)	19 (16.96)	28 (17.61)		
	gastrointestinal	42 (15.50)	12 (10.71)	30 (18.87)		
	thyroid gland	27 (9.96)	11 (9.82)	16 (10.06)		
	mammary gland	14 (5.17)	6 (5.36)	8 (5.03)		
	orthopedic surgery	37 (13.65)	15 (13.39)	22 (13.84)		
	ear nose and throat	18 (6.64)	13 (11.61)	5 (3.14)		
	thoracic	2 (0.74)	0 (0.00)	2 (1.26)		
	burn (injury)	2 (0.74)	0 (0.00)	2 (1.26)		
(a person's) age	18-44	113 (41.70)	56 (50.00)	57 (35.85)	12.66	0.005
	45-59	73 (26.94)	30 (26.79)	43 (27.04)		
	60-74	77 (28.42)	24 (21.43)	53 (33.33)		
	74-90	8 (2.95)	2 (1.79)	6 (3.77)		
distinguishing between the sexes	male	119 (43.91)	45 (40.18)	74 (46.54)	0.959	0.327
	women	152 (56.09)	67 (59.82)	85 (53.46)		
BMI	<18.5	19 (7.01)	6 (5.36)	13 (8.18)	0.786	0.853
	≥18.5	135 (49.82)	52 (46.43)	83 (52.20)		
	≥24	77 (28.41)	37 (33.04)	40 (25.16)		
	≥27	40 (14.76)	17 (15.18)	23 (14.47)		
tobacco and alcohol history	there are	34 (12.55)	15 (13.39)	19 (11.95)	0.66	0.797
	not have	237 (87.45)	97 (86.61)	140 (88.05)		
surgical history	there are	167 (61.62)	67 (59.82)	100 (62.89)	2.199	0.138
	not have	104 (38.38)	45 (40.18)	59 (37.11)		

economic crisis	there are	10 (3.69)	3 (2.68)	7 (4.40)	1.518	0.218
	not have	261 (96.31)	109 (97.32)	152 (95.60)		
Cardiac function ratings	Class I	208 (76.75)	88 (78.57)	120 (75.47)	0.059	0.808
	Class II	63 (23.25)	24 (21.43)	39 (24.53)		
Airway Ratings	Class I	153 (56.46)	62 (55.36)	91 (57.23)	2.739	0.434
	Class II	109 (40.22)	46 (41.07)	63 (39.62)		
	Class III	7 (2.58)	31 (2.68)	4 (2.52)		
	Class IV	2 (0.74)	1 (0.89)	1 (0.63)		
ASA rating	Class I	16 (5.90)	8 (7.14)	8 (5.03)	1.508	0.68
	Class II	183 (67.53)	80 (71.43)	103 (64.78)		
	Class III	71 (26.20)	23 (20.54)	48 (30.19)		
	Class IV	1 (0.37)	1 (0.89)	0 (0.00)		
difficult airway	be	6 (2.21)	2 (1.79)	4 (2.52)	0.127	0.721
	clogged	265 (97.79)	110 (98.21)	155 (97.48)		
surgical position	supine position	236 (87.08)	98 (87.50)	138 (86.79)	3.226	0.199
	lateral position	14 (5.17)	8 (7.14)	6 (3.77)		
	truncation (medicine)	21 (7.75)	6 (5.36)	15 (9.43)		
Duration of intubation	≤1h	2 (0.74)	0 (0.00)	2 (1.26)	5.467	0.362
	1h-1h30	59 (21.77)	25 (22.32)	34 (21.38)		
	1h30-2h	86 (31.73)	39 (34.82)	47 (29.56)		
	2h-2h30	55 (20.30)	20 (17.86)	35 (22.01)		
	2h30-3h	24 (8.86)	12 (10.71)	12 (7.55)		
	≥3h	45 (16.61)	16 (14.29)	29 (18.24)		
Number of sputum aspirations	0	238 (87.82)	96 (85.71)	142 (89.31)	0.324	0.851
	≥1	27 (9.96)	12 (10.71)	15 (9.43)		
	≥2	6 (2.21)	4 (3.57)	2 (1.26)		
Number of choking coughs	0	171 (63.10)	64 (57.14)	107 (67.30)	3.64	0.457
	≥1	54 (19.93)	25 (22.32)	29 (18.24)		
	≥2	21 (7.75)	10 (8.93)	11 (6.92)		
	≥3	17 (6.27)	9 (8.04)	8 (5.03)		
	≥4	8 (2.95)	4 (3.57)	4 (2.52)		
Number of agitations	0	241 (88.93)	98 (87.50)	143 (89.94)	0.141	0.998

	≥1	14 (5.17)	6 (5.36)	8 (5.03)		
	≥2	10 (3.69)	3 (2.68)	7 (4.40)		
	≥3	4 (1.48)	3 (2.68)	1 (0.63)		
	≥4	2 (0.74)	2 (1.79)	0 (0.00)		
Delayed awakening	be	4 (1.48)	3 (2.68)	1 (0.63)	2.547	0.111
	clogged	267 (98.52)	109 (97.32)	158 (99.37)		
Whether the tracheal tube meets the	be	12 (4.43)	8 (7.14)	4 (2.52)	2.828	0.093
	clogged	259 (95.57)	104 (92.86)	155 (97.48)		
Whether or not hormones are used	be	105 (38.75)	37 (33.04)	68 (42.77)	5.009	0.025
	clogged	166 (61.25)	75 (66.96)	91 (57.23)		
Preoperative anxiety	be	51 (18.82)	28 (25.00)	23 (14.47)	7.073	0.008
	clogged	220 (81.18)	84 (75.00)	136 (85.53)		
Catheter type	Ordinary capsule	257 (94.83)	106 (94.64)	151 (94.97)	0.134	0.715
	The wire is encapsulated	14 (5.17)	6 (5.36)	8 (5.03)		
Perioperative hypothermia	be	95 (35.06)	75 (66.96)	20 (12.58)	49.361	0
	clogged	176 (64.94)	37 (33.04)	139 (87.42)		

Table 1: Univariate analysis of the effect of general information of general anesthesia patients on the occurrence of postoperative sore throat [cases (percentage, %).

Multifactorial Logistic Regression Analysis of the Occurrence of Postoperative Sore Throat after General Anesthesia

Multifactorial Logistic regression analysis was performed with the occurrence of sore throat as the dependent variable (no=0, yes=1), age, hormone use, anxiety, hypothermia as independent variables, and the absence of sore throat as the model reference category. The results showed that when uncorrected, the p-value for hormone use was 0.053, ($p > 0.05$), which was not statistically significant. And the P value of age, preoperative anxiety, and the presence of hypothermia was <0.05, which was statistically significant. The risk of postoperative sore throat in patients with preoperative anxiety was 0.376 times higher than that in patients with non-preoperative anxiety, with a P value of 0.043 ($P < 0.05$). The risk of postoperative sore throat in patients with hypothermia was 0.055 times higher than that in patients with non-hypothermia postoperatively, with a p-value of <0.001 ($p < 0.05$) See Table 2.

Norm	Form	Regression Coefficient	Standard Error	Wald X^2 Value	OR value	95% CI	P-value
(a person's) age		-0.643	0.185	12.075	0.153	0.366-0.755	0.001
hormone use	No hormone use as a control	0.602	0.32	3.745	1.825	0.287-1.008	0.053
Preoperative anxiety	Using nonoperative anxiety as a control	0.787	0.389	4.082	0.376	1.024-4.712	0.043
Perioperative hypothermia	Non-perioperative hypothermia as a control	2.89	0.346	69.748	0.055	9.129-35.433	0

Table 2: Multifactorial logistic regression analysis of the occurrence of postoperative sore throat after general anesthesia (uncorrected).

The effect of preoperative anxiety on the occurrence of postoperative sore throat was again analyzed by including age, hormone use, and postoperative hypothermia as covariates in a multifactorial logistic regression model. The results showed that after correction, the risk of postoperative sore throat in patients with preoperative anxiety was 2.661 times higher than that in patients with no preoperative anxiety, with a statistically significant P value of 0.01 ($P < 0.05$). See Table 3.

Norm	Form	Regression Coefficient	Standard error	Wald X^2 Value	OR value	95% CI	P-value
(a person's) age		-0.632	0.185	11.675	1.882	1.309-2.705	0.001
hormone use	No hormone uses as a control	0.601	0.332	3.274	0.548	0.286-1.051	0.07
Preoperative anxiety	Using nonoperative anxiety as a control	0.979	0.379	6.664	2.661	1.266-5.593	0.01
Perioperative hypothermia	Non-perioperative hypothermia as a control	2.905	0.349	69.457	18.269	9.226-36.178	0

Table 3: Multifactorial logistic regression analysis of the occurrence of postoperative sore throat after general anesthesia (corrected).

Discussion

Preoperative anxiety as a risk factor for the development of postoperative sore throat in patients intubated under general anesthesia

Preoperative anxiety is prevalent and occurs in approximately 25% to 80% of patients undergoing surgery [8]. It has been shown that preoperative anxiety can cause an increase in the subjective perception of pain, and that the persistence of preoperative anxiety can lead to slower recovery, increased pain, higher levels of inflammation, and higher rates of complications in surgical patients in the early postoperative period [9].

Studies have shown that anxiety can be used as a stressor to produce a stress response, causing a series of psychological, endocrine and immune changes. Under the same stimulus source, anxious individuals are more sensitive to the environment, the more obvious stimulus response to pain, and friction and damage to the tracheal mucosa during general anesthesia intubation, more likely to have postoperative pharyngeal erythema and pain; anxiety can lead to nociceptive allergy, reduced adaptability to pain, the stronger the subjective perception of pain, aggravating the postoperative pain; preoperative anxiety may lead to sympathetic over-activity, myocardial oxygen consumption increases, increasing perioperative adverse events, such as postoperative pain, seriously affecting the patient's regression and prognosis. adverse events in the perioperative period, such as postoperative pain, which seriously affects patient regression and prognosis [10-12].

In this study we investigated the correlation between preoperative anxiety and postoperative sore throat in patients undergoing surgery under general anesthesia by using the Hamilton Anxiety Rating Scale and the Faces Visual Analog Scale, the results showed that out of the 271 investigated patients, 51 patients were found to have preoperative anxiety, of which 28 presented with postoperative sore throat, which is 54.90%.220 patients without preoperative anxiety, presented with postoperative sore throat in 84 cases, which is only 38.18%. After correcting for confounding factors, the risk of postoperative sore throat in patients with preoperative anxiety was 2.661 times higher than that in patients with nonpreoperative anxiety ($P < 0.05$), which shows that preoperative anxiety is a risk factor for postoperative sore throat in patients undergoing intubation for general anesthesia, and the two are correlated. Preoperative anxiety increases the risk of postoperative sore throat in general anesthesia patients, and alleviating patients' preoperative anxiety can effectively reduce the occurrence of postoperative sore throat and promote postoperative comfort care for patients. In addition, the results of this study show that the age factor affects the occurrence of postoperative sore throat, and the risk of postoperative sore throat is high in patients with postoperative hypothermia, suggesting that caregivers need to pay attention to the management of patients' body temperature during the period of perianesthesia, which can effectively prevent and reduce the occurrence of postoperative sore throat.

Alleviating preoperative anxiety in general anesthesia intubated patients to reduce postoperative sore throat in general anesthesia patients

Based on the results of this study, it is suggested that healthcare professionals need to pay attention to patients' preoperative anxiety. Preoperative anxiety can adversely affect patients physically and psychologically, increase patients' need for postoperative analgesia, and severe preoperative anxiety can lead to incomplete wound healing and complications (including sore throat, etc.) [13], so intervention for preoperative anxiety is necessary.

Interventions for preoperative anxiety can be categorized into pharmacologic and nonpharmacologic methods. Pharmacological interventions include sedatives and anxiolytics, of which studies have shown that benzodiazepines and melatonin as preoperative medications can improve patients' sleep quality and reduce their preoperative anxiety [14], but pharmacological treatments have adverse effects, so non-pharmacological interventions are more commonly used. Psychoeducational and cognitive-behavioral interventions are effective in relieving preoperative anxiety [15], including preoperative education and preoperative care counseling for patients. Studies have shown that acupuncture [16] and aromatherapy [17] can also alleviate preoperative anxiety, reduce the incidence of postoperative sore throat, and improve the perioperative experience of patients. At the same time, the nursing work in the anesthesia recovery room needs to pay attention to the postoperative sputum suction operation gently, to avoid excessive negative pressure and repeated friction caused by the mucous membrane of the oropharyngeal cavity breakage and bleeding, and try to avoid choking, coughing, dry vomiting and other adverse reactions of the patient when removing the tracheal tube. During general anesthesia, airbag pressure should be monitored at regular intervals, and the normal range of catheter sleeve pressure (20-30 cmH2O) should be maintained [18]. Nebulized inhalation should be given to the patients 30 min before anesthesia and after awakening as prescribed by the doctor to alleviate postoperative pharyngolaryngeal pain [19].

Summary

In summary, preoperative anxiety is a risk factor for the occurrence of postoperative sore throat in patients with general anesthesia intubation, increasing the risk of postoperative sore throat in patients with general anesthesia. Therefore, for elective general anesthesia surgery patients' health care personnel need to strengthen perioperative health management, preoperative effective relief of patient anxiety, active prevention and the occurrence of postoperative sore throat, to provide comfort care. In addition, this study is a single-center study, the inclusion of the survey population has certain geographical characteristics, and the number of limited, representative of the limitations, it is recommended that the future can further expand the sample size, to carry out multi-center large sample study.

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