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ORIGINAL

ANALYSIS OF THE INFLUENCING FACTORS IN THE DETECTION OF DIFFICULT PHARYNGEAL FISHBONE BY 70° RIGID LARYNGOSCOPE

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ABSTRACT

Objective: To analyze the related factors affecting the detection of difficult pharyngeal fishbone under 70° rigid laryngoscopes. **Methods:** A retrospective analysis was made of 490 adult pharyngeal fishbone patients who were treated in our department from January 2019 to May 2022, who underwent the author's detailed oropharyngeal and indirect laryngoscopy without fishbone, and then underwent 70° rigid laryngoscopies. According to the clinical data, the patients were divided into the detected group and the non-detected group according to whether the fishbone was detected. Univariate analysis and binary logistic regression analysis were performed on factors such as age, gender, time from ingestion to admission, symptoms, indicated side and position of neck, tongue height, tonsil size, and pre-treatment treatment of the two groups of patients. **Results:** Univariate analysis showed that age, gender, time from ingestion to admission, indicated side and position of neck, tongue height, tonsil size, and pre-treatment treatment had no statistical differences between the pharyngeal fishbone detection group and the non-detected group ($P > 0.05$), and the symptoms of the patients were significantly different between the two groups ($P < 0.001$). Binary logistic regression analysis showed that throat tingling was an independent risk factor for difficult pharyngeal fishbone detection under 70° rigid laryngoscopes. ($P<0.001$), OR value and 95%CI were 2.762 (1.832-4.185). **Conclusion:** Difficult pharyngeal fishbone patients with throat tingling need to go to the outpatient clinic for follow-up and complete laryngoscopy to reduce the possibility of missed diagnosis.

KEYWORDS: Pharyngeal foreign body; Fishbone; Rigid laryngoscope; Related factors

1. INTRODUCTION

Pharyngeal fishbone is a common disease in the emergency department of otolaryngology head and neck surgery. Fishbone choking in the throat can range from foreign body discomfort to unbearable pain in severe cases, even difficulty in swallowing and shortness of breath, which seriously affects daily life. Because the throat often has depressions, folds, and small foreign bodies, etc., it often leads to missed diagnosis (Xiaoyan Huang, Luo, & Jin, 2018). Part of the pharyngeal fishbone cannot be detected only by direct vision of the oropharynx and indirect laryngoscopy. These fish bones are called difficult pharyngeal fishbone. Further 70° rigid laryngoscopy or electronic laryngoscopy is required, which will affect the laryngoscopy. There are few literature reports on the related factors of lower fishbone detection. This study intends to use multivariate regression analysis to find out the independent related factors that affect the difficult pharyngeal fishbone detection under 70° rigid laryngoscopes.

2. Materials and Methods

2.1 General information

A retrospective analysis of 2,365 adult patients with pharyngeal fishbone who were treated by the author in the Department of Otorhinolaryngology, the First People's Hospital of Linping District, Hangzhou from January 2019 to May 2022 was conducted. And indirect laryngoscopy detected 1412 cases of fishbone, and 490 cases of non-detected fishbone underwent 70°rigid laryngoscopies. According to whether fishbone was detected under 70°rigid laryngoscopes, they were divided into difficult pharyngeal fishbone detection group and non-detection group, including 161 cases in the detection group and 329 cases in the non-detection group. Inclusion criteria: (1) patients aged ≥18 years; (2) with a clear history of fishbone ingestion; (3) clinical manifestations of foreign body sensation or tingling in the throat; (4) complete clinical data. Exclusion criteria: (1) Definitely diagnosed as fishbone in the esophagus by throat and chest CT; (2) Pharyngeal diseases that cause sore throat, such as pharyngeal ulcer, acute pharyngitis, acute tonsillitis, and epiglottitis.

2.2 Instruments and Equipment

Endoscopic video image processing device and supporting foreign body forceps, in which the endoscopic system is produced by Japan Olympus Co., Ltd., model: OLYMPUS CV-170. The display screen is: Panasonic EJ-MLA26C1. The 70° laryngoscope is: Shen Da J2670 (manufacturer: Shenyang Shenda Endoscope Co., Ltd.). The topical anesthetic is tetracaine hydrochloride with a concentration of 1% (manufacturer: Jiangsu Jiuxu Pharmaceutical Co., Ltd., approved by the State Drug Administration H20000309, specification 50mg/bottle).

2.3 Methods

Record the patient's gender, age, and stabbing time; ask the patient whether there is a foreign body sensation or tingling sensation in the pharynx when seeing the doctor, whether he has drunk vinegar, swallowed food, or picked the pharynx before seeing the doctor. The side and position of the neck where the fishbone is located (with the level of the upper edge of the thyroid cartilage as the boundary, the indicated position of the patient's neck is divided into the area above the level of the upper edge of the thyroid cartilage and the area below the level of the upper edge of the thyroid cartilage). Newly diagnosed patients underwent direct vision and indirect laryngoscopy, and the Friedman classification system was used to record the patient's tongue position (1-2 degrees were defined as low tongue position, 3-4 degrees were defined as high tongue position) and tonsil size (0-1 Degrees 2-4 are defined as large tonsils). If the gag reflex is obvious, 1% tetracaine spray is given to the local surface anesthesia of the throat, base of tongue, Valle of epiglottis, lateral pharyngeal wall, posterior pharyngeal wall, and pyriform sinus, etc., if no fishbone is found, if it is an outpatient, a 70° rigid laryngoscopy should be performed directly; if it is an emergency patient, make an appointment for the nearest outpatient period. 70° rigid laryngoscopies.

During the examination, instruct the patient to sit upright, raise the chest and head up, open the mouth, and stick the tongue out of the mouth to the maximum extent. The operator holds the gauze in the left hand to wrap the front of the tongue, pulls the tongue forward and fixes it, and holds a 70° rigid laryngoscope in the patient’s mouth with the right hand. enter. Instruct the patient to make a long "hei" or “hey" sound, adjust the direction of the laryngoscope, and check the supratonsillar fossa, tonsil inferior pole, lateral pharyngeal wall, tongue root, epiglottis Valle, lower part of the posterior pharyngeal wall, post circumferential area, and pyriform fossa, etc. place. After the fishbone is found in the inspection, the patient pulls the tongue. The operator holds the laryngoscope in his left hand and selects the foreign body forceps with the appropriate opening direction according to the direction of the fishbone incarceration. Holding the foreign body forceps in the right hand will quickly remove the fishbone. If the fishbone is too long and the foreign body forceps cannot be withdrawn smoothly, adjust the direction of the foreign body forceps properly and withdraw it. Do not loosen the foreign body forceps easily during the fishbone removal process to prevent the fishbone from accidentally falling under the glottis and causing foreign bodies in the trachea.

2.4 Statistical Methods

SPSS 26.0 statistical software was used to analyze the results, and the count data were expressed as rates, and the $\chi 2$ test was used, and $P<0.05$ was considered statistically significant, because there were few meaningful single

factors, the multi-factor inclusion standard was relaxed to P<0.1, and the single factor with P<0.1 in the univariate analysis was included for binary logistic regression analysis, and P<0.05 was considered statistically significant.

3. Results

3.1 The Results of Univariate Analysis Affecting the Detection of Difficult Pharyngeal Fishbone Under 70° Rigid Laryngoscope

The univariate analysis showed that age, gender, time of visit, neck indication side and position, tongue position, tonsil size, pre-treatment There was no statistical difference between the pharyngeal fishbone detection group and the non-detection group (P>0.05), but there was a significant statistical difference between the two groups (P<0.001). See Table 1.

Table 1: (a) Univariate analysis on the detection of difficult pharyngeal fishbone under 70° rigid laryngoscopes［n (%) ］

VARIABLE	FISHBONE UNDETECTED GROUP（N=329）	FISHBONE DETECTED GROUP（N=161）	X^2	P
SEX				
MALE	172（66.2）	88（33.8）	0.246	0.62
FEMALE	157（68.3）	73（31.7）		
GENERATION				
18-34 YEARS	124（67）	61（33）	0.656	0.883
35-50 YEARS	129（68.6）	59（31.4）		
51-65 YEARS	62（66）	32（34）		
＞6 YEARS	14（60.9）	9（39.1）		
FISHBONE POSSESSION				
YES	190（66.9）	94（33.1）	0.018	0.894
NO	139（67.5）	67（32.5）		
TREATMENT TIME				
ONE DAY	186（68.1）	87（31.9）	0.828	0.661
NEXT DAY TO 3 DAYS	116（64.8）	63（35.2）		
＞3 DAYS	27（71.1）	11（28.9）		
SYMPTOM				
FOREIGN BODY SENSATION	167（79.5）	43（20.5）	25.535	＜ 0.001
TINGLING	162（57.9）	118（42.1）		
NECK INDICATING SIDE				
LEFT	131（64.2）	73（35.8）	4.096	0.251
RIGHT	128（67.4）	62（32.6）		
MIDDLE	62（75.6）	20（24.4）		

Table 1: (b) Univariate analysis on the detection of difficult pharyngeal fishbone under 70° rigid laryngoscopes［n (%)］

VARIABLE	FISHBONE UNDETECTED GROUP（N=329）	FISHBONE DETECTED GROUP（N=161）	X^2	P
UNCLEAR	8（57.1）	6（42.9）		
NECK INDICATION POSITION				
ABOVE THE LEVEL OF THE UPPER BORDER OF THE THYROID CARTILAGE	195（64.4）	108（35.6）	2.794	0.095
BELOW THE LEVEL OF THE UPPER BORDER OF THE THYROID CARTILAGE	134（71.7）	53（28.3）		
TONGUE POSITION				
LOW	213（67.6）	102（32.4）	0.091	0.763
HIGH	116（66.3）	59（33.7）		
TONSIL				
SMALL	287（66.7）	143（33.3）	0.253	0.615
BIG	42（70）	18（30）		
HISTORY OF DRINKING VINEGAR BEFORE SEEING A DOCTOR				
NONE	240（68.2）	112（31.8）	0.612	0.434
HAVE	89（64.5）	49（35.5）		
HISTORY OF SWALLOWING BEFORE SEEING A DOCTOR				
NONE	187（70.8）	77（29.2）	3.534	0.06
HAVE	142（62.8）	84（37.2）		
DIGGING HISTORY BEFORE SEEING A DOCTOR				
NONE	276（66.5）	139（33.5）	0.498	0.48
HAVE	53（70.7）	22（29.3）		

The results of multivariate analysis affecting the detection of difficult pharyngeal fishbone under 70° rigid laryngoscopes were based on P<0.1, and the symptoms at the time of visit, the position of the neck indication and the history of swallowing before the visit were included in the multivariate analysis in the univariate analysis.

Binary logistic regression analysis showed that only the patient's

symptoms at the time of consultation were independent factors affecting the detection of fishbone in the difficult pharynx under a 70° rigid laryngoscope (OR=2.762, 95%CI 1.823-4.185, P<0.001). See Table 2.

Table 2: Logistic regression analysis affecting the detection of difficult pharyngeal fishbone under 70°rigid laryngoscope

INFLUENCING FACTORS	*β*	*S$\bar{x}$*	*WALD X2*	*P*	*OR*	95% CI
TINGLING SENSATION AT DOCTOR VISIT	1.016	0.212	22.948	＜0.001	2.762	1.823～4.185
THE NECK INDICATOR IS-LOCATED AT	-0.376	0.208	3.277	0.07	0.686	0.457～1.032
BELOW THE LEVEL OF THE UPPER BORDER OF THE THYROID CARTILAGE	0.249	0.2	1.549	0.213	1.283	0.867～1.9

4. Discussion

The anatomical structure of the pharynx is complex, and there are several mucosal folds and recesses (Xuanzhao Huang, Wang, & Kong, 2008), which makes it easy for some small foreign bodies to be hidden, especially small and sharp foreign bodies such as fishbone. Therefore, foreign bodies in the pharynx are very common in the emergency department of otolaryngology, among which fishbone is the most common. It was previously reported (Shi, Tang, & Chen, 2021) that fishbone accounted for more than 90% of all foreign bodies in the pharynx. Pharyngeal foreign bodies are easily missed by direct vision and indirect laryngoscopy. Lin et al (Lin et al., 2020) reported that the detection rate was only 20.1% (316/1572); Zhou Guowen et al (Zhou, Bai, & Yang, 2022) reported that the detection rate was 44.17% (413/935). However, Huang Y et al. (Y.-B. Huang et al., 2021) also believed that only about 2/3 of the pharyngeal fishbone could be detected and removed by using a spatula under direct vision and an indirect laryngoscope. This study found that the detection rate of foreign bodies in the pharynx was 59.7% (1412/2365), which was basically consistent with previous reports. Numerous studies have shown (Kikuchi, Ikeda, & Murono, 2021; Li, Xu, & Zhang, 2020) that 70° rigid laryngoscopy or electronic laryngoscopy can fully expose the hidden parts of the pharynx and reduce the missed diagnosis rate of pharyngeal foreign bodies. However, due to the limited space in the emergency room and the requirement of nosocomial feeling, the emergency departments of otolaryngology departments in most public hospitals are not equipped with 70° rigid laryngoscopes or electronic laryngoscopes. However, patients who did not find fishbone at the first visit had low compliance with follow-up and laryngoscopy. We found that only 51.4% (490/953) of the patients chose to follow-up and complete laryngoscopy. Therefore, according to some clinical characteristics of the patients at the time of treatment, it is very important to judge those patients

who have not detected pharyngeal fishbone at the first diagnosis, and to strengthen education and encourage them to complete the laryngoscopy examination as soon as possible.

It is generally believed that patients with obvious symptoms at the time of treatment are more likely to have fishbone. Sun Jun et al (Sun & Zhu, 2013) reported that there was a statistically significant difference between patients complaining of foreign body sensation in the pharynx, pain in swallowing, and whether or not fish bones were obtained. Pain patients are more likely to have fishbone. He Feng et al (He & Zheng, 2008) also believed that those with obvious stinging pain were more likely to have foreign bodies remaining, while those with only pharyngeal foreign body sensation might be caused by foreign body scratches without foreign bodies remaining. In this study, the detection rate of patients with tingling sensation was significantly higher than that of patients with foreign body sensation only (P<0.001). The multivariate regression analysis also showed that the presence of tingling sensation in patients was an independent risk factor affecting the detection of difficult pharyngeal fishbone under 70° rigid laryngoscopes (OR=2.762, 95%CI 1.823-4.185, P<0.001). Under a 70° rigid laryngoscope, the possibility of fishbone detection in patients with pharyngeal tingling was nearly three times that of patients with pharyngeal foreign body sensation.

In short, in the current situation that there is no laryngoscope support in the emergency department of otolaryngology, we should repeatedly emphasize the importance of outpatient follow-up and laryngoscopy for patients with difficult pharyngeal fishbone who have throat tingling when they go to the doctor, so as to avoid missed diagnosis. cause adverse consequences. This study ignored the possibility that the fishbone in the undetected group fell off spontaneously in the later stage or the fishbone was detected in other hospitals when the patient visited a doctor, and the follow-up data needs to be further improved.

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