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Assessment Of The Effectiveness Of Suture Lateralization In Patients With Bilateral Vocal Fold Paralysis After Thyroidectomy

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Abstract

Background. Preserving a patient's life is always a priority for medicine around the world. Unfortunately, surgery is fraught with possible postoperative complications. In particular, thyrectomies are often associated with the possibility of vocal cleft paralysis. It causes a number of symptoms that not only impair patients' quality of life, but can also be fatal.

Materials and Methods. We have conducted a retrospective and prospective analysis according to the medical records of 43 patients who underwent thyroidectomy followed by diagnosed bilateral vocal cord paralysis. The study was conducted at the National Otorhinorological Hospital of Vietnam between January 2018 to August 2019.

Results. Lateral fixation of one of the vocal cords reduces the number of patients suffering from shortness of breath (difficulty in breathing) from 100% preoperatively to 88.4% postoperatively. Laterofixation also has a positive effect on the recovery of speech function capability. Speech function was recovered from normal to moderate levels in 77.8% of patients after laterofixation.

Conclusions. Laterofixation is a temporary manipulation that significantly improves the quality of patients' life with bilateral vocal cord paralysis who have undergone thyroidectomy. The undisputed advantage of the present method is the low complication rate and the positive post-operative prognosis for the patient, which significantly depends on the age of the patient.

Ключевые слова: двусторонний паралич голосовых складок, тиреоидэктомия, латерализация швов.

Keywords: bilateral vocal fold paralysis, thyroidectomy, suture lateralisation.

Introduction

The medical rehabilitation of patients with bilateral laryngeal palsy, aimed at correcting the respiratory function of the larynx is one of the complex and urgent problems of modern otorhinolaryngology. Vocal fold paralysis refers to the neurological causes of reduced or absent movement of one or both vocal folds [1-2]. Such pathology can be regarded as a posttraumatic disorder, taking into account the fact that laryngeal function can be restored over time [3-4]. It should be noted that bilateral paralysis is characterised by inspiratory dyspnoea (due to narrowing of the airways at the level of the vocal fold), with both vocal folds assuming a paramedian position [1-2]. Since 1980, suture lateralisation has been used instead of an endolaryngeal ablation procedure during endoscopy to alleviate this symptom (treatment of bilateral immobility of the vocal folds) [5].

Statistics shows that the majority of patients with bilateral laryngeal paralysis are women of working age [6]. The incidence of such complication varies considerably, ranging from 0.2 to 15% in cases of benign thyroid surgery, and 30% in cases of malignant tumours or recurrent nodular goiter [2, 4, 7-10]. Bilateral vocal cord paralysis can also be an adverse complication in patients with respiratory obstruction after surgery on a thyroid tumour. Temporary laterofixation of one of the vocal cords is performed for relief. Such manipulation provides a stable airway and an acceptable level of voice [4,11]. In addition, the structure of the larynx, including the mucosa and cartilage, can be preserved and is widely used in clinical practice with some modifications. The advantage of the technique is its low invasiveness and reversibility compared to endoscopic total arytenoidectomy [12-16].

The age and anatomy of the patient play a significant role in the effectiveness of the recovery. Votor cleft dilation in children during the first phase of treatment of bilateral vocal fold palsy can help to avoid tracheostomy or a second operation in most cases. The prognosis is less favourable for adult patients [7]. As in any surgical procedure, complications can occur in mature patients, e.g. restenosis due to rupture and slippage of the suture [8, 12, 17]. Restenosis can be caused not only by the process of suture pulling, but also by the presence of endolaryngeal soft tissue. It can be explained by the difference in muscle and vocal cord tension: the muscle tension is weaker. The phenomenon of vocal cord deflection into the larynx may also play a role [18].

The aim of our study was the analysis and evaluation of the outcome of suture lateralisation in patients with bilateral vocal fold paralysis after thyroidectomy.

Materials and Methods

We have analysed the outcome of suture lateralisation manipulation in patients with bilateral vocal fold paralysis after thyroidectomy at the National Otorhinorological Hospital of Vietnam. Some clinical manifestations of the pathology (vocal fold paralysis) were also analysed and evaluated. The study was conducted from January 2018 to August 2019.

Research design

We have conducted a retrospective and prospective review of the medical records of 43 patients who underwent thyroidectomy (Table 1) with subsequent development of bilateral vocal cord paralysis.

A morphometric retrospective comparative study of the occurrence of different symptoms and the recovery of vocal and breathing function was carried out. The effectiveness of vocal cord suture laterization was also evaluated.

For statistical evaluation of the effectiveness of the manipulations performed, patients were divided into groups according to their age category, taking into account the physiological features of each category.

Results and Discussion

Analysis of the age groups of the operated patients showed that the average age of the patients was 57.1±8.7 years (Fig. 1). There were 93.0% of female patients, which confirms the worldwide statistics of the prevalence of this postoperative complication among women [4, 6, 19].

We assessed the manifestation of clinical symptoms before the operation, based on a retrospective and prospective analysis of the symptoms in different age groups. We found dyspnea (difficult breathing) in all 43 examined patients, dysphonia was diagnosed in 19 patients (44.2% of the total number). It should be noted that the clinical symptoms were present in all patients before the operation (Table 2).

Breathlessness was recorded in 100% of patients, hoarseness was seen in 62.8%.Gradually more frequent breathlessness was recorded in 83.7%.First-degree breathlessness was observed in 74.4% of patients, second-degree breathlessness in 25.6%; difficulty in breathing in 1 hour was typical for 34.9% of the patients.

Before lateral fixation, we measured the width of the vocal cleft. It was less than 1 mm (51.2%) in the vast majority of patients (Fig. 2). The findings indicated the presence of vocal fold paralysis.

The surgical procedure resulted in a reduction of the undesirable symptoms of vocal fold paralysis (Tables 3).

Thus, 11.6% of patients had shortness of breath, while the vast majority (88.4%) were able to overcome this symptom. In addition, the width of the vocal cleft was significantly increased, allowing the patients to regain the ability to reproduce the sound background.

We compared the voice disturbance index before and after surgery (Fig. 3). According to our data, the result of laterofixation for the majority of patients was a significant improvement of the index: from mild to moderate voice disturbance index (59.3%).

Comparing the results of the study patient group with a similar meta-analysis previously conducted by Tohoku University Hospital between 2014 to 2017, a positive course of rehabilitation can be predicted [20]. Similarly, a positive prognosis for functional recovery and improvement in quality of life has been described by several other researchers (Chen et al, Ezzat et al.) [21-22].

It should be noted that postoperative monitoring showed the occurrence of postoperative complications (Table 4) in 11.6% of patients, in particular, suture divergence. However, in general, the laryngofixation was successful in 88.4 % of the patients.

It should be noted that laryngofixation is a common practice in the treatment of vocal cord palsy. Xuhui Chen and Ping Wan, for example, recommend early laterofixation and combined laser arytenoidectomy followed by cordectomy after 12 months as a result of a systematic error risk assessment [21].

Conclusions

Laterofixation of the vocal cords is a measure to ensure stable patency of the upper airways. By performing this manipulation, fewer life-threatening complications can be observed. It shortens rehabilitation time and reduce the time of restoration of the ability to reproduce the sound background. This method preserves the structure of the larynx, including the mucosa and cartilage, which is an advantage over endoscopic total arytenoidectomy.

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Tables

Table 1. The characteristic conducted thyroidectomy in patients with post-surgery complications (bilateral vocal cords paralysis)

Times of conducted thyroidectomy	Patient's number, persons	The range, %
1 time	31	72.1
2 times	9	20.9
3 times	3	7.0
Total patients with post-surgery complication	43	100.0

Table 2. The characteristics of the dyspnea manifestation in patients with bilateral vocal cords paralysis

Characterisitic	The occurrence, persons (n=43)	The range, %

Occurrence	Gradually	36	83.7
	Suddenly	7	16.3
Degree	I	32	74.4
	II	11	25.6
	III	0	0.0
Time	< 3 min	13	30.2
	3-6 min	13	30.2
	> 6-12 min	2	4.7
	> 12 min	15	34.9

Table 3. The results of the post-surgery patient's observation

Observed parameter		The patient's number, persons (n=43)	The range, %
The dyspnea present	No fixed	38	88.4
	degree I	5	11.6
	Degree II	0	0.0
	Degree III	0	0.0
Dimension of glottic	< 3mm	5	11.6
	3-5mm	4	9.3
	> 5mm	34	79.1

Figures

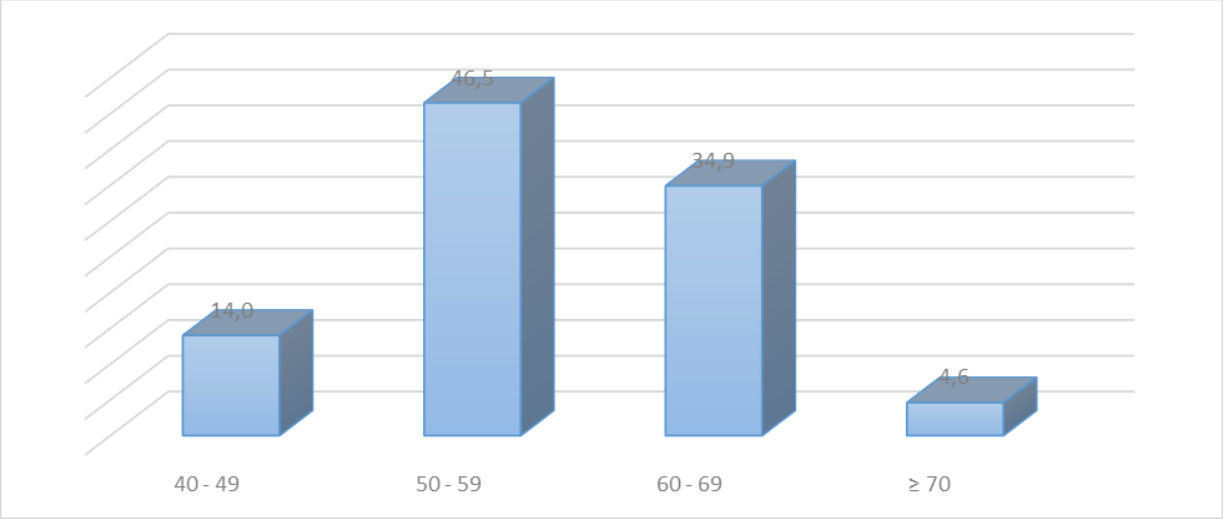

Figure 1. The age distribution of the patients with bilateral vocal cords paralysis.

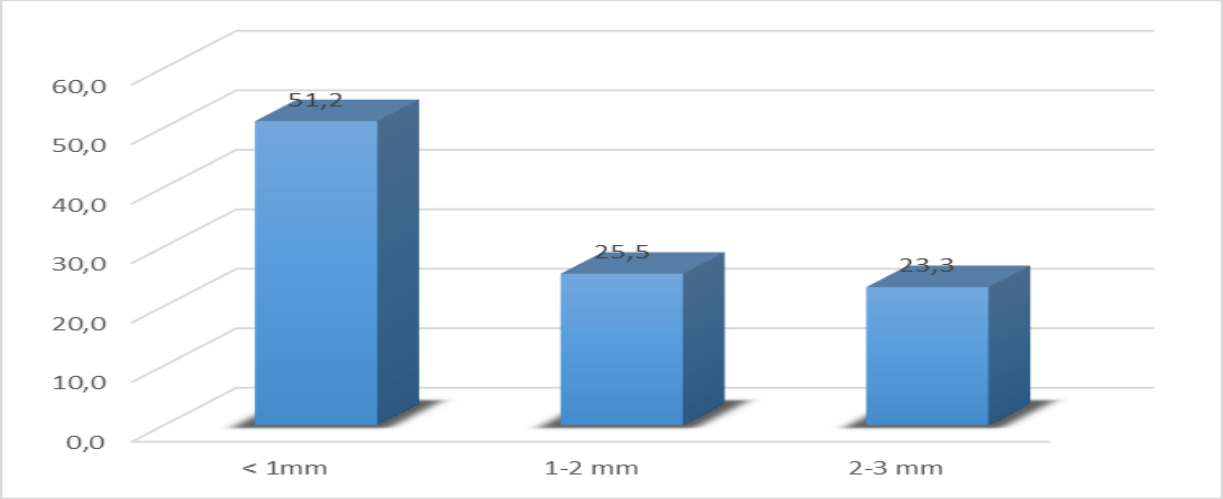

Figure 2. The observation results in the glottic dimension in patients with bilateral vocal cords paralysis after thyroidectomy

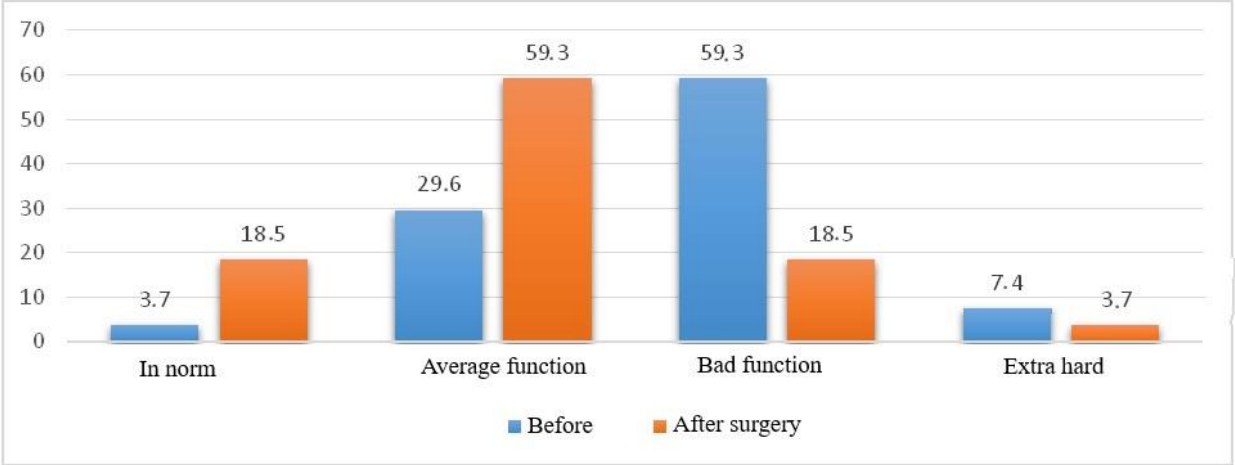

Figure 3. The range of the possibility to reproduce the voice by the patients with bilateral vocal cords paralysis before and after surgery