https://ijmsphr.com

DOI: - 10.37547/ijmsphr/Volume07Issue04-06

Open Access Research Paper

INTERNATIONAL JOURNAL OF MEDICAL SCIENCE AND PUBLIC HEALTH RESEARCH

Vol. 07, No. 04, April 2026, 33-38

eISSN 2767-3774

Outcomes of Clinical Research in Patients Affected by Unilateral Vocal Cord Paralysis

Makhmudov Akmal Ravshan o'gli

Republican Specialized Scientific and Practical ENT Center, Uzbekistan, Tashkent State Medical University, Uzbekistan

M.D. Makhamadaminova Shoira Abduvalievna

Republican Specialized Scientific and Practical ENT Center, Uzbekistan, Tashkent State Medical University, Uzbekistan

Article Received: 08/03/2026, Article Accepted: 29/03/2026, Article Published: 24/04/2026

Abstract

Unilateral vocal fold paresis/paralysis (UVFP) is a complex disorder of the laryngeal vocal apparatus, most commonly associated with damage to the vagus nerve and its branches. In recent years, the incidence of this pathology has increased, particularly following surgical interventions involving the neck and thoracic regions. Despite extensive anatomical knowledge, iatrogenic injury to the recurrent laryngeal nerve remains a significant clinical problem.

Keywords: Unilateral vocal fold paralysis (UVFP), vocal cord paresis, recurrent laryngeal nerve, vagus nerve injury, dysphonia, maximum phonation time, acoustic voice analysis.

Introduction

This study presents the clinical outcomes of 50 patients with UVFP examined and treated between 2022 and 2024. Patients were stratified into three groups according to the position of the affected vocal fold: paramedial (18%), intermediate (78%), and lateral (4%). Clinical assessment included videolaryngoscopy, acoustic voice analysis (maximum phonation time, fundamental frequency, jitter, shimmer), and imaging methods such as MRI and CT.

The results demonstrated that the severity of dysphonia correlates with the position of the paralyzed vocal fold. Patients with paramedial positioning showed relatively preserved phonatory function, whereas intermediate and lateral positions were associated with severe (grade III) dysphonia and significantly reduced maximum phonation time. Acoustic analysis revealed increased jitter and shimmer values, indicating impaired vibratory function and voice instability.

Based on clinical and functional findings, treatment strategies were individualized. Conservative management was effective in patients with paramedial vocal fold position. Injection medialization was preferred in intermediate cases, while thyroplasty was recommended for patients with lateral vocal fold paralysis.

The study highlights the importance of patient stratification in optimizing treatment selection and improving functional voice outcomes in UVFP.

Paresis/paralysis of the vocal cords is a complex symptom of disorder, called pathology of the vocal apparatus of the larynx. Usually, such a condition leads to a pathological process, which affects the n. vagus. In recent years, there has been an increase in the number of patients with this pathology.

Despite the complete description of the anatomy of the larynx in the literature, the percentage of various types of injuries of the nerves innervating the larynx during surgical operations remains. The problem of reducing complications of intraoperative injuries of the laryngeal nerves poses the task of researchers to study the anatomy of the larynx, in particular the topographic anatomy of the vagus nerve and its branches in more depth and detail.

As a result of our research, there are different methods of

treating patients with this pathology, and in order to clarify which method to use for a particular patient, we propose dividing patients into different groups based on the results of a clinical and functional examination.

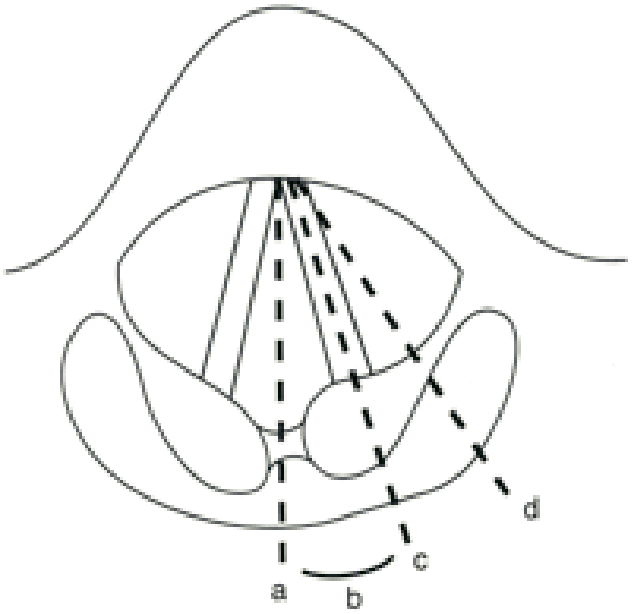
This article discusses the effects of unilateral vocal cord paresis/paralysis (UVFP) from 2022 to 2024. 50 patients who underwent examination and treatment according to are described and patients are divided into 3 groups to plan treatment tactics.

Patients in the study group were matched for key descriptive criteria (sex, age, comorbidities, surgical history). Therefore, the results of this small sample of patients presented below may reflect the population-level problem. None of the included subjects smoked, and none of the patients with UVFP had any congenital malformations. Patients were included regardless of the presence of allergies, gastroesophageal reflux disease (GERD), or asthma.

Patients are classified according to the location of the affected vocal cords. Divided into 3 groups:

1. Paramedial – 9 patients (18 %)
2. Intermediate – 39 patients (78 %)
3. Lateral - 2 patients (4%)

Figure 1



3. Vocal fold paresis: a- medial position; b- paramedial position; c-intermediate position; d-lateral position.

On admission, the general condition of patients in group 1 was relatively satisfactory, with symptoms ranging from mild periodic hoarseness to aphonia, stridor during sleep, and grade 1 respiratory failure. At the same time, 9 (100%) patients had only hoarseness, 2 (22%) patients had stridor during sleep, and 1 (11%) had severe respiratory failure. In general, this group was characterized by the same features as the planned preparation for medical procedures.

The general condition of patients in group 2 on admission varied from satisfactory to severe, all patients had severe hoarseness, shortness of breath during phonation, and mild neurotic symptoms. At the same time, 39 (100%) patients had only hoarseness, 8 (20.5%) patients had mild neurotic symptoms, and 30 (76.9%) patients had shortness of breath during speech.

The condition of patients in group 3 is moderate to severe, hoarseness is more pronounced, all patients have hoarseness. At the same time, 1 (50.0%) patient has only hoarseness, 1 (50.0%) patient has regurgitation when drinking liquids, cough symptoms. All patients have aphonia and shortness of breath. This group of patients underwent a full examination

Patients underwent videolaryngoscopy before undergoing Dr. Vox voice therapy or surgical procedures

No.	Anatomical structures and mucosal changes of the larynx	Number of observations	
		number	%

1	Swelling and hyperemia of the scapular cartilage		38	76
2	Vocal cord paresis/paralysis	Right	4	8
		left	46	92
		Total:	50	100.0

Before treatment, during endoscopic examination of the larynx, it was found that one of the vocal cords in the larynx was limited in movement, 38 (76%) patients had discoloration of the laryngeal mucosa, edema and hyperemia of the mucous membrane of the sphenoid sinuses; among patients, paresis/paralysis left cord was more common in the (46 patients – 92%) than in the right (46 patients – 92%)

The patients were diagnosed using several clinical examination methods: indirect optical videolaryngoscopy (70°, 90°, fibrolaryngoscopy), MRI of the brain, soft tissue CT of the neck and chest. Difficulties were presented by young children, who, in the absence of respiratory failure, had to undergo several examinations in the dynamics of monitoring the course of the disease.

Clinical study results of patients with unilateral vocal cord paresis/paralysis of the vocal cords in the medial and paramedial positions.

Patients underwent endoscopic examination of the larynx using indirect laryngoscopy using a 70□ 27 mm rigid laryngoscope. Indirect laryngoscopy was performed on an empty stomach, under local application anesthesia with spraying of a 10% solution of lidocaine into the oropharynx. After the onset of anesthesia, the distal end of the endoscope was inserted along the axis of the root of the tongue, and the distal end was used to examine the larynx, the condition of the piriform sinuses, the condition of the epiglottis; the color of the laryngeal mucosa, the presence or absence of edema, the mobility or limitation of the vocal cords, the position of the glottis during inhalation and phonation were checked.

According to the results of the study, in patients with unilateral vocal cord paresis/paralysis of the vocal cords, the study group included 9 patients, which accounted for 18% of all patients with laryngeal paralysis. The patients were aged between 16 and 70 years, and the patients belonged to the able-bodied group.

The degree of dysphonia in all patients was determined by the maximum phonation time (MPT). That is, each patient was asked to say the vowel “A” continuously at the maximum rate of pronunciation in one breath. The maximum phonation time was more than 10 seconds.

Patients performed the MPT task while sitting upright. They repeated the maximum phonation time of /a/ three times with a one-minute rest period between each trial. Patients were instructed to hold the /a/ vowel as long as possible in a normal speaking voice after maximal inspiration. They were also instructed to pronounce the vowel /a/ and say it until they could no longer hold it, even if their voices were strained and strained. The researcher showed the patients how to perform the task with a shortened model of the MPT. He demonstrated the task by holding the vowel /a/ with his own voice for a few seconds. He then showed how long to continue saying the /a/ by imitating the end of the MPT. Patients were given additional training, if necessary, until each could complete the task as instructed. No instrument was used to record the patients' vocal pitch; however, the patients were instructed to perform the task with normal speaking voices. Additionally, additional feedback was provided for patients to continue at a higher or lower pitch, if necessary.

According to the results of the examination of the patients, the degree of dysphonia was divided into 3 groups in seconds: patients with a maximum phonation time of 1 to 3 seconds were considered to have severe dysphonia, i.e., grade 3 dysphonia. Patients with a maximum phonation time of 4 to 6 seconds were considered to have moderate dysphonia, i.e., grade 2 dysphonia, and patients with a maximum phonation time of 7 to 9 seconds were considered to have grade 1 dysphonia, i.e., mild dysphonia. The results of the examination of the patients are shown in Table 1.

Table 1

Degrees of dysphonia in patients

Degree of dysphonia	Number of patients (n)	%
0	-	
1	-	
2	2	22.2
3	7	77.8

As shown in Table 1, when the vocal cords with limited mobility occupy a paramedial position, the majority of patients have third-degree dysphonia. In about a quarter of patients, moderate, or second-degree dysphonia, is observed. This means that even the limitation of the vocal cords with limited mobility, occupying a paramedial position, reduces the quality of life of patients and significantly complicates their social life in society.

After the patients were classified into groups according to the condition of their vocal cords, an acoustic analysis of their voice was performed. In all patients, the main voice parameters, including maximum phonation time, fundamental tone frequency, Jitter, which indicates the change in voice frequencies relative to the fundamental tone, and Shimmer, which indicates the change in amplitudes, were measured using the PRAAT computer program.

Before the analysis began, the patients were explained the content of the analysis and how it was performed. Each patient was placed in front of a microphone connected to a computer and was instructed to stand 30 cm from the microphone. Patients were instructed to count from 1 to 10 and say the vowel /A/ to determine the maximum phonation time when the recording began. The results of the analysis are presented in Table 2.

The sound acoustic analysis

Maximum phonation time	4,7 +2.3
F0	2 24. 4 + 19. 36
Jitter	6.1 + 3.1
Shimmer	1 2 . 74 + 6 . 24

As can be seen from the table above, in patients with unilateral vocal cord paralysis and paramedial vocal cords, the maximum phonation time varies from 3.4 seconds to 7.0 seconds. Due to the change in the biomechanical parameters of the larynx due to vocal cord damage, changes are also observed in the fundamental tone.

Although there were no significant changes in the fundamental tone frequencies, i.e., no significant increases in the jitter index, significant changes were observed in the fundamental tone amplitude.

The shimmer index in this group of patients averages 12 percent, which is 2.5 times higher than normal, and indicates that the loudness of the voice is mainly due to the observed asymmetry in the amplitude of the patients' voices.

Clinical study results of patients with unilateral vocal cord paresis/intermediate vocal cord paralysis.

In 4 patients in this group, unilateral vocal cord paresis and paralysis were observed, but the patient's history does not indicate the onset of the disease. Hoarseness began after a seasonal viral illness.

The maximum phonation time in patients in this group is shown in Table 2.

2.Table
Degrees of dysphonia in patients

Degree of dysphonia	Number of patients (n)	%
0	-	
1	-	
2	-	
3	39	100.0

As shown in Table 2, all patients had grade 3 dysphonia.
The patients' voice acoustic analysis is presented in Table 3.

Table 3. Sound acoustic analysis

Maximum phonation time	1.9 + 1.3
F0	236.632+ 25 . 36
Jitter	7.18 + 3. 3
Shimmer	20.086%+ 4 . 24

As can be seen from the table above, the maximum phonation time in patients with unilateral vocal cord movement limitation and vocal cords in an intermediate position varies in the range of 0.6 seconds to 3.2 seconds.

Clinical study results of patients with unilateral vocal cord paresis/paralytic vocal cords in lateral position.

According to the results of the study, in patients with unilateral vocal cord paresis/paralysis of the laryngeal paralysis, 2 patients were included in the study group, which accounted for 4% of all patients with laryngeal paralysis. The patients were aged between 16 and 70 years, and the patients belonged to the able-bodied group.

The results of the examination of the patients are shown in Table 4.

Table 4
Degrees of dysphonia in patients

Degree of dysphonia	Number of patients (n)	%
0	-	
1	-	
2	-	
3	2	100.0

As shown in Table 4, patients experience third-degree dysphonia when the vocal cords, with limited mobility, assume a lateral position.
The results of the sound acoustic analysis are presented in Table 5.

Table 5. Sound acoustic analysis

Maximum phonation time	0.9 + 0.7
F0	236.632+ 25 . 36
Jitter	7.9 + 2.1
Shimmer	2 2 .086%+ 2 . 24

As can be seen from the table above, the maximum phonation time in patients with unilateral vocal cord movement limitation and vocal cords in an intermediate position varies in the range of 0.6 seconds to 1.3 seconds.

Discussion. For the effective treatment of patients with unilateral vocal cord paralysis, dividing them into appropriate groups plays a decisive role in choosing conservative or surgical methods for patients. In the first group of patients, conservative treatment in most cases improves the patient's condition without surgical methods. In the second group of patients, injection medialization is used as a surgical method. And in the third group of patients, thyroplasty is recommended.

References

1. Бербом Х. Болезни уха, горла и носа/Бербом Х., Кашке О., Навка Т., Свифт Э.; пер.с англ.- М.:МЕДпресс-информ, 2012-776 С.:ил.

2. Вязьменов Э.О. Парезы и параличи гортани у детей: особенности развития итечения, методы диагностики и лечения / Э.О. Вязьменов, Е.Ю. Радциг, М.Р.Богомильский// Вестн. оториноларингологии. - 2007. - № 2. - С. 63-67.

3. Дайхес Н.А., Назарочкин Ю.В., Трофимов Е.И., Харитонов Д.А., Е.М.ФукиЕ.М.Профилактика нарушений иннервации гортани при лечении больных узловымизаболеваниями щитовидной железы. //Усовершенствованная медицинская технология,Москва – 2006

4. Дерягин Н.И. Кокорина В.Э. К вопросу о тактике лечения больных с нарушениями двигательной иннервации гортани // Дальневост. мед.журн. - 2002. - № 1. - С. 71-72.

5. Магомедов Р.Б. Профилактика повреждений возвратного гортанного нерва при операциях на щитовидной железе : автореф. дис. ... канд. мед.наук : спец. 14.00.27 / Магомедов Рашид Балабекович ; [Рос. мед. акад. последиплом. образования]. - М., 2000. - 22 с. : ил. - Библиогр.: с 22

6. Карпова О.Ю. Нарушение голоса- симптом не только заболеваний гортани// РМЖ № 9, 1999 г.

7. Benninger M.S., Gillen J.B., Altman J.S. Changing etiology of vocal fold immobility // The Laryngoscope, 108(9), 1998, pp. 1346-1350

8. Chandrasekhar S.S., et al. Clinical practice guideline: improving voice outcomes after thyroid surgery./Chandrasekhar SS, Randolph GW, Seidman MD, Rosenfeld RM, Angelos P, Barkmeier-Kraemer J, Benninger MS, Blumin JH, Dennis G, Hanks J, Haymart MR, Kloos RT, Seals B, Schreibstein JM, Thomas MA, Waddington C, Warren B, Robertson

PJ//Otolaryngol Head Neck Surg. 2013 Jun;148(6 Suppl):S1-37.

9. Kwon S.K., Kim H.-B., Song J.-J., Cho C.G., Park S.-W., et al. Vocal Fold Augmentation with Injectable Polycaprolactone Microspheres/Pluronic F127 Hydrogel: Long-Term In Vivo Study for the Treatment of Glottal Insufficiency.//Published: January 22, 2014DOI:10.1371/journal.pone.0085512

10. Malcolm W.F.,Hornik C., Evans A., SmithP.B.,Cotten C.M. Vocal fold paralysis following surgical ductal closure in extremely low birth weight infants: a case series of feeding and respiratory complications.// JournalofPerinatology. 2008;28:782-785

11. Miyamoto R.C., Parikh S.R., Gellad W., Licameli G.R. Bilateral congenital vocal cord paralysis: a 16-year institutional review.//Otolaryngol Head Neck Surg. 2005 Aug;133(2):241-5

12. Parnell F.W. Vocal cord paralysis. A review of 100 cases / F.W. Parnell, J.H. Brandenburg //Laryngoscope.-1970.-Vol.80.-P. 1036-1045.

13. Srirompotong S., Sae-Seow P. The cause and evaluation of unilateral vocal cord paralysis.//J Med Assoc Thai. 2001 Jun; 84(6):855-8.

14. Sulica L., Blitzer A.Preface in Vocal Fold Paralysis // Springer, New York, 2006

15. Willatt D.J. The prognosis and management of idiopathic vocal cord paralysis / D.J. Willatt, P.M. Stell // Clin. Otolaryngol.-1989.-Vol. 14.-P. 247-250.