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Research Article

USEFULNESS OF THE VOICE HANDICAP INDEX-10 AS A SYMPTOM MONITORING TOOL IN ACUTE NON-INFECTIOUS LARYNGITIS ATTRIBUTED TO VARIOUS ETIOLOGIES: A PROSPECTIVE COMPARATIVE STUDY

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ABSTRACT

Background: Acute non-infectious laryngitis is a common cause of sudden dysphonia and may arise from diverse etiologies including reflux, smoking, allergy, and professional voice use. Although diagnosis is primarily clinical, objective assessment alone may not adequately reflect patient-perceived voice impairment. The Voice Handicap Index-10 (VHI-10) is a validated patient-reported outcome measure that quantifies impact of changes in voice.

Objectives: To evaluate the usefulness of the VHI-10 in assessing symptom severity and monitoring treatment response in patients with acute non-infectious laryngitis across different etiological subgroups (GERD, LPRD, Smoking, Allergy and Voice Users).

Methods: VHI-10 scores were recorded at baseline and after 12 weeks of conservative and etiology-specific management. Statistical analysis was performed using paired student t-tests.

Results: All groups demonstrated statistically significant improvement in VHI-10 scores after 4 weeks ($p < 0.01$). The greatest improvement was observed in the smoking group, with a mean reduction of 16.7 points (69.3%), while the least improvement was seen in the allergic laryngitis group, with a mean reduction of 5.7 points (26.4%).

Conclusion: The Voice Handicap Index - 10 is a simple & inexpensive tool, yet potent to assess the Quality of Life in non-infectious laryngitis.

KEYWORDS: Allergic Laryngitis, Gastro-Oesophageal Reflux, Laryngopharyngeal Reflux, Voice Handicap Index-10.

Introduction

Acute laryngitis is an inflammatory condition of the laryngeal mucosa that presents with rapid-onset sudden change in voice quality, typically presenting with hoarseness, raspy voice, reduced pitch range and vocal fatigue with or without cough. It is differentiated from chronic laryngitis by symptom duration, with acute cases generally resolving

within 3 to 7 days[1]. Infectious causes are the most common (viral upper respiratory infections) but a significant section of patients experience a sudden onset acute non-infectious laryngitis. These non-infectious forms may arise from voice misuse, vocal abuse, exposure to environmental irritants causing Allergic Laryngitis and Bronchial Asthma, Gastro-Oesophageal Reflux Disease (GERD), Laryngopharyngeal Reflux (LPRD), physical trauma to the vocal cords, smoking and other inhalational injuries form the cornerstone of the various causes for the same[2,3,4].

Vocal misuse or abuse can be acute in onset, as seen after a day or days of shouting/yelling even for a short duration. Usage of voice in a frequency and pitch which is not consistent with the person's age or gender constitutes abuse. Whispering over a long time can also count as a vocal misuse. This is also common in individuals who have not had formal voice coaching suddenly beginning to use the voice over a long duration.

GERD and LPRD have been known to cause on and off Laryngitis because of the excessive mucosal irritation cause by the acid reflux into the glottis. Although more seen in Chronic cases, on and off Acute episodes are seen in regular practice. The main symptom in such cases is excessive throat clearing in attempt to get symptomatic relief[5].

Other features associated with this can include a sensation of globus, odynophagia, increased and dense endolaryngeal mucus, on and off hoarseness and in some rare cases, dysphonia or aphonia.

Voice problems seem to be a very common symptom in allergic diseases like allergic asthma, allergic laryngitis, allergic rhinosinusitis, OAS, and angioedema, many information regarding the mechanism/s that allergy affects voice production are lacking. Lack of information also exists concerning the voice-related epidemiology and pathology in allergic diseases. The role of allergy in voice production remains under investigated, and this is the main reason why many basic questions still remain unanswered[6].

In Acute Laryngitis, when the generation of adequate phonation pressure becomes more difficult because of the oedema, phonatory changes begin because of the changing fluid-wave dynamics of the inflamed and oedematous tissue[1].

A detailed history and clinical examination usually can give an accurate diagnosis of Acute Laryngitis. This can be supported by Endoscopy with or without Stroboscopy. Further evaluation is individualized based on the clinical context and suspicion of underlying conditions[7].

Although identification and diagnosis are easy, the management is not straightforward because of the complex etiology. Thus, the use of self-validated questionnaires is important for better understanding. The Voice Handicap Index - 10 (VHI-10) was developed by Rosen et al in 2004[8] with a set of 10 questions and a range from 0-40. It is simple to read, assesses all variants in voice usage and can be reproduced easily. The other Quality of Life scales for the same include the VoiSS (a patient-derived Voice Symptom Scale) [9], GRBAS (Grade, Roughness, Breathiness, Asthenia, Strain) [10] among others.

The aim of this study is to examine the use of VHI-10 in Acute non-infectious Laryngitis and identify if it can help serve a benefit in monitoring the progress of a patient symptomatically whilst undergoing treatment for the same.

Materials and Methods

Study Design and Setting: This prospective study was conducted in the Department of Otorhinolaryngology over a period of 12 months at a tertiary Hospital in South India in patients clinically diagnosed with Acute non-infectious Laryngitis. The Ethical Committee approval was obtained before the commencement of the study and informed consent was taken from each individual (viz.no.2025/01/13).

Study Population and Duration: All adult patients presenting to the outpatient clinic with acute onset dysphonia were screened for eligibility over the study duration of 12 months from January to December 2025. A consecutive sampling method was used and all patients fulfilling the criteria were taken up. A formal sample size was not calculated because of multiple etiologies and a total of 100 patients were taken to be part of the study, divided into 5 groups of 20 each:

- Group A - LPRD (made by Reflux Symptom Index and Reflux Finding Score [11,12]). The RSI has to be greater than 20 out of 45 and RFS more than 10 out of 26.
- Group B - GERD (made by DeMeester composite score [13]). The score has to be more than 14.72 out of a possible 100.
- Group C - Smoking (newly started, for less than 1 year). The smoking has to be only tobacco irrespective of the pack index.
- Group D - Allergic Laryngitis (parallelly co-existing with Allergic Rhinitis and elevated Immunoglobulin E levels of more than 300 IU/mL).
- Group E - Professional voice use (singer/teacher/hawker for more than 5 years) with no mucosal abnormalities of the vocal cords.

Care was taken that a single patient did not fulfil the criteria for more than one group among the five. If it did, the case was excluded. Overlapping scenarios were clearly evaluated and effort was made to isolate symptoms.

Inclusion Criteria

- Age between 21-60.
- Acute onset of voice change (hoarseness, vocal fatigue, reduced pitch or vocal effort) of ≤ 14 days duration.\
- Clinical diagnosis of acute non-infectious laryngitis based on history and laryngoscopic evidence of erythema and oedema around the laryngeal framework without purulence.

- Absence of systemic symptoms suggestive of acute infection.
- Ability to comprehend and complete the VHI-10 questionnaire independently.

Exclusion Criteria

- Evidence of infectious laryngitis, including concurrent viral or bacterial upper respiratory tract infection which warrant antibiotics.
- Present or previous evidence of chronic laryngitis with symptoms lasting longer than 3 weeks which might further need long term follow-up and investigations to rule out the cause.
- Mucosal abnormalities of the vocal cords which can cause chronicity.
- Present or past history of malignancy of the larynx which could have altered normal mucosa.
- Neurological lesions of the larynx which needs further evaluation.

Statistical Analysis

All statistical analysis was done using the SPSS software version 25 (IBM Corp., NY., USA). Continuous variables were summarized using mean and standard deviation, Paired T-tests were used to compare baseline and follow-up VHI-10 scores.

Management

Group A & B individuals were advised to reduce spicy food and space out meals adequately. Group C individuals were advised to stop smoking. Group D individuals were asked to wear a mask at all times to work as a physical barrier. Group E individuals were asked to rest or reduce vocal use as much as possible. In Groups A and B, treatment was given with Tablet Vonoprazan 20 mg two times a day before food for 12 weeks. In Groups C and E, Benzydamine 0.15%v/v mouth gargle was used to alleviate throat irritation for 12 weeks. In Group D, Tablet Bilastine 20 mg was used for allergic symptoms for 12 weeks.

Follow-up

The VHI-10 scale [Image 1] was taken at baseline and at 12 weeks by the same principal investigator to prevent bias. The score of the VHI-10 could range from 0-40.

Observations and Results

Table 1 shows the baseline demographic characteristics of the study population distributed across five groups. Age distribution among the four predefined age categories was comparable across all groups, with no statistically significant difference observed ($p = 0.84$). Gender distribution demonstrated a male predominance across the entire cohort; however, intergroup comparison revealed no statistically significant difference ($p = 0.62$).

	VHI-10 statement	Score				
1.	My voice makes it difficult for people to hear me.	0	1	2	3	4
2.	I run out of air when I talk.	0	1	2	3	4
3.	People have difficulty understanding me in a noisy room.	0	1	2	3	4
4.	The sound of my voice varies throughout the day.	0	1	2	3	4
5.	My family has difficulty hearing me when I call them throughout the house.	0	1	2	3	4
6.	I use the phone less often than I would like to.	0	1	2	3	4
7.	I'm tense when talking to others because of my voice.	0	1	2	3	4
8.	I tend to avoid groups of people because of my voice.	0	1	2	3	4
9.	People seem irritated with my voice.	0	1	2	3	4
10.	People ask, "What's wrong with your voice?" 0 1	0	1	2	3	4

VHI : Voice Handicap Index
0 = never, 1 = almost never (occasionally), 2 = sometimes, 3 = almost always, 4 = always

Image 1. The Voice Handicap Index 10

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Table 1: Demographic Data of the study participants

Variable	Category	Group A	Group B	Group C	Group D	Group E	Total	p value
Age group (years)	21–30	4	5	6	5	4	24	
	31–40	6	5	7	6	6	30	
	41–50	6	7	4	5	7	29	
	51–60	4	3	3	4	3	17	
	Total	20	20	20	20	20	100	**0.84**
Gender	Male	14	13	16	12	15	70	
	Female	6	7	4	8	5	30	
	Total	20	20	20	20	20	100	**0.62**

Table 2: Paired Differences and T-test results in each group before and after management

Comparison (Before vs After)	Paired Differences Mean	S.D.	S.E. Mean	95% Confidence Interval of the Difference		t	Corr.
				Lower	Upper		
Group A	12.20	2.10	0.47	11.22	13.18	26.10	0.001
Group B	10.70	1.90	0.42	9.82	11.58	25.48	0.001
Group C	16.70	2.40	0.54	15.57	17.83	31.02	0.001
Group D	5.70	1.60	0.36	4.94	6.46	15.83	0.002
Group E	14.70	2.30	0.51	13.63	15.77	28.82	0.001

Table 3: Changes in VHI 10 scores before and after management

Group	Baseline (Mean ± SD)	4-Week (Mean ± SD)	Mean Reduction	% Improvement	p value†
A	23.4 ± 3.2	11.2 ± 2.6	12.2	52.1%	**0.001**
B	22.8 ± 3.0	12.1 ± 2.8	10.7	46.9%	**0.001**
C	24.1 ± 3.5	7.4 ± 2.1	16.7	**69.3%**	**0.001**
D	21.6 ± 2.9	15.9 ± 3.1	5.7	**26.4%**	**0.002**
E	25.3 ± 3.8	10.6 ± 2.4	14.7	58.1%	**0.001**

Table 4: Symptom wise score distribution in all Groups

VHI-10 Item	Group A *(B→A, %)*	Group B *(B→A, %)*	Group C *(B→A, %)*	Group D *(B→A, %)*	Group E *(B→A, %)*
1	2.6→1.2 (53.8)	2.5→1.3 (48.0)	2.7→0.8 (70.4)	2.3→1.9 (17.4)	2.8→1.1 (60.7)
2	2.4→1.1 (54.2)	2.3→1.2 (47.8)	2.6→0.7 (73.1)	2.2→1.8 (18.2)	2.7→1.0 (63.0)
3	2.3→1.0 (56.5)	2.2→1.1 (50.0)	2.5→0.6 (76.0)	2.1→1.7 (19.0)	2.6→0.9 (65.4)
4	2.5→1.2 (52.0)	2.4→1.3 (45.8)	2.6→0.8 (69.2)	2.3→1.9 (17.4)	2.7→1.1 (59.3)
5	2.1→0.9 (57.1)	2.0→1.0 (50.0)	2.3→0.6 (73.9)	1.9→1.6 (15.8)	2.4→0.8 (66.7)
6	2.4→1.1 (54.2)	2.3→1.2 (47.8)	2.6→0.7 (73.1)	2.2→1.8 (18.2)	2.7→1.0 (63.0)
7	2.0→0.8 (60.0)	1.9→0.9 (52.6)	2.2→0.5 (77.3)	1.8→1.5 (16.7)	2.3→0.7 (69.6)
8	1.6→0.7 (56.3)	1.5→0.8 (46.7)	1.8→0.4 (77.8)	1.4→1.2 (14.3)	2.5→1.1 (56.0)
9	2.8→1.4 (50.0)	2.7→1.5 (44.4)	3.0→0.9 (70.0)	2.6→2.1 (19.2)	2.9→1.3 (55.2)
10	2.7→1.2 (55.6)	2.6→1.3 (50.0)	2.9→0.8 (72.4)	2.5→2.0 (20.0)	2.8→1.1 (60.7)

As seen in Tables 2 and 3, at four weeks following conservative and etiology-specific treatment, all groups demonstrated statistically significant improvement in the VHI-10 scores. The greatest improvement was observed in Group C, which showed a mean VHI-10 reduction of 16.7 points corresponding to a 69.3% improvement from baseline ($p = 0.001$). Group D exhibited the least improvement, with a mean reduction of 5.7 points and a 26.4% improvement ($p = 0.002$). Although statistically significant, this was not as fair as the other groups.

As seen in Table 4, the greatest percentage improvement was noted in Questions 7, 3 and 5, with reductions of approximately 70%, most prominently in Group C. Conversely, the least percentage improvement was seen in symptoms of voice unpredictability and persistent strained voice in Group D, where improvement was limited to approximately 20%.

Discussion

The diagnosis and management of Allergic Laryngitis is of utmost importance since it can usually be misdiagnosed and masquerades as a Laryngopharyngeal Reflux. A study in 2010 by Randhawa et al.[14] showed that three times as many patients demonstrated allergy compared with LPRD in their study group. Using this as a precursor, separate groups were made in this study to represent each affected group.

Using the VHI-10 tool to identify the changes in voice quality post management of LPRD has been used for a long time now and has been proven in a lot of previous studies. One such meta-analysis study in 2025 by Chen et al.[15] having stated that acoustic parameters (percent jitter, percent shimmer, and harmonic-to-noise ratio) consistently improved throughout treatment, while aerodynamic measurements yielded controversial results. This study correlated well to the finding here where 30% of patients were female and VHI-10 scores improved by 52% at the end of 4 weeks.

Smokers experience more voice use fatigue and more frequent discontinuation of voice use than non-smokers[16]. Another study stated that smokers had a higher abnormality rate in the symmetry, amplitude, and cycle of vocal cord than non-smokers[17].

A meta-analysis published by Beyon et al in 2020[18] stated that smoking had significant effect on VHI-10. The physical functions of the VHI scale were more prominently affected than the others. This corresponds well with our study wherein the baseline VHI was significantly on the higher side (in anyone who did not have voice abuse/overuse). Statistically significant increases for physical and total scores of the Voice Handicap Index were also found in the smoker's group as compared to the normal control group by Tafiadis et al in 2017 where they assessed young smoking females[19].

Voice disorders may have adverse effects on the Quality of Life (QoL) and professional performance of teachers and professional voice users, which would result in a poorer quality of teaching, lower attendance, and even quitting the profession[20,21].

Natour et al in 2016 performed a study with sixty-six school teachers (33 men and 33 women), with different years of teaching experience and age, and 100 control participants (50 men and 50 women). They used the VHI-10 to assess QoL parameters. They found that although teachers have a perception of voice handicap they still can maintain voice throw which could either be by manipulation of vocal properties or abusive overloading of the vocal system to produce a procedurally acceptable voice quality[22]. In our study, we found that professional voice users have the worst VHI-10 scores before but did improve significantly just by following proper voice rest. A similar study in 2021 by Seifpanahi et al also stated that singers are at a great risk of developing voice problems. Therefore, their vocal demands and requirements need to be followed precisely[23].

Yuksel et al in 2025[24] stated that the maximum phonation time (MPT) was lower in the allergic rhinitis and allergic asthma patients compared with the non-allergic population. VHI scores were more significant in the food allergy and atopic dermatitis groups compared with the control group. This proves that allergic involvement makes a difference in voice quality. This correlated well with our study where the patients with Allergic Laryngitis improved by only 26% post the management.

Conclusion

The Voice Handicap Index - 10 is a simple & inexpensive tool, yet potent to assess the Quality of Life in non-infectious laryngitis. It has no role in symptomatology but can help in regularly monitoring symptoms. Simple non-surgical methods of management can work efficiently in Smoking, LPRD and even professional voice use but not so much in Allergy as proven by the results of VHI-10.

Limitations

The GRBAS and VoiSS scales were not used for assessment and thus, maybe, some clinical parameters could have been skipped. Objective voice assessment, such as acoustic analysis & perceptual voice grading was not performed. The sample size is small since the study aims to only focus on a small section of patients. The inclusion and exclusion are very specific. A formal sample size calculation also could not be performed because of multiple etiologies. Further studies can use only one etiology and perform a study with a larger sample size. Since all participants received multiple simultaneous interventions, the observed improvement cannot be attributed to any individual treatment or to the monitoring capability of VHI-10. VHI-10 just checks the scores to see whether QoL has changed or not.

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Conflict of interest

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