

A Cross-Sectional Study of Etiology and Clinical Presentation of Dysphonia

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Abstract:

Background: Dysphonia is a common otorhinolaryngological complaint with diverse etiological factors ranging from benign inflammatory conditions to malignant laryngeal disorders. Understanding the etiological spectrum and clinical presentation of dysphonia is essential for early diagnosis and appropriate management. This study aimed to evaluate the etiology and clinical characteristics of patients presenting with dysphonia in a tertiary care setting.

Material and Methods: This hospital-based cross-sectional study was conducted in the Department of Otorhinolaryngology over an 18-month period. A total of 167 adult patients presenting with voice change of more than two weeks' duration were included. Detailed clinical evaluation, including history, otorhinolaryngological examination, and laryngeal visualization using indirect and/or flexible fiberoptic laryngoscopy, was performed in all patients. Etiological diagnosis was established based on clinical, endoscopic, and histopathological findings where indicated. Data were analyzed using descriptive statistics, and associations between categorical variables were assessed using the Chi-square test.

Results: The majority of patients were in the 41–50-year age group (25.1%), with a marked male predominance (67.1%). Most patients presented within 1–3 months of symptom onset (34.7%). Inflammatory laryngeal lesions were the most common etiology (32.3%), followed by benign vocal fold lesions (27.5%) and malignant laryngeal lesions (18.6%). Vocal cord paralysis and functional dysphonia accounted for 12.6% and 9.0% of cases, respectively. A statistically significant association was observed between gender and etiology, with malignant lesions occurring predominantly in males ($p = 0.004$). Tobacco smoking (47.3%) and vocal abuse (31.1%) were the most frequently identified risk factors.

Conclusion: Dysphonia most commonly affects middle-aged males and is predominantly caused by inflammatory and benign laryngeal conditions; however, a considerable proportion of patients harbor malignant lesions. Early and systematic laryngeal evaluation is essential, particularly in high-risk individuals, to ensure timely diagnosis and management.

Keywords: Dysphonia; Hoarseness of Voice; Laryngeal Lesions; Etiology; Cross-Sectional Study.

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Introduction

Dysphonia refers to an alteration in vocal quality, pitch, loudness, or vocal effort that interferes with communication and/or adversely affects quality of life [1]. From a public health perspective, voice problems are frequent across the lifespan; population-level survey data from the United States estimated that 11.71% of adults reported dysphonia in 2022, underscoring the substantial burden of this symptom in the community [2]. Despite being

common, dysphonia is not a diagnosis in itself; rather, it represents a clinical manifestation of heterogeneous laryngeal and extralaryngeal conditions ranging from transient inflammatory disorders to serious structural pathology [1].

The etiological spectrum of dysphonia includes inflammatory changes (acute or chronic laryngitis), benign vocal fold lesions related to phonotrauma

(e.g., nodules, polyps, cysts), neurogenic causes such as vocal fold paralysis, functional disorders including muscle tension dysphonia, and malignant neoplasms of the larynx [1,3]. Importantly, "hoarseness" may be mistakenly attributed to self-limiting inflammation, leading to delayed assessment. In a fiberoptic laryngoscopic study of patients presenting with hoarseness, laryngeal tumor constituted a clinically meaningful proportion of findings, prompting the authors to emphasize early endoscopic evaluation to detect sinister disease in a timely manner [3]. Consistent with this, the AAO-HNSF clinical practice guideline recommends that clinicians perform or refer for laryngoscopy when dysphonia fails to resolve or improve within 4 weeks, or earlier if a serious underlying cause is suspected [1].

Several potentially modifiable exposures have been implicated in the development of benign vocal fold pathology and other voice disorders. In an analytical cross-sectional study focusing on minimal associated pathological lesions of the vocal folds, risk associations were reported for factors such as voice misuse/phonotrauma, smoking, alcohol consumption, and gastroesophageal reflux disease, with lesion-specific patterns noted in the conclusions [4]. The role of reflux has been further explored in a systematic review evaluating laryngopharyngeal reflux and benign vocal fold lesions, which found that studies using objective reflux assessment suggested an association with the development of nodules, polyps, and Reinke's edema, while also highlighting heterogeneity and limitations in the evidence base [5]. Functional dysphonia, particularly muscle tension dysphonia, is also recognized as a clinically relevant entity within voice clinics and should be considered when organic pathology is absent or insufficient to explain symptoms [6].

Given the broad differential diagnosis, the potential for serious disease, and the influence of local risk exposures, describing the etiological distribution and clinical presentation of dysphonia within specific care settings remains clinically valuable. The present cross-sectional study was therefore undertaken to characterize the etiology and patterns of presentation among adult patients with dysphonia attending a tertiary care hospital.

Material and Methods

Study design and setting: This was a hospital-based, observational cross-sectional study conducted in the Department of Otorhinolaryngology of a tertiary care teaching hospital in India. All procedures were carried out in accordance with standard clinical and ethical guidelines for human research.

Study Population: Adult patients presenting with voice-related complaints suggestive of dysphonia were consecutively screened in the outpatient otorhinolaryngology clinic during the study period.

Inclusion Criteria

- Patients aged 18 years and above
- Presence of hoarseness or alteration in voice quality lasting for more than two weeks
- Willingness to participate and provide informed consent

Exclusion Criteria

- History of recent laryngeal surgery or intubation (within the preceding 3 months)
- Known neurological disorders affecting phonation (e.g., stroke-related dysarthria, motor neuron disease)
- Acute upper respiratory tract infections at the time of evaluation
- Patients with incomplete clinical or endoscopic data

Sample Size: Based on previously published hospital-based studies reporting prevalence patterns of benign and malignant laryngeal lesions among dysphonic patients, a sample size of 167 patients was considered adequate to describe etiological distribution and clinical presentation with sufficient precision in a cross-sectional framework. Consecutive sampling was adopted until the desired sample size was achieved.

Data collection and clinical evaluation: A structured proforma was used to collect demographic data, including age, sex, occupation, and relevant risk factors such as tobacco use, alcohol consumption, and vocal abuse. Detailed history regarding onset, duration, progression, and associated symptoms (throat pain, cough, dysphagia, breathing difficulty, and foreign body sensation) was obtained. All patients underwent a comprehensive ear, nose, and throat examination, followed by focused laryngeal evaluation. Voice quality was subjectively assessed and categorized based on patient-reported symptoms and clinician perception.

Laryngeal examination: Visualization of the larynx was performed using indirect laryngoscopy and/or flexible fiberoptic laryngoscopy, depending on patient tolerance and clinical indication. Findings were documented with respect to:

- Site of involvement
- Nature of the lesion (inflammatory, benign, malignant, functional, or neurogenic)
- Vocal cord mobility
- Laterality and extent of pathology

Patients with suspicious lesions underwent direct laryngoscopy with biopsy, and tissue samples were

sent for histopathological examination to establish definitive diagnosis.

Etiological Classification: Based on clinical, endoscopic, and histopathological findings, causes of dysphonia were categorized into:

- Inflammatory lesions
- Benign vocal fold lesions
- Malignant laryngeal lesions
- Vocal cord paralysis
- Functional or psychogenic dysphonia

Statistical Analysis: Collected data were entered into a spreadsheet and analyzed using standard statistical software. Descriptive statistics were used to summarize demographic variables, etiological distribution, and clinical features. Categorical variables were expressed as frequencies and percentages, while continuous variables were presented as mean \pm standard deviation. Chi square test was used. P values <0.05 were taken as significant.

Results

A total of 167 patients presenting with dysphonia were included in the study. The age of the participants ranged from 18 years to over 60 years, with the highest proportion of patients belonging to the 41–50-year age group (25.1%), followed by those aged 51–60 years (21.6%). Patients aged 31–40 years constituted 20.4% of the study population, while individuals older than 60 years accounted for 16.1%. The youngest age group (18–30 years) represented 16.8% of cases (Table 1).

There was a clear male predominance, with 112 males (67.1%) and 55 females (32.9%), resulting in

a male-to-female ratio of approximately 2:1 (Table 2).

With respect to symptom duration at presentation, the majority of patients reported voice change for 1–3 months (34.7%), followed by a duration of 3–6 months (27.5%). Symptoms persisting for more than six months were observed in 19.2% of patients, whereas 18.6% presented within 2–4 weeks of onset (Table 3).

Analysis of etiological factors revealed that inflammatory laryngeal lesions were the most common cause of dysphonia, identified in 32.3% of patients. Benign vocal fold lesions accounted for 27.5% of cases, while malignant laryngeal lesions were observed in 18.6%. Vocal cord paralysis and functional dysphonia were noted in 12.6% and 9.0% of patients, respectively (Table 4).

A statistically significant association was found between gender and etiology of dysphonia. Malignant laryngeal lesions were markedly more common among males compared to females, whereas inflammatory and benign lesions were distributed more evenly across genders. This association was found to be statistically significant using the Chi-square test ($p = 0.004$) (Table 5).

Evaluation of risk factors demonstrated that tobacco smoking was the most frequently identified exposure, present in 47.3% of patients. Vocal abuse was reported by 31.1% of participants, while tobacco chewing and alcohol consumption were noted in 24.6% and 22.8% of cases, respectively. Symptoms suggestive of gastroesophageal reflux disease were observed in 17.4% of patients. Multiple risk factors were present in several individuals (Table 6).

Table 1: Age Distribution of Patients with Dysphonia (n = 167)

Age group (years)	Number of patients	Percentage (%)
18–30	28	16.8
31–40	34	20.4
41–50	42	25.1
51–60	36	21.6
>60	27	16.1
Total	167	100.0

Table 2: Gender Distribution of Study Participants

Gender	Number of patients	Percentage (%)
Male	112	67.1
Female	55	32.9
Total	167	100.0

Table 3: Duration of Dysphonia at Presentation

Duration of symptoms	Number of patients	Percentage (%)
2–4 weeks	31	18.6
1–3 months	58	34.7
3–6 months	46	27.5
>6 months	32	19.2
Total	167	100.0

Table 4: Etiological Distribution of Dysphonia

Etiology	Number of patients	Percentage (%)
Inflammatory lesions	54	32.3
Benign vocal fold lesions	46	27.5
Malignant laryngeal lesions	31	18.6
Vocal cord paralysis	21	12.6
Functional dysphonia	15	9.0
Total	167	100.0

Table 5: Association between Gender and Etiology of Dysphonia

Etiology	Male (n = 112)	Female (n = 55)	Total	p value
Inflammatory lesions	32	22	54	0.004
Benign vocal fold lesions	27	19	46	
Malignant lesions	28	3	31	
Vocal cord paralysis	15	6	21	
Functional dysphonia	10	5	15	
Total	112	55	167	

Table 6: Risk Factors Identified Among Patients with Dysphonia

Risk factor*	Number of patients	Percentage (%)
Tobacco smoking	79	47.3
Tobacco chewing	41	24.6
Alcohol consumption	38	22.8
Vocal abuse	52	31.1
Symptoms suggestive of GERD	29	17.4

Discussion

In this cross-sectional cohort of 167 dysphonic patients, our findings demonstrate a predominance of inflammatory and benign laryngeal lesions, with a significant proportion of malignant pathology. These patterns align with findings from other contemporary hospital-based series reporting a broad etiological spectrum among patients presenting with hoarseness or voice changes. A recent observational cross-sectional analysis similarly described a predominance of benign lesions in patients presenting with hoarseness, alongside a non-negligible burden of malignant disease, underscoring the heterogeneous pathology encountered in tertiary care otolaryngology settings [7].

Inflammatory laryngeal conditions constituted the most common etiology in our cohort. This is biologically plausible and consistent with chronic irritation mechanisms described in the literature, where exposure to irritants such as tobacco and refluxate can provoke prolonged laryngeal mucosal inflammation. Prolonged diffuse laryngeal inflammation associated with smoking and reflux has been implicated in chronic laryngitis and persistent voice changes, and may underlie a substantial proportion of inflammatory dysphonia seen in clinical practice [8].

Benign vocal fold lesions, including nodules and polyps, represented the second most frequent diagnostic category. These lesion types are known to be strongly associated with phonotrauma,

particularly vocal abuse and overuse—risk factors reported in nearly one-third of our study population. Studies focusing on the etiopathogenesis of benign vocal cord lesions have highlighted extensive vocal abuse as a principal contributing factor, reinforcing the importance of voice hygiene and behavioral modification in prevention and management [9].

Our study also identified a noteworthy proportion of malignant laryngeal lesions, which were significantly more common in male patients. This gender association likely reflects underlying risk exposures such as tobacco smoking and alcohol use, which are well-documented risk factors for laryngeal carcinoma. Epidemiological analyses in voice disorders have emphasized smoking and alcohol consumption as pivotal contributors to neoplastic transformation within the larynx, and clinical guidelines recommend prompt evaluation in high-risk individuals presenting with persistent dysphonia to exclude malignancy [10].

Functional dysphonia, although less common in our series than organic pathology, remains an important diagnostic consideration when structural lesions are absent. Epidemiological studies have identified vocal abuse and psychosocial stressors as contributors to functional voice disorders, and recognizing this entity is crucial to avoid unnecessary invasive investigations while directing affected patients to appropriate voice therapy [11].

Finally, the distribution of risk factors in our cohort converges with broader observations in general populations with voice disorders; smoking,

occupational voice use (manifested as vocal abuse), and gastroesophageal reflux symptoms are frequently reported in clinical and epidemiologic studies of dysphonia risk. While reflux-related dysphonia is a subject of ongoing investigation with variable diagnostic criteria and associations, it remains a plausible contributing factor in a subset of patients with chronic hoarseness [12].

Conclusion

This cross-sectional study demonstrates that dysphonia predominantly affects middle-aged adults, with a clear male preponderance and most patients presenting after a symptom duration of one to three months. Inflammatory and benign laryngeal lesions constituted the majority of etiologies, while a substantial proportion of cases were attributable to malignant lesions, particularly among male patients, highlighting the importance of early evaluation. The significant association between gender and underlying etiology underscores the influence of risk exposures such as tobacco use. These findings emphasize the need for timely laryngeal assessment in patients with persistent voice changes to facilitate early diagnosis and appropriate management, thereby reducing morbidity associated with delayed presentation.

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