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Original Research Article

Clinical profile, etiological spectrum and management of patients presenting with change of voice: a cross-sectional study

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ABSTRACT

Background: Change of voice (dysphonia) is a common presenting complaint in otorhinolaryngology and may result from a wide spectrum of benign, inflammatory, neurological, and malignant disorders affecting the larynx and upper aerodigestive tract. Because persistent hoarseness may be the earliest manifestation of laryngeal malignancy, timely evaluation is essential for accurate diagnosis and appropriate management. Objectives were to evaluate the clinical profile, etiological spectrum, anatomical distribution of lesions, histopathological findings, and management patterns among patients presenting with change of voice at a tertiary care center.

Methods: A hospital-based cross-sectional study was conducted in the Department of Otorhinolaryngology of a tertiary care teaching hospital of western Gujarat, India, from March 2024 to September 2025. One hundred consecutive patients presenting with change of voice were enrolled. All patients underwent detailed clinical evaluation and laryngeal examination using appropriate endoscopic techniques. Radiological and histopathological investigations were performed when indicated. Demographic characteristics, duration of symptoms, site of lesion, histopathological diagnosis, and treatment modalities were analyzed. The association between gender and malignancy was assessed using the Chi-square test.

Results: Of the 100 patients included, 76 (76%) were males and 24 (24%) were females (male-to-female ratio 3.2:1). 30 (30%) patients belonged to the 61-70-year age group. 80 (80%) patients presented within three months of symptom onset. The supraglottic region was the most frequently involved anatomical site seen in 50 (44.25%) patients, followed by the hypopharynx in 34 (30.09%) patients and glottis in 20 (17.70%) patients. Histopathological examination was available for 57 (57%) patients, with squamous cell carcinoma representing the predominant diagnosis; well-differentiated in 15 (26.3%) patients and moderately differentiated in 14 (24.6%) patients. Conservative treatment was advised in 40 (40%) of patients, whereas 30 (30%) patients underwent direct laryngoscopy with biopsy and tracheostomy. Malignancy was more frequent among males, the association reached statistical significance (χ^2=4.03, df=1, p=0.04).

Conclusions: Change of voice predominantly affects middle-aged and elderly males and is frequently associated with significant laryngeal pathology, particularly squamous cell carcinoma. The supraglottic region was the most common site of involvement. Persistent voice changes warrant early endoscopic evaluation to facilitate prompt diagnosis and timely intervention, thereby improving patient outcomes.

Keywords: Change of voice, Dysphonia, Hoarseness, Laryngeal lesions, Squamous cell carcinoma, Cross-sectional study, Laryngoscopy, Otorhinolaryngology

INTRODUCTION

Voice change, or dysphonia, is a frequently encountered symptom in otorhinolaryngology clinics and can significantly affect an individual's ability to communicate. Dysphonia refers to any disturbance in the normal characteristics of the voice, including alterations in quality, pitch, volume, or the effort required for speech. Normal voice production depends on the harmonious interaction of several anatomical and physiological systems, including the lungs, larynx, vocal folds, and resonating structures of the upper airway. Disruption of any part of this mechanism, whether due to inflammation, structural lesions, neurological impairment, systemic illness, or functional abnormalities, may lead to a change in voice quality.[1] While many cases arise from benign and self-limiting conditions, persistent dysphonia can occasionally signal a more serious underlying disease, including malignancy of the larynx. For this reason, timely assessment of patients presenting with voice complaints remains an important clinical responsibility.

The causes of dysphonia are varied and encompass a broad spectrum of disorders. Common etiologies include acute and chronic laryngeal infections, vocal fold nodules and polyps, cysts, Reinke's edema, laryngopharyngeal reflux disease, vocal cord paralysis, functional voice disorders, traumatic injuries, and malignant tumors of the larynx.[2,3] The distribution of these conditions is influenced by factors such as age, sex, occupation, environmental exposures, and lifestyle habits. Individuals who rely heavily on their voice for professional purposes, such as teachers, singers, and public speakers, are particularly vulnerable to phono-traumatic lesions. Similarly, advancing age is associated with degenerative changes within the laryngeal framework, increasing susceptibility to voice disorders.

Among the various manifestations of laryngeal disease, persistent hoarseness deserves special attention because it may represent an early sign of upper aerodigestive tract malignancy. Current clinical guidelines emphasize that hoarseness lasting longer than four weeks, especially when accompanied by risk factors or alarming symptoms such as tobacco use, dysphagia, neck swelling, odynophagia, stridor, or hemoptysis, warrant visualization of the larynx.[3,4] Failure to recognize these warning signs may delay diagnosis and allow disease progression, potentially resulting in more extensive treatment and poorer outcomes.

A thorough evaluation of patients with voice change begins with detailed history taking and careful examination of the head and neck region. Direct visualization of the larynx using indirect laryngoscopy, rigid endoscopy, or flexible fibre-optic laryngoscopy plays a central role in identifying the underlying pathology. Additional investigations, including radiological imaging and histopathological analysis, are employed when required to confirm the diagnosis and assess the extent of disease. Such a systematic approach helps distinguish benign conditions from malignant lesions and facilitates appropriate treatment planning.

Research examining the clinical spectrum of dysphonia has demonstrated notable variation in disease patterns across different populations and healthcare settings. Many studies report inflammatory and benign vocal fold lesions as the predominant causes of dysphonia, whereas tertiary referral centres often encounter a relatively greater proportion of malignant conditions. In India, the widespread use of tobacco continues to contribute significantly to the burden of laryngeal and hypopharyngeal cancers, underscoring the importance of investigating persistent voice changes without delay.[4] Although dysphonia constitutes a substantial proportion of routine ENT consultations, there remains a relative scarcity of region-specific data regarding patient demographics, lesion characteristics, histopathological findings, and treatment practices, particularly in western India. A better understanding of these local trends may contribute to earlier diagnosis, improved healthcare planning, and more effective patient management. Against this background, the present study was undertaken to examine the clinical profile of patients presenting with voice change at a tertiary care teaching hospital, with emphasis on demographic characteristics, anatomical distribution of lesions, etiological factors, histopathological diagnoses, and treatment modalities.

METHODS

This hospital-based cross-sectional observational study was conducted in the Department of Otorhinolaryngology, of a tertiary care teaching hospital of western Gujarat, India, over a period of 19 months from March 2024 to September 2025. The study was approved by IEC (Approval No. IEC/RESCH/2023/028, dated 22.03.2024). The institute is a tertiary care teaching hospital catering to urban and rural populations of Kachchh district and adjoining regions.

Inclusion criteria

The study included patients presenting to the Otorhinolaryngology outpatient department with the primary complaint of change of voice (dysphonia/hoarseness).

Exclusion criteria

Patients who did not give consent to be a part of the study were excluded.

A total of 100 consecutive patients fulfilling the eligibility criteria were included in the study. The sample size was calculated using the standard formula for estimating proportions with a 95% confidence interval and an anticipated prevalence of 60%, allowing an absolute precision of 10%.

After obtaining informed consent, a detailed clinical history was recorded using a predesigned case record form. All patients underwent laryngeal examination using appropriate endoscopic techniques, including indirect laryngoscopy, rigid endoscopy, or flexible fibre-optic laryngoscopy depending on patient tolerance and clinical indication. Investigations were performed whenever clinically indicated and included routine laboratory investigations, radiological imaging (X-ray and contrast-enhanced computed tomography of the neck where appropriate), direct laryngoscopy under general anesthesia, micro-laryngoscopy, biopsy of suspicious lesions and histopathological examination of biopsy specimens. The final diagnosis was established on the basis of clinical findings, endoscopic evaluation, radiological investigations, operative findings, and histopathological examination wherever applicable.

The primary outcome measures included demographic profile of patients, duration of symptoms, anatomical distribution of lesions, histopathological diagnosis and management advised. The secondary outcome was evaluation of the association between gender and malignant disease. Data were entered into Microsoft Excel 2016 and analyzed using IBM SPSS Statistics version 25.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean ± standard deviation (SD) where appropriate, while categorical variables were presented as frequencies and percentages. The association between categorical variables was assessed using the Chi-square test. A $p<0.05$ was considered statistically significant.

RESULTS

A total of 100 patients presenting with change of voice were included in the study. The demographic characteristics, duration of symptoms, anatomical distribution of lesions, management modalities, histopathological findings, and association between gender and malignancy were analyzed. 76 (76%) patients were males with a male-to-female ratio of 3.2:1. 30 (30%) patients belonged to the 61-70 years age group, followed by 27 (27%) patients in 51-60 years age group. Female predominance was observed only in patients aged ≤30 years (Table 1).

Table 1: Distribution of patients according to age and gender, (n=100).

Age group (in years)	Male	Female	Total, n (%)
≤30	3	5	8 (8.0)
31-40	8	4	12 (12.0)
41-50	13	1	14 (14.0)
51-60	21	6	27 (27.0)
61-70	24	6	30 (30.0)
>70	7	2	9 (9.0)
Total	76	24	100 (100)

The study population demonstrated a progressive increase in the number of patients with advancing age, reaching a peak in the sixth and seventh decades of life. 80 (80%) patients presented within three months of onset of voice change. Only 8 (8%) patients had symptoms persisting for more than six months. These findings indicate that the majority of patients sought medical attention relatively early after symptom onset. A total of 113 anatomical sites were involved because several patients had lesions involving more than one site. The supraglottic region was the commonest site of involvement involving 50 (44.25%) patients, followed by the hypopharynx in 34 (30.09%) patients and glottis in 20 (17.70%) patients (Table 2).

Table 2: Distribution of patients according to the site of lesion, (n=113 sites).

Site of involvement	N	Percentage (%)
Supraglottis	50	44.25
Glottis	20	17.70
Subglottis	1	0.88
Nose/Nasopharynx	1	0.88
Oropharynx	5	4.42
Hypopharynx	34	30.09
Esophagus	1	0.88
Total	113	100

Supraglottic and hypopharyngeal lesions together accounted for nearly three-fourths of all anatomical sites involved. Conservative management was advised in 40 (40%) patients and constituted the commonest treatment modality. Direct laryngoscopy with biopsy and tracheostomy was performed in 30 (30%) patients, while direct laryngoscopic biopsy alone was required in 21 (21%) patients (Table 3).

Table 3: Distribution of patients according to the management, (n=100).

Management	N	Percentage (%)
Conservative management	40	40
Direct laryngeal biopsy + tracheostomy	30	30
Direct laryngeal biopsy	21	21
Extra-laryngeal biopsy	4	4
Direct laryngeal biopsy followed by total laryngectomy	1	1
Micro-laryngeal surgery	1	1
Cyst excision	1	1
Direct laryngeal biopsy + tracheostomy + foreign body removal	1	1
Direct laryngeal biopsy + tracheostomy + esophageal biopsy	1	1
Total	100	100

Overall, operative intervention was required in 60 (60%) patients, whereas conservative treatment alone was sufficient in 40 (40%) patients. Histopathological examination was available for 57 patients who underwent biopsy. Table 4 shows the etiological factors of change of voice in the remaining 43 patients.

Table 4: Etiology of change of voice in patients without biopsy, (n=43).

Laryngeal finding	N	Percentage (%)
Congested laryngeal mucosa	19	44.1
Laryngopharyngeal reflux changes	5	11.6
Vocal cord nodule	4	9.3
Laryngeal edema (post intubation)	5	11.6
Vocal cord thickening (post radiotherapy)	2	4.6
Left vocal cord palsy	4	9.3
Right para-glottic cystic swelling	1	2.3
Phonatory gap	3	6.9
Total	43	100

Squamous cell carcinoma (SCC) represented the overwhelming majority of malignant lesions. Well differentiated SCC was the most frequent diagnosis seen in 15 (26.31%) patients, followed by moderately differentiated SCC in 14 (24.56%) patients (Table 5).

Table 5: Distribution of patients according to histopathological diagnosis, (n=57).

Histopathological diagnosis	N	Percentage (%)
Well-differentiated SCC	15	26.31
Well to moderately differentiated SCC	9	15.78
Moderately differentiated SCC	14	24.56
Moderately to poorly differentiated SCC	5	8.77
Poorly differentiated SCC	3	5.26
Dysplasia (mild/ moderate/ severe)	7	12.28
Benign lesions	2	3.50
Adenocarcinoma	1	1.75
Suspicious for malignancy	1	1.75
Total	57	100

Overall, malignant squamous cell carcinoma constituted the predominant histopathological diagnosis among biopsied patients. Among male patients, 40 of 76 (52.6%) had malignant lesions compared with 7 of 24 (29.2%) female patients. The association between gender and malignancy was analysed using the Chi-square test. Malignancy was more frequent among males, the association reached statistical significance (χ^2=4.03, df=1, p=0.04).

DISCUSSION

The present cross-sectional study evaluated the demographic characteristics, anatomical distribution, histopathological spectrum, and management patterns of patients presenting with change of voice at a tertiary care teaching hospital. A total of 100 patients were included over a 19-month period. The findings demonstrate that change of voice is a common symptom among middle-aged and elderly individuals, with a marked male predominance and a substantial burden of malignant laryngeal pathology. These observations highlight the importance of early endoscopic evaluation in patients with persistent dysphonia.

In the present study, males constituted 76% of the study population, with a male-to-female ratio of 3.2:1. The majority of patients belonged to the fifth to seventh decades of life, with the highest proportion observed in the 61-70-year age group. Similar findings have been reported by Banjara et al, Soni and Chouksey, and Rathi and Sharma, who also observed a higher prevalence of dysphonia among middle-aged and elderly men.[4-6] This demographic pattern may be explained by greater exposure of males to established risk factors such as tobacco smoking, alcohol consumption, occupational exposure to dust and fumes, and chronic vocal abuse. Furthermore, cumulative exposure to these risk factors with advancing age increases the likelihood of developing both benign and malignant laryngeal diseases. Age-related structural changes of the vocal folds, including atrophy, reduced elasticity, and degeneration of the lamina propria, may further contribute to dysphonia in older individuals.

Most patients (80%) presented within three months of symptom onset. This finding is encouraging, as early presentation increases the likelihood of diagnosing laryngeal disorders before progression to advanced disease. Comparable observations have been reported by Baitha et al. and Banjara et al., who noted that persistent alteration in voice often prompts patients to seek medical consultation because of its impact on communication, occupation, and quality of life.[3,4] Nevertheless, 20% of patients in the present study had symptoms persisting for more than three months, indicating that delayed presentation continues to occur. Such delays may result from lack of awareness, socioeconomic barriers, inadequate access to specialist care, or underestimation of the seriousness of persistent hoarseness. Public education regarding the significance of prolonged voice change, particularly among smokers and elderly individuals, remains essential.

The supraglottis was the most frequently involved anatomical site (44.25%), followed by the hypopharynx (30.09%) and glottis (17.70%). These findings differ from

several published studies in which glottic lesions were more common because even small abnormalities affecting the true vocal folds produce early voice symptoms. The higher proportion of supraglottic and hypopharyngeal lesions in the present study probably reflects the referral pattern of a tertiary care center managing a large number of advanced head and neck malignancies. Supraglottic tumors often remain clinically silent until they become extensive enough to affect laryngeal function or involve adjacent structures, resulting in voice change at a relatively advanced stage. Similar observations have been reported from tertiary oncology referral centers in India, where supraglottic as well as the hypopharyngeal malignancies constitute a significant proportion of patients presenting with the dysphonia.[5,7]

Conservative treatment was advised in 40% of patients and represented the most frequently recommended management strategy. These patients largely comprised inflammatory, infective, functional, or benign disorders amenable to medical therapy, voice rest, lifestyle modification, and voice therapy. Surgical intervention was required in the remaining patients, with direct laryngoscopy and biopsy, either alone or combined with tracheostomy, being the most common procedures. This distribution reflects the heterogeneous nature of dysphonia and emphasizes the importance of individualized management based on underlying pathology. Patients with airway compromise, advanced malignancy, or obstructing lesions required tracheostomy to secure the airway before definitive treatment.

Histopathological examination was available for 57 patients, among whom squamous cell carcinoma was the predominant diagnosis. Well-differentiated and moderately differentiated squamous cell carcinoma together accounted for more than half of all histopathological diagnoses. These findings are consistent with the established epidemiology of laryngeal malignancy, in which squamous cell carcinoma accounts for more than 90% of malignant laryngeal tumours. Similar observations have been reported by Soni and Chouksey, Vivek and Shankar, and other Indian studies demonstrating squamous cell carcinoma as the commonest malignant lesion among patients presenting with persistent hoarseness.[5,8] The high proportion of malignant lesions observed in the present study probably reflects the tertiary referral nature of the institution, where patients with suspicious laryngeal lesions are preferentially referred for further evaluation and management.[9,10]

Malignancy was more frequent among males, the association reached statistical significance (χ^2=4.03, df=1, p=0.04). Nevertheless, clinicians should maintain a high index of the suspicion irrespective of gender when evaluating persistent dysphonia, particularly in the presence of additional risk factors such as smoking, alcohol use, weight loss, dysphagia, or the cervical lymphadenopathy.

The findings of the present study have important clinical implications. First, they reinforce the need for prompt laryngeal visualization in patients with voice change persisting beyond four weeks, in accordance with contemporary clinical practice guidelines. Second, they emphasize that dysphonia should not be regarded merely as a benign symptom, particularly in older adults and individuals with established risk factors. Third, the predominance of malignant lesions among biopsied patients highlights the importance of maintaining a structured diagnostic pathway incorporating endoscopic examination, appropriate imaging, and histopathological confirmation whenever malignancy is suspected. Early diagnosis facilitates organ-preserving treatment, improves functional outcomes, and enhances survival.[11-13]

The strengths of the present study include its prospective data collection, standardized clinical evaluation, inclusion of histopathological confirmation whenever indicated, and comprehensive assessment of demographic, clinical, and management characteristics. However, several limitations should be acknowledged. The study was conducted at a single tertiary care centre, limiting the generalizability of the findings. The sample size was relatively modest, and detailed evaluation of individual risk factors such as smoking, alcohol consumption, occupational voice use, and laryngopharyngeal reflux was not undertaken. In addition, long-term treatment outcomes and voice-related quality-of-life measures were not assessed. Future multicentre studies with larger sample sizes incorporating validated voice assessment instruments and longitudinal follow-up would provide a more comprehensive understanding of the epidemiology, treatment outcomes, and prognostic factors associated with change of voice.[14]

Overall, the present study demonstrates that change of voice is a clinically significant symptom associated with a broad spectrum of laryngeal disorders, including a considerable burden of malignant disease. Comprehensive clinical evaluation combined with early endoscopic assessment remains the cornerstone of accurate diagnosis and appropriate management.

CONCLUSION

Persistent change of voice should never be considered a trivial symptom. Every patient with dysphonia lasting more than four weeks, particularly those with risk factors such as tobacco use, alcohol consumption, occupational voice abuse, or associated upper aerodigestive tract symptoms, should undergo comprehensive laryngeal evaluation. Increased awareness among primary care physicians and the general population regarding the significance of persistent hoarseness may promote earlier diagnosis, enable organ-preserving treatment where

feasible, and ultimately improve functional and oncological outcomes.

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