International Journal of Otorhinolaryngology and Head and Neck Surgery
Akshay DS et al. Int J Otorhinolaryngol Head Neck Surg. 2024 Oct;10(5):524-529
http://www.ijorl.com
pISSN 2454-5929 | eISSN 2454-5937

DOI: https://dx.doi.org/10.18203/issn.2454-5929.ijohns20242708

Original Research Article

A clinical study on hoarseness of voice, etiology and its management

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Received: 29 June 2024
Revised: 19 August 2024
Accepted: 23 August 2024

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ABSTRACT

Background: Voice is an inherent means of communication intended to convey feelings of intimacy. One of the most frequent symptoms otolaryngologist's encounters is hoarseness. The aims of this study are to determine the causes of hoarseness predisposing factors, to assess the clinical profile as well as how to evaluate and treat hoarseness of voice. To estimate the proportion of common causes of hoarseness in patients, identify predisposing factors and evaluate outcomes of various treatment methods.
Methods: This was a cross-sectional study conducted at ENT department of tertiary care center. A total of 80 cases presenting with hoarseness were studied. A detailed history was taken, followed by a comprehensive local and systemic examination, leading to a clinical diagnosis supported by relevant investigations.
Results: The most frequent cause of hoarseness of voice among patients was determined to be laryngeal cancer, with a 32.5% incidence rate. The incidence of hoarseness was 0.40% among the total ENT cases. Out of total 80 study subjects with hoarseness of voice 40% were from lower socioeconomic class, 30% had habit of smoking. Among them,35% were treated medically, 50% were treated surgically/radiotherapy and for remaining 15% study subjects no treatment was given.
Conclusion: Therefore, based on this study, we conclude that hoarseness of voice is a primary symptom warranting investigation, as it could signal early laryngeal malignancy.

Keywords: Hoarseness, Smoking, Vocal cord nodules, Laryngeal malignancy

INTRODUCTION

Voice is crucial for expressing emotions and moods, being a fundamental aspect of speech. Hoarseness, characterized by an abnormal voice lacking clarity, often includes symptoms like breathiness, tension, and strain.[1] Hoarseness can be classified as acute or chronic based on duration. Acute hoarseness, more common, is typically due to inflammation (acute laryngitis), chronic sinusitis, acid reflux, excessive alcohol, smoking, and voice misuse. It can also result from laryngeal trauma, thyroid surgery, or systemic diseases. Chronic hoarseness stems from conditions like chronic laryngitis, vocal nodules, polyps, laryngeal papillomatosis, vocal cord tumors, hemorrhage, functional dysphonia, smoking, vocal abuse, laryngopharyngeal reflux, post-nasal drip, and systemic diseases such as tuberculosis and diabetes. Persistent hoarseness might indicate severe illness and requires thorough examination for proper diagnosis.[2]

Etiologically, hoarseness is divided into organic (related to physical organs) and functional (due to voice misuse). Managing hoarseness involves treating underlying conditions, voice therapy, vocal hygiene, and specific treatments for vocal cord lesions.[3] Complaints of hoarseness may represent severe disease. Therefore, it should not be ignored. In the words of Chevalier Jackson

"Hoarseness is a symptom of importance and it needs separate consideration as a subject, because of the frequency of its occurrence as a signal of malignancy and other related conditions". It is often the first and only sign of severe disease directly or indirectly affecting the voice apparatus or systemic disease. Good vocal hygiene can prevent and treat some of the pathologies, and voice therapy is a cornerstone of management in some cases of hoarseness of voice.[4]

This study aims to identify the causes of hoarseness, evaluate predisposing factors, and explore methods of evaluation and management. The objectives of the study were to estimate the proportion of common causes of hoarseness in patients. To identify common predisposing factors that lead to hoarseness in patients. To assess the clinical profile of patients with hoarseness. To evaluate the outcomes of various treatment methods for hoarseness in patients.

METHODS

Study design

This was cross sectional study conducted at ENT department of tertiary care center from January 2021 to December 2021.

Study population

Patients attending ENT department in tertiary care centre and also patients referred from other department in the same hospital with complaints of hoarseness of voice. A total of 80 cases were selected for the study.

Sample size

Sample size is calculated by the formula.

N=(Z1-a/2)2×P×(1-P)/E2 N=sample size, Z=1.96 at 95% CI, P=70% (proportion of patients with smoking having hoarseness of voice) (1) E= 10%=Relative precision, N=76, Hence minimum sample size=76.

So, we have included 80 study subjects who met above mentioned inclusion and exclusion criteria.

Statistical analysis

Data collected in the study was analyzed using SPSS version 26.0 and MS-excel. Univariate analysis was done to check the quality of data entry. For the quantitative variables, (mean±SD) or median was used for data presentation.

For categorical variables, frequencies along with their respective percentages was used. For representation of data graphically, pie charts and bar diagrams were used. Student 't' test for quantitative variables and 'chi square test' for categorical variable was used for statistical significance, p value <0.05 was considered for decision making.

Methods of data collection

The proforma, developed based on the study's objectives, was pretested and used after modifications (included in the annexure). A detailed history was taken, followed by a comprehensive ENT and systemic examination, leading to a clinical diagnosis supported by relevant investigations. All 80 patients underwent indirect and video laryngoscopy under local anesthesia. Many required surgical intervention for diagnostic and therapeutic purposes. When initial findings were insufficient, further examinations such as direct laryngoscopy, suspension micro-laryngoscopy, or flexible endoscopy, with or without biopsy, were performed. Biopsy specimens were sent for histopathological examination. The study was approved by the Institutional Ethics Committee.

RESULTS

During the study, 80 cases of hoarseness of voice were examined. The majority, 25%, were in the 41-50 age group, while the smallest group, 2.5%, were aged 10 years or younger. The youngest patient was 7 years old, and the oldest was 76.

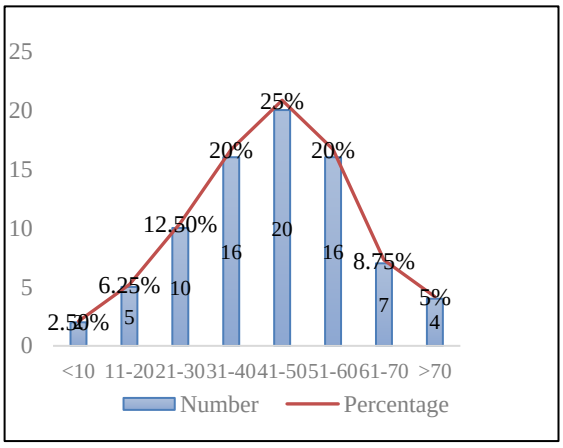
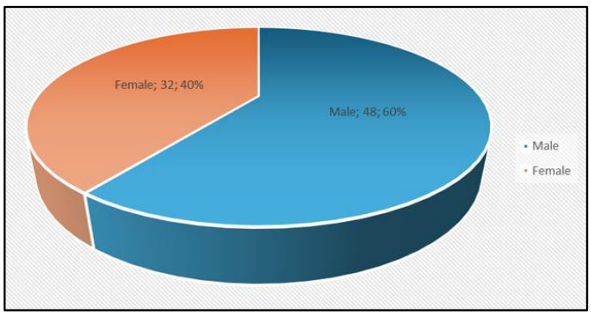


Figure 1: Distribution of study subjects according to age.



Graph 2: Distribution of study subjects according to gender.

Out of 80 cases 60% were males and 40% were females. Out of total 80 patients all were having hoarseness of voice. This was followed by dysphagia in 25%, neck swelling in 22.5%, dry cough in 15%, foreign body sensation in 16.25% and, stridor and hemoptysis in 55 each study subjects.

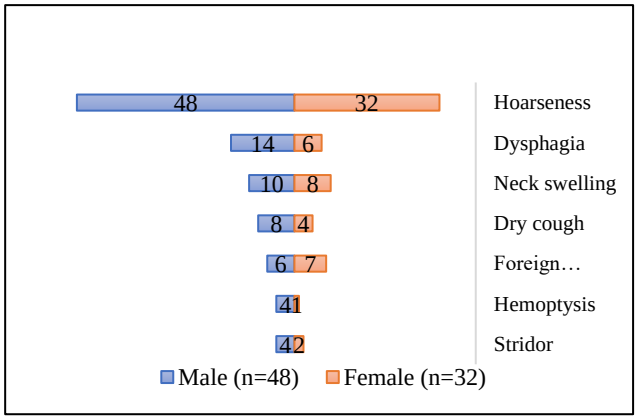


Figure 3: Distribution of study subjects according to presenting symptoms and gender.

Out of total 80 study subjects 30% had habit of smoking. This was followed by tobacco chewing in 20%, alcohol in 8.755, both smoking and alcohol in 7.5%, vocal abuse in 21.25% and there were no habits in 22.5% study subjects. Male with alcohol as habit were significantly more as compared to females. Overall habits are significantly more in males as compared to females.

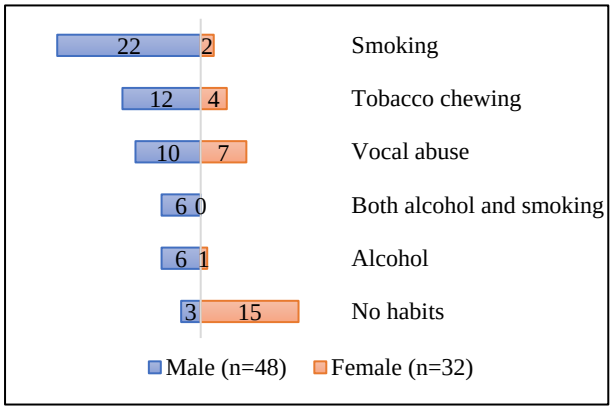


Figure 4: Distribution of study subjects according to personal habits and gender.

Out of total 80 subjects 33.75% had ulcero -proliferative growth involving supra-glottis, glottis and sub-glottis. This was followed by congestion of vocal folds, arytenoids, aryepiglottic folds, epiglottis, inter-arytenoid in 30% study subjects, vocal cord nodules in 32.5%.

Vocal cord paralysis in 15%, vocal cord polyp in 10 m%, vocal cord papilloma in 5%, vocal cord cyst in 1.25% and submucosal hemorrhage of vocal folds and false cords in 1.25% study subjects.

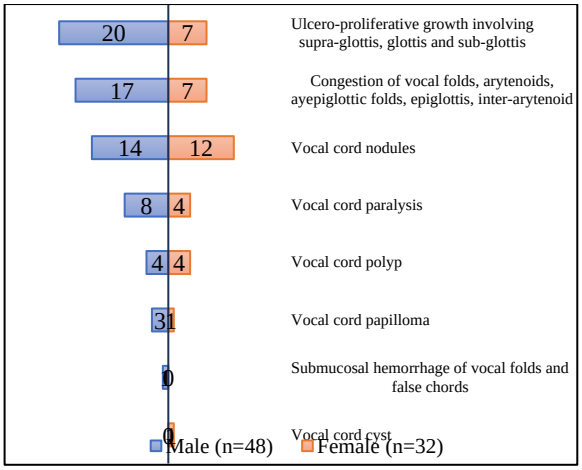
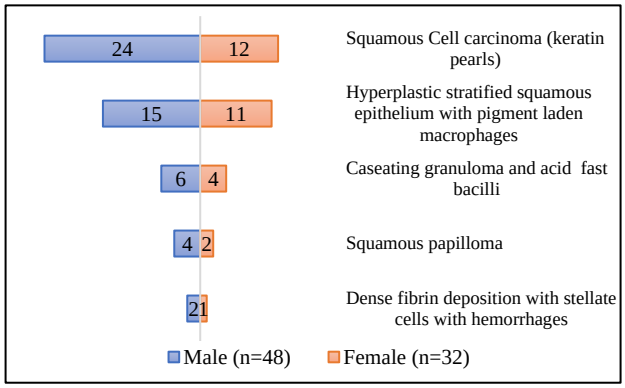


Figure 5: Distribution of study subjects according to indirect laryngoscopy examination.

Out of total 80 subjects 45% had squamous cell carcinoma (keratin pearls). This was followed by caseating granuloma and acid-fast bacilli in 12.5% study subjects, hyperplastic stratified squamous epithelium with pigment laden macrophages in 32.5%, Squamous papilloma in 7.5%, and dense fibrin deposition with stellate cells with hemorrhages in 3.75% study subjects.



Graph 6: Distribution of study subjects according to histopathology of lesions.

Out of total 80 study subjects 32.5% study subjects had hoarseness of voice due to laryngeal malignancy. This was followed by 22.5%, 15%, 10%, 7.5%, 3.75%, 2.5% and 1.25% study subjects had hoarseness of voice because of vocal cord nodules, vocal cord palsy, chronic laryngitis and GERD, tuberculosis of larynx vocal cord papilloma, vocal cord polyp, vocal cord cyst and laryngeal trauma respectively.

Out of total 80 study subjects with hoarseness of voice, 35% were treated medically, 50% were treated surgically/RT and for remaining 15% study subjects no treatment was given. All study subjects with laryngeal malignancy were treated with surgical treatment. Out of total 18 study subjects with vocal nodules 77% treated

with medical treatment and remaining 23% study subjects treated with surgical treatment.

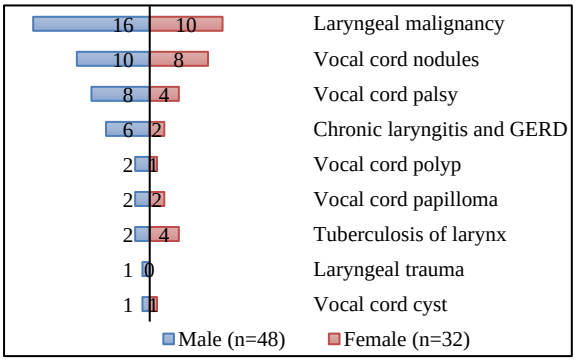


Figure 7: Distribution of study subjects according etiology of hoarseness of voice.

For all subjects with vocal cord palsy there was no treatment. Study subjects with chronic laryngitis and GERD, and tuberculosis of larynx were treated with medical treatment.

Remaining patients with vocal cord papilloma, vocal cord polyp, vocal cord cyst and laryngeal trauma were treated with surgical treatment.

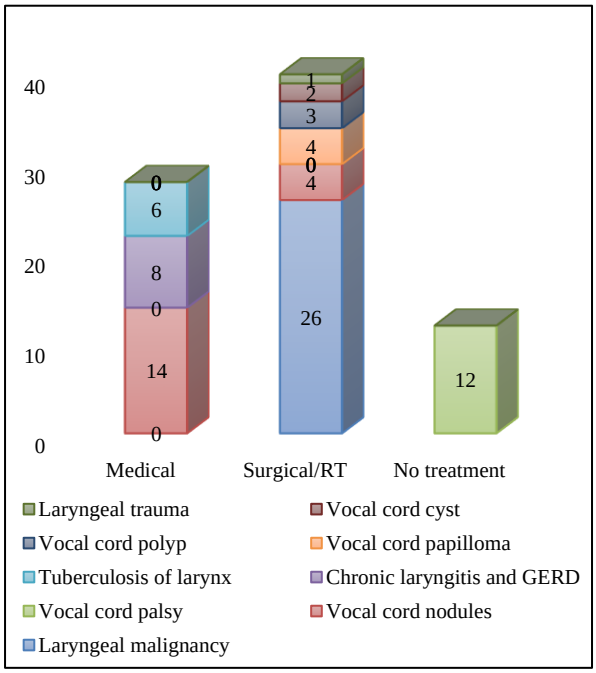


Table 8: Distribution of study subjects according etiology of hoarseness of voice and treatment.

DISCUSSION

Hoarseness, a common symptom, is typically the earliest sign of various conditions affecting the voice apparatus. Despite benign causes being more prevalent than malignancies, delays in diagnosis can lead to missed opportunities for effective treatment.

During the study period, 19,764 cases attended the ENT OPD. Out of these, 80 cases presenting with hoarseness of voice were randomly selected, representing 0.40% of all cases. This proportion is similar to the incidence of 0.32% reported in a study by Baitha et al.[5]

Age and sex

In the present study, 80 cases of hoarseness of voice were examined. The highest number of cases (25%) were in the 41-50 age group, while the lowest number (2.5%) were in the ≤10 age group. The youngest patient was 7 years old, and the oldest was 76 years old. In a study by Baitha et al, the majority of patients (28.18%) were in the 31-40 age group.[5]

Similarly, in a study by Ghosh et al, most patients (28%) were in the 21-30 age group. In our study, 60% of the 80 cases were males, and 40% were females.[5,6] This finding is similar to Baitha et al study, which reported 67.27% males and 32.72% females, and Parikh et al study, which found 67% males and 63% females with a male-to-female ratio of 2:1. However, Babu et al study reported a slightly lower male-to-female ratio of 1.89:1.[5-7]

Occupation

In the present study, among the 80 subjects, 23.75% were farmers, 10% were housewives, 47.5% were laborers, 12.5% were students, and 6.25% were clerks and drivers. There was a significant difference between male and female occupations, primarily because all housewives were female. Similarly, Baitha et al observed that the majority of patients were laborers (36.36%). In our study, laborers comprised 52.63% of males and 48.30% of females, with housewives being the next most common group among females (27.28%). In contrast, Ghosh et al study found that the majority of patients were housewives (29%).[5,6]

Socio economic status

We found that among the 80 study subjects, 40% were from the lower socioeconomic class. This was followed by 30% from the upper lower class, 18.75% from the lower middle class, 7.5% from the upper middle class, and 3.75% from the upper class.

Residence

Among the total 80 study subjects, 72.5% resided in urban areas, while the remaining 17.5% came from rural areas. There was no significant difference between males and females regarding their place of residence. This finding aligns with Bhatia's study, where the majority of patients were from rural areas, comprising 75.5% of the cases.[5]

Habits: In the current study, among the total 80 study subjects, 30% had a smoking habit, followed by 20%

with tobacco chewing, and 8.75% with alcohol consumption. Additionally, 7.5% reported both smoking and alcohol consumption, while 21.25% reported vocal abuse, and 22.5% reported no habits. Males with alcohol consumption as a habit were significantly more prevalent compared to females. Overall, habits were significantly more common in males compared to females. Brock has identified inhaled irritants, particularly cigarette smoke, as the most significant predisposing factors for hoarseness. In our current study, the most common habit noted was smoking, observed in 30% of patients, while alcohol consumption was the least prevalent habit, noted in 8% of patients. This finding aligns with Baitha's study.[5] In Ghosh et al's study, vocal abuse was noted in 72% of cases, indicating its importance as a predisposing factor.[6]

Baitha et al's study reported smoking in 25.45% of cases, chewing tobacco in 17.27%, and alcohol. consumption in 12.72%.[5] Parikh found that smoking was associated with hoarseness in only about 20% of cases, whereas vocal abuse was found in 56%. In our study, the majority of males were smokers, accounting for about 79.17%, while among females, 50% had a history of vocal abuse.[7] In our study, all 80 patients presented with hoarseness of voice. This was followed by dysphagia in 25% of cases, neck swelling in 22.5%, dry cough in 15%, and foreign body sensation in 16.25%. Additionally, stridor and hemoptysis were reported in 55 patients each. These findings are consistent with Baitha's study, where hoarseness was observed in all cases (100%), and the least common symptom was noisy respiration (0.99%).[5]

Duration

Among the total 80 study subjects, 37.5% experienced hoarseness of voice for less than 1 month. This was followed by 32.5% of subjects experiencing hoarseness for 1-3 months, 22.5% for 3-6 months, 3.75% for 6-9 months, 2.5% for 9-12 months, and one female had it for more than 12 months. These findings closely resemble those of Baitha's study, where approximately 50% of patients presented to the hospital with a duration of one month.[5]

Video laryngoscopy

In the present study, among the total 80 subjects, 33.75% exhibited Ulcero-proliferative growth involving the supra-glottis, glottis, and sub-glottis. This was followed by congestion of various vocal structures (vocal folds, arytenoids, aryepiglottic folds, epiglottis, inter-arytenoid) in 30% of study subjects. Additionally, vocal cord nodules were observed in 32.5% of cases, vocal cord paralysis in 15%, vocal cord polyps in 10%, vocal cord papillomas in 5%, vocal cord cysts in 1.25%, and submucosal hemorrhage of vocal folds and false cords in 1.25% of study subjects.

In contrast, Baitha's study noted congestion of vocal cords in 34.54% of cases and growths in only 9% of cases on IDL examination. This disparity may be attributed to differences in patient habits between the studies.[5] In our study, indirect laryngoscopy was conducted in 98% of the study subjects, while video laryngoscopy was performed in 45% of cases. Parikh's research indicated that 60% of patients underwent microlaryngoscopic, and Baitha's study observed DLS/MLS in 40 cases (36.36%), mirroring our findings.[5] Among the total 80 subjects, 45% were diagnosed with squamous cell carcinoma (keratin pearls). Additionally, 12.5% exhibited caseating granuloma and acid-fast bacilli, while 32.5% showed hyperplastic stratified squamous epithelium with pigment-laden macrophages.[7] Furthermore, 7.5% had squamous papilloma, and 3.75% displayed dense fibrin deposition with stellate cells and hemorrhages.

Etiology

Regarding the causes of hoarseness of voice, we observed that 32.5% of subjects experienced it due to laryngeal malignancy. Following this, 22.5%, 15%, 10%, 7.5%, 3.75%, 2.5%, and 1.25% of subjects had hoarseness of voice due to Vocal cord nodules, Vocal cord palsy, Chronic laryngitis and GERD, Tuberculosis of the larynx, Vocal cord papilloma, Vocal cord polyp, Vocal cord cyst, and Laryngeal trauma, respectively. Out of 12 patients (15%) with vocal cord palsy, 50% had idiopathic causes, 20% were due to thyroid surgery, 16.67% resulted from neck trauma, and one case was attributed to nasopharyngeal carcinoma.

In contrast, Parikh, Kadambari, and Baitha et al reported lower incidences of 3%, 9%, and 9% respectively. Baitha et al's study showed a male-to-female ratio of 9:1, whereas our study indicated a notably lower ratio, highlighting a higher prevalence of vocal cord palsy among males.[5,7,9] In Bhatia's study, the incidence of malignancy was 14.54%, with a male-to-female ratio of 15:1.[5] Kadambari reported an incidence of malignancy at 18%, while Ghosh found it to be 8%, and Parikh reported 12%. Compared to these studies, our study showed a higher incidence of malignancy associated with hoarseness, possibly due to socioeconomic factors and substance abuse.[6,7,9] In our research, vocal cord nodules emerged as the second most prevalent cause, identified in 18 cases, with a male-to-female ratio of 1.25:1. Among males, 55% (10 cases) exhibited nodules, while among females, 45% (8 cases) presented with them.

Notably, all cases featured bilateral vocal nodules. Parikh's study highlighted vocal nodules as the primary cause (50%), with 43.3% occurring in males and 56.7% in females.[7] Similarly, Ghosh identified vocal nodules as the most prevalent cause, with a 30% incidence and a male-to-female ratio of 1:1.5.[6] Conversely, Baitha et al reported a lower incidence of only 12.72%, with a male-to-female ratio of 1:1.3.[5] Our study reaffirms the higher prevalence of vocal nodules in females compared to males, albeit with a ratio lower than that reported in other studies. The fourth most common etiology observed in

our study was chronic laryngitis and GERD, noted in 8 cases. Among females, it accounted for 2 cases as a common etiology. The male-to-female ratio was found to be 3:1, with 6 male cases of chronic laryngitis. In both Parikh's and Baitha et al's studies, chronic laryngitis was the most common etiology, comprising 48% in each. However, in Ghosh's study, it was only 6%, and in Kadambari's study, it was 8%. Our study findings align more closely with those of Ghosh and Kadambari, but differ from Parikh and Baitha et al's studies.

Vocal cord papilloma was identified in 4 cases, with a male-to-female ratio of 1:1. Vocal cord polyp was observed in 3 patients, with a male-to-female ratio of 2:1, consisting of two males and one female. In Swapan Ghosh's, Parikh's, and Baitha et al's studies, the incidence of vocal cord polyps was reported as 23%, 15%, and 4.54%, respectively. The male-to-female ratio was 3.6:1 in Ghosh's study and 1:1.5 in Parikh's study. Notably, only Parikh's study showed a similar incidence of vocal cord polyps to ours, while the other studies reported a higher incidence. Other cases of hoarseness included vocal cord cysts in 2 patients and laryngeal trauma in one patient.

Management

In the present study, out of the total 80 study subjects with hoarseness of voice, 35% underwent medical treatment, 50% underwent surgical treatment or radiotherapy, and the remaining 15% received no treatment. All study subjects with laryngeal malignancy underwent surgical treatment and radiotherapy. Among the 18 study subjects with vocal nodules, 77% received medical treatment, while the remaining 23% underwent surgical treatment.

No treatment was administered for subjects with vocal cord palsy. Study subjects with chronic laryngitis and GERD, as well as tuberculosis of the larynx, were treated with medical intervention. Patients with vocal cord papilloma, vocal cord polyp, vocal cord cyst, and laryngeal trauma underwent surgical treatment. In our study, out of the total 80 study subjects, 48.75% showed improvement in their disease condition. However, all 26 cases of malignancy (32.5%) worsened even after treatment. Among the remaining 18.755 cases, there was no change after treatment, including all 12 cases of vocal cord palsy, 2 cases of chronic laryngitis, and 1 case of vocal cord polyp.

These findings regarding treatment and outcomes were similar to those observed in studies conducted by Ghosh, Parikh, and Baitha et al.[5-7]

Limitations of the study were the age group below 5 years could not be included in our study. Voice disorders other than hoarseness like rhinolalia aperta, rhinolalia clausa, articulation disorders and central nervous system diseases like Bulbar palsy, Multiple sclerosis, Stroke and Parkinson's diseases were not included in our study.

CONCLUSION

Therefore, based on this study, we conclude that hoarseness of voice is a primary symptom warranting investigation, as it could signal early laryngeal malignancy. It is predominantly observed in the middle-age group and among individuals from lower socioeconomic backgrounds in rural areas, where smoking is prevalent. Timely diagnosis and suitable treatment are crucial for preventing the progression of laryngeal malignancy.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Akshay DS, Raithatha H, Borewad G. A clinical study on hoarseness of voice, etiology and its management. Int J Otorhinolaryngol Head Neck Surg 2024;10:524-9.