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Original Article

Clinical Study on Etiopathogenesis of Hoarseness of Voice at Tertiary Care Hospital

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ABSTRACT

Background: Hoarseness of voice is a common presenting symptom in otorhinolaryngology practice, arising from a wide spectrum of etiologies ranging from benign inflammatory conditions to malignancies. It significantly impacts communication, social interaction, and quality of life. Early identification of the underlying cause is essential for timely management and prevention of complications. **Aim and Objectives:** This study aimed to analyze the clinical and demographic profile of patients presenting with hoarseness of voice and to evaluate its etiology and pathogenesis in a tertiary care setting. **Materials and Methods:** This hospital-based observational study was conducted in the Department of ENT & Head and Neck Surgery at Muzaffarnagar Medical College & Hospital over a period of 18 months. A total of 120 patients aged 15–75 years with hoarseness of voice were included using purposive sampling. Data collection involved detailed history, clinical examination, and indirect/video laryngoscopy. Additional investigations such as X-ray, CT scan, and biopsy were performed when indicated. Data were analyzed using SPSS version 29.0 applying appropriate statistical tests, with $p<0.05$ considered statistically significant. **Results:** The majority of patients were in the 31–40 years age group (30.0%) with a mean age of 44.73±12.6 years, and a male predominance (63.3%). Smoking (65.0%), alcohol consumption (47.5%), and tobacco use (45.0%) were the major risk factors. Vocal fatigue (63.3%), foreign body sensation (55.8%), and throat pain (47.5%) were common presenting complaints. Laryngoscopic findings revealed predominant involvement of the true vocal cords and arytenoids. Benign lesions such as bilateral vocal cord nodules (24.2%) and polyps (15.8%) were most frequent, while malignant and other conditions were less common. Most patients (61.7%) did not require advanced investigations. **Conclusion:** Hoarseness of voice is predominantly caused by benign laryngeal conditions and is strongly associated with modifiable risk factors. Comprehensive clinical and laryngoscopic evaluation plays a crucial role in diagnosis. Early intervention, along with preventive strategies such as vocal hygiene and risk factor modification, can significantly improve patient outcomes and quality of life.

Keywords: *Hoarseness, Vocal cord lesions, Laryngoscopy, Risk factors, Voice disorders.*

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. Inflammation (acute laryngitis), chronic sinusitis, acid reflux, excessive alcohol consumption, smoking, and voice abuse are the most prevalent causes of acute hoarseness. Persistent hoarseness might indicate severe illness and requires a thorough examination for proper diagnosis. [2] Hoarseness is particularly

prevalent among individuals who extensively use their voice professionally, such as teachers, singers, and other voice professionals. It affects both genders and can occur across all age groups. If hoarseness of the voice persists for more than two weeks, then it should be investigated properly to find the cause. [3]

Managing hoarseness involves treating underlying conditions, voice therapy, vocal hygiene, and specific treatments for vocal cord lesions. [4] 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. [5] Hoarseness is observed with greater frequency among teachers and older adults. Nevertheless, it can affect individuals of both sexes and across all age groups. The condition may arise from either benign or malignant laryngeal pathologies. Depending on the underlying cause and degree of laryngeal dysfunction, the associated symptoms can range from mild hoarseness to severe, life-threatening stridor. Benign conditions are more common than malignant.[6]

This study aims to investigate the etiopathogenesis of hoarseness of voice in patients presenting to a tertiary care hospital, identifying the various causes, risk factors, and demographic patterns associated with this common symptom. By elucidating the underlying etiologies, this study will contribute to improved diagnosis, management, and prevention of hoarseness, ultimately enhancing patient outcomes and quality of life.

AIM & OBJECTIVES

1. To analyze clinical and demographical profile of patients with hoarseness of voice.
2. To study etiology and pathogenesis of hoarseness of voice.

MATERIAL AND METHODS

A hospital-based observational study was conducted in the Department of ENT & Head and Neck Surgery at Muzaffarnagar Medical College & Hospital over 18 months (1 year data collection and 6 months analysis). A total of 120 patients aged 15–75 years presenting with hoarseness of voice were included using purposive sampling. A pilot study on 15 patients validated the methodology and data collection tools. Data were collected prospectively using a structured case record form, including detailed history, clinical examination (throat, ear, and nose), and laryngoscopic evaluation using indirect and 70-degree endoscopy. Relevant investigations such as X-ray neck, CT scan, direct laryngoscopy with biopsy, and routine laboratory tests were performed as indicated. Data were analyzed using SPSS version 29.0 with descriptive statistics, chi-square test, t-test/ANOVA, and multivariable logistic regression; $p<0.05$ was considered significant. Validity and reliability were ensured through standardized protocols, investigator training, and pilot testing (kappa=0.82). Ethical approval was obtained, and informed consent was taken from all participants.

Inclusion criteria

- Patients presenting with Hoarseness of Voice.
- Patients of both sexes.
- Age group between 15 – 75 years.

Exclusion criteria

- Patients refusing to give an informed written consent.
- Age group below 15 years and above 75 years.
- Patients with h/o vocal surgery
- Conditions affecting the central nervous system, such as bulbar palsy, multiple sclerosis, stroke, and Parkinson's disease, as well as voice abnormalities other than hoarseness, such as rhinolalia clausa and rhinolalia aperta.

RESULTS

Among the 120 participants, the largest age group was 31–40 years, comprising 36 patients (30.0%), followed by 41–50 years with 28 patients (23.3%) and 51–60 years with 26 patients (21.7%). Gender-wise, males predominated in the study with 76 participants (63.3%), while females constituted 44 participants (36.7%), indicating a clear male preponderance. Regarding occupation, labourers formed the largest occupational group with 25 participants (20.8%), followed by housewives and shopkeepers with 23 participants each (19.2%), and farmers with 22 participants (18.3%). Businessmen accounted for 13 cases (10.8%) and teachers for 10 cases (8.3%). **(Table 1)**

Among the 120 studied patients, smoking was the most prevalent addiction, reported by 78 participants (65.0%), while 42 patients (35.0%) were non-smokers. Alcohol consumption was present in 57 patients (47.5%), whereas 63 patients (52.5%) denied alcohol intake. Tobacco or paan chewing was noted in 54 participants (45.0%), while 66 patients (55.0%) did not have this habit. **(Table 2)**

Table 3 shows that most structures had predominantly normal findings except the vocal cords. The base of tongue was normal in 77.5%, with 21.7% showing lingual hyperplasia. The true vocal cords (TVC) were most affected, with only 5.8% normal; common findings included bilateral nodules (24.2%), edema and granulations (12.5% each), and

polyps/palsy. The false vocal cords (FVC) were normal in 65.8%, while 23.3% showed congestion. Overall, TVC and arytenoids were the most commonly involved sites.

Majority of patients (61.7%) did not require any additional investigations. Among those investigated, the most common modality was CECT neck with biopsy under GA (15.0%), followed by X-ray chest PA view with CECT neck (14.2%). A smaller proportion underwent CECT neck with FNAC and biopsy (5.0%), while X-ray neck AP and lateral view was done in 2.5% and biopsy under GA alone in 1.7% of patients. Overall, only 38.3% required further investigations, predominantly advanced imaging and histopathological evaluation. **(Table 4)**

Table 5 shows that the most common provisional diagnosis was bilateral TVC nodules (24.2%), followed by TVC polyp (15.8%) and TVC palsy (10.8%). Glottic growth under evaluation and LPR-induced pachydermia laryngis were each seen in 9.2% of patients. Laryngeal tuberculosis and chronic laryngitis accounted for 5.8% each, while Reinke's edema and laryngeal intubation granuloma were observed in 5.0% each. Less common conditions included supraglottic UPG under evaluation (4.2%), supraglottic squamous papillomas (2.5%), laryngotracheal trauma (1.7%), and laryngocele (0.8%).

Figure 1 shows that change in voice (100%) was the most common presenting complaint among all patients. This was followed by vocal fatigue (63.3%) and foreign body sensation (55.8%). Overall, voice-related and reflux-associated symptoms were predominant in the study population.

Table 1- Socio-demographic profile of participants:

Variables	No. of patients (n=120)	Percentage
Age group		
20-30 Year	15	12.5%
31-40 Year	36	30.0%
41-50 Year	28	23.3%
51-60 Year	26	21.7%
>60 Year	15	12.5%
Gender		
Male	76	63.3%
Female	44	36.7%
Occupation		
Farmer	22	18.3%
Labour	25	20.8%
Housewife	23	19.2%
Shopkeeper	23	19.2%
Business man	13	10.8%
Teacher	10	8.3%
Student	2	1.7%
Singer	2	1.7%

Table 2- Distribution of the studied patients based on addictions and history:

Addictions /Personal History	Yes	No
Smoking	78 (65.0%)	42 (35.0%)
Alcohol	57 (47.5%)	63 (52.5%)
Tobacco/ paan chewing	54 (45.0%)	66 (55.0%)
Occupational Voice Use	35 (29.2%)	85 (70.8%)
Intubation history	21 (17.5%)	99 (82.5%)

Table 3: Distribution of the studied patients based on Indirect laryngoscopy/ Video laryngoscopy findings:

Indirect laryngoscopy/ Video laryngoscopy findings		Number of patients (n=120)	Percentage
Base of tongue	**Lingual hyperplasia +**	26	21.7%
	UPG + over R side	1	0.8%
	Normal	93	77.5%
Vallecula	**UPG + over R side of vallecula**	2	1.7%
	Congested	4	3.3%
	Normal	114	95.0%
Epiglottis	**Congested**	26	21.7%
	Edematous and congested	3	2.5%
	UPG + over R side of epiglottis	1	0.8%

	UPG + over R side of lingual surface of epiglottis	1	0.8%
	UPG + over Laryngeal surface of epiglottis	1	0.8%
	Normal	88	73.3%
AE fold	**B/l Congested**	42	35.0%
	UPG +over L side	2	1.7%
	UPG +over R side	2	1.7%
	Normal	74	61.7%
Arytenoids	**B/l Congested**	71	59.2%
	B/l ulcers +	2	1.7%
	Bulge + over R side	2	1.7%
	UPG +over L side	1	0.8%
	Normal	44	36.7%
TVC	**B/l nodules +**	29	24.2%
	L TVC Palsy	9	7.5%
	R TVC palsy	4	3.3%
	L TVC Polyp +	9	7.5%
	R TVC polyp +	10	8.3%
	B/l ulcerative lesions +	8	6.7%
	B/l TVC edematous	15	12.5%
	Granulations + over B/l TVC	15	12.5%
	UPG R TVC +	5	4.2%
	UPG L TVC +	6	5.0%
	UPG B/l TVC +	3	2.5%
	Normal	7	5.8%
FVC	**B/L congested**	28	23.3%
	B/L edematous and congested	9	7.5%
	UPG + over L FVC	2	1.7%
	UPG + over B/L FVC	1	0.8%
	R edematous and congested	1	0.8%
	Normal	79	65.8%
Pyriform fossa	**B/L Congested**	20	16.7%
	Bulge + over R Side	2	1.7%
	UPG + over L Side	1	0.8%
	Normal	97	80.8%

Table 4: Distribution based on other investigations:

Other Investigations	Number of patients (n=120)	Percentage
X-ray chest PA view, CECT neck	17	14.2%
X-ray neck AP and lateral view	3	2.5%
CECT neck, FNAC neck swelling and biopsy under GA	6	5.0%
CECT neck and biopsy under GA	18	15.0%
Biopsy under GA	2	1.7%
Not required	74	61.7%

Table 5: Distribution of the studied patients based on provisional diagnosis:

Provisional Diagnosis	Number of patients (n=120)	Percentage
B/L TVC nodules	29	24.2%
Glottic growth under evaluation	11	9.2%
LPR induced pachydermia larynges	11	9.2%
TVC polyp	19	15.8%
Laryngeal tuberculosis	7	5.8%
TVC palsy	13	10.8%
Chronic laryngitis	7	5.8%
B/L Reinke's edema	6	5.0%
Laryngeal Intubation Granuloma	6	5.0%
Supraglottic UPG under evaluation	5	4.2%
Laryngotracheal trauma	2	1.7%

Supraglottic squamous papillomas	3	2.5%
Laryngocele	1	0.8%

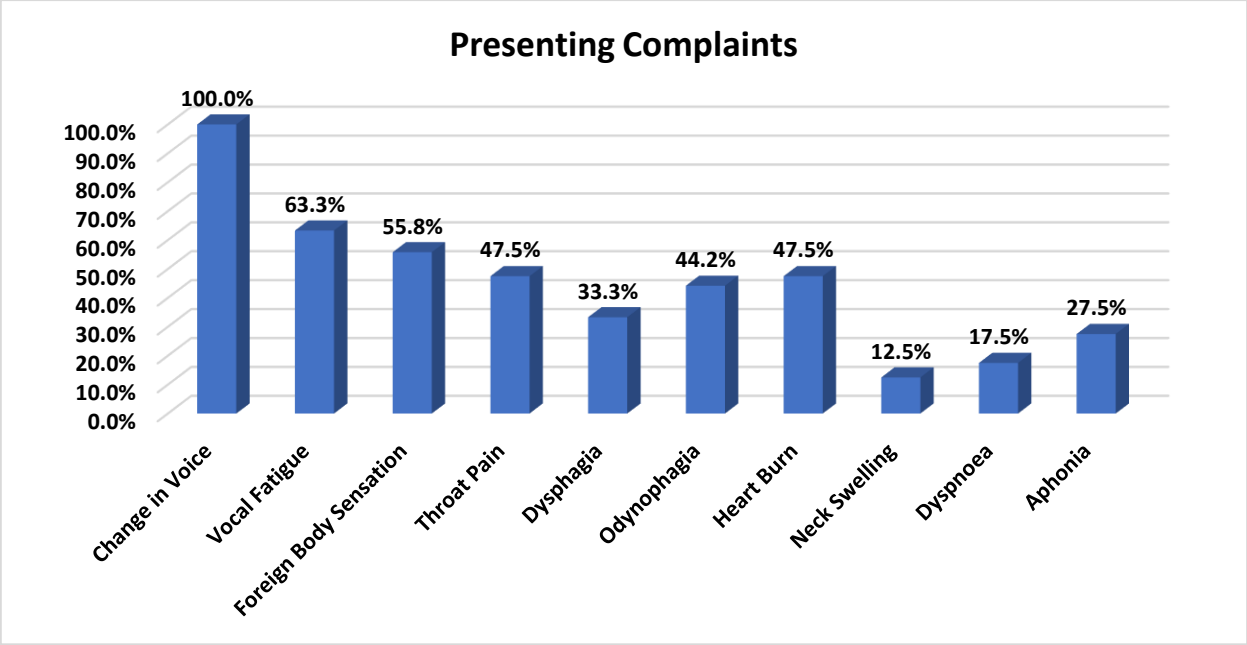

Figure 1: Distribution of the studied patients based on presenting complaints

DISCUSSION

In the present study, the mean age of the studied patients was 44.73±12.6 years, with the majority of the cases in the age range from 31 to 40 years (30.0%). Most of the cases were males, with 76 patients (63.3%) and 44 patients (36.7%) being female. **Biswas NN et al**[7] revealed that 18 patients (24.0%) were in the 41–50 age group, followed by 16 patients (21.33%) in the 61–70 age group and 15 patients (20.0%) in the 21–30 age group. There were 83.0% male and 17.0% were female. According to **Moers C et al**[8] study, the patients' ages varied from 6 to 71 years, and their male to female ratio was 2:1.9. In another study by **Siddhartharaj MK et al**[9]**,** males constituted 58.4% of the participants, resulting in a male-to-female ratio of 1.5:1, which is consistent with and comparable to the findings reported in the present study.

In the present study, vocal fatigue (63.3%) was the most common complaint, followed by foreign body sensation (55.8%), throat pain and heartburn (47.5% each). Among associated symptoms, cough (50.8%) was the most frequent, followed by difficulty in breathing on exertion (48.3%) and acid reflux (47.5%). Our findings were consistent with the findings of **Pal KS et al**[10] who revealed that the most common complaint, recorded in 92 instances (92%), was a change in voice (hoarseness). Eight patients (8%) reported dysphagia, twenty-five cases (25%) reported throat discomfort or foreign body feeling, ten cases (10%) reported neck oedema or secondary deposits, and twenty-three cases (23%) reported breathy voice quality. Two instances (2%) had laryngeal trauma. According to **Ahmmed SU et al**[11], most common and common presenting symptom, which was seen in all 130 patients (100.0%), was a change in voice (hoarseness). Also, **Akshay DS et al**[12] 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.

In the present study, smoking was the most common addiction, reported by 78 patients (65.0%). Our findings were in concordance with the findings of **Shailja Y et al**[13] who reported that the most prevalent habits among the patients were smoking (30.0%), followed by tobacco chewing (20.0%), alcohol consumption (8.7%), combined alcohol and smoking (7.50%), and other habits or no significant habit (33.75%). According to **Akshay DS et al**[12]**,** 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.

In the present study, indirect laryngoscopy or video laryngoscopy findings revealed that most structures were predominantly normal: base of tongue in 93 patients (77.5%), vallecula in 114 patients (95.0%), epiglottis in 88 patients (73.3%), and pyriform fossa in 97 patients (80.8%). Our findings were consistent with the findings of **Biswas NN et al**[14] who reported that the most frequent laryngeal finding was laryngeal growth, observed in 20 patients (26.7%), followed by polyp or cyst in 11 patients (14.7%), paresis in 10 patients (13.3%), nodules in 8 patients (10.7%), chronic laryngitis in 4 patients (5.3%), and phonatory gap in another 3 patients (4.0%). In the **Akshay DS et al**[12] study, 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. Also, **Shailja Y and Siddique QAB**[13] found that the most frequent cause of hoarseness was laryngeal cancer, which accounted for 32.5% of cases, followed by chronic laryngitis in 22.5% of patients. 15% of patients had vocal cord paralysis, 5% had voice cord papilloma and 2.5% had vocal cord cysts.

CONCLUSION

Hoarseness of voice is a common clinical presentation with multifactorial etiology, predominantly affecting middle-aged males with significant exposure to risk factors such as smoking, alcohol consumption, and vocal abuse. The majority of cases were attributed to benign laryngeal conditions, particularly vocal cord nodules, polyps, and inflammatory lesions, with true vocal cords being the most commonly involved site. Early diagnosis and appropriate management, including vocal hygiene and treatment of underlying causes, are essential to prevent progression and improve quality of life.

Limitations of the study

This study was conducted at a single tertiary care center with a relatively small sample size of 120 patients, which may limit the generalizability of the findings to the wider population. The use of purposive sampling could introduce selection bias. Histopathological confirmation was not available for all cases, especially those not undergoing biopsy, potentially leading to diagnostic limitations. Additionally, long-term follow-up of patients was not included, restricting assessment of treatment outcomes and disease progression.

Relevance of the study

This study is clinically relevant as hoarseness of voice is a common yet often neglected symptom that may indicate underlying benign or serious laryngeal pathology. By identifying the demographic profile, risk factors, and etiological patterns, the study aids in early recognition and appropriate evaluation of patients presenting with hoarseness. The findings highlight the predominance of benign vocal cord lesions and the significant role of modifiable risk factors such as smoking, alcohol use, and vocal abuse, thereby emphasizing preventive strategies and vocal hygiene. The study also underscores the importance of laryngoscopic examination as a primary diagnostic tool, reducing unnecessary investigations. Additionally, it provides useful data for clinicians in tertiary care settings to formulate effective diagnostic and management protocols, ultimately improving patient outcomes and quality of life.

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