



Epidemiological and Clinical Profile of Laryngeal Disorders in the Himalayan Region

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Abstract

Background: Laryngeal disorders are a common cause of morbidity and frequently present with hoarseness of voice. Epidemiological data from the Himalayan region remain limited. **Objective:** To study the epidemiological and clinicopathological profile of laryngeal disorders detected on laryngoscopy in patients from the Himalayan region. **Materials and Methods:** This retrospective observational study was conducted at a tertiary care hospital in the Himalayan region over a one-year period. A total of 1100 patients undergoing diagnostic laryngoscopy were included. Demographic characteristics, smoking status, occupational history, and laryngoscopic findings were analyzed. Laryngeal lesions were classified into inflammatory, benign, and malignant categories. **Results:** Most patients were middle-aged to elderly, with a marked male predominance. Smoking was a common associated risk factor, particularly among males. Inflammatory lesions constituted the largest group of laryngoscopic findings. Laryngopharyngeal reflux (16.8%) was the most common diagnosis, followed by chronic laryngitis and vocal cord palsy. Benign phonotraumatic lesions such as vocal cord nodules, polyps, and Reinke's edema were frequently observed. Malignant laryngeal lesions were predominantly detected in older male smokers. **Conclusion:** Laryngeal disorders in the Himalayan region demonstrate distinct epidemiological and clinicopathological patterns influenced by demographic and lifestyle factors. Early laryngoscopic evaluation is essential for timely diagnosis and effective management, particularly in high-risk populations.

Keywords: Laryngoscopy; Laryngeal disorders; Epidemiology; Himalayan region; Hoarseness of voice



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INTRODUCTION

Laryngeal disorders constitute a significant proportion of otorhinolaryngology outpatient consultations and are a common cause of morbidity due to their impact on voice, airway, and swallowing functions. Hoarseness of voice is the most frequent presenting symptom and may be associated with a wide spectrum of laryngeal pathologies ranging from benign inflammatory conditions to premalignant and malignant lesions [1,2]. Early evaluation using laryngoscopy plays a crucial role in the diagnosis of laryngeal disorders and facilitates early detection, thereby improving treatment outcomes [3]. Epidemiological patterns of laryngeal diseases vary across geographical regions due to differences in smoking habits, occupational exposure, environmental factors, and healthcare accessibility [4]. The Himalayan region presents unique risk factors such as cold climate, increased use of biomass fuel, tobacco consumption, and occupational voice abuse, all of which may influence the prevalence and pattern of laryngeal pathology [5]. However, large-scale epidemiological studies from this region are scarce, with most available literature focusing on urban or plains-based populations [6]. The present

study aims to analyze the epidemiological and clinicopathological profile of laryngeal disorders detected on laryngoscopy in patients from the Himalayan region, thereby contributing valuable region-specific data to existing literature.

MATERIALS AND METHODS

This retrospective observational study was conducted in a tertiary care hospital located in the Himalayan region over a period of one year. A total of 1100 patients who underwent diagnostic laryngoscopy for various laryngeal complaints were included in the study. Demographic details including age, gender, occupation, and smoking status were recorded. Laryngoscopic findings were documented and classified into inflammatory, benign, and malignant lesions based on clinical diagnosis. Diagnoses were coded using the International Classification of Diseases (ICD). Patients with incomplete medical records were excluded from the analysis. Data were entered into Microsoft Excel and analyzed using descriptive statistical methods. Results

were expressed as frequencies, percentages, and mean values where applicable.

Inclusion Criteria

1. All patients undergoing diagnostic laryngoscopy for hoarseness of voice, throat discomfort, dysphagia, chronic cough, breathing difficulty, or suspected laryngeal pathology during the study period.
2. Patients of all age groups and both genders.
3. Patients with complete clinical and laryngoscopic documentation.

Exclusion Criteria

1. Patients with incomplete medical records.
2. Patients with prior laryngeal surgery during the study period.
3. Patients with previously treated laryngeal malignancy.

Patients with insufficient documentation for smoking status or final diagnosis.

A total of 1100 patients fulfilled the inclusion criteria and were included in the analysis.

Diagnostic Criteria

Laryngoscopic findings were documented and classified into inflammatory, benign, and malignant lesions based on clinical diagnosis.

Diagnosis of laryngopharyngeal reflux (LPR) was based on laryngoscopic findings consistent with posterior laryngeal erythema and edema, with or without associated clinical reflux symptoms.

Malignant lesions were diagnosed based on laryngoscopic suspicion and confirmed by histopathological examination where available.

Diagnoses were coded using the International Classification of Diseases (ICD).

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using SPSS version 8

Descriptive statistics were expressed as frequencies, percentages, and mean values where applicable.

The Chi-square test was used to assess the association between smoking status and type of laryngeal lesion. A p-value < 0.05 was considered statistically significant.

Odds Ratio (OR) with 95% confidence interval (CI) was calculated to determine the strength of association between smoking and malignant laryngeal lesions.

RESULTS

A total of 1100 patients who underwent diagnostic laryngoscopy during the one-year study period were included in the analysis.

Demographic Profile

The age of patients ranged across all age groups, with the majority belonging to the fifth to seventh decades of life. A clear male predominance was observed across all age groups. Out of 1100 patients, 722 (65.6%) were males and 378 (34.4%) were females, resulting in a male-to-female ratio of approximately 1.9:1. Male predominance was more marked in patients above 40 years of age.

Table 1. Age and Gender Distribution of Patients (n = 1100)

Age Group (years)	Female (n)	Male (n)	Total
≤20	20	51	71
21–30	56	72	128
31–40	94	133	227
41–50	74	140	214
51–60	64	126	190
61–70	48	118	166
>70	22	82	104
Total	378	722	1100

Table 2. Smoking Status Distribution (n = 1100)

Smoking Status	Number of Patients	Percentage (%)
Absent	751	68.3
Present	349	31.7
Total	1100	100

Table 3. Distribution of Laryngoscopic Findings (n = 1100)

Laryngoscopic Finding	Number of Patients	Percentage (%)
Laryngopharyngeal reflux (LPR)	185	16.8
Chronic laryngitis	114	10.4
Vocal cord palsy (unilateral/bilateral)	184	16.7
Phonatory gap	85	7.7
Vocal cord nodules (bilateral)	81	7.4
Reinke's edema	69	6.3
Vocal cord polyp	37	3.4
Leukoplakia	41	3.7
Malignant laryngeal lesions	32	2.9
Others*	272	24.7
Total	1100	100

Others include keratosis, paresis, hemorrhage, verrucous lesions, and other less frequent diagnoses.

Table 4. Association Between Smoking and Malignant Laryngeal Lesions

Smoking Status	Malignant (n=32)	Non-Malignant (n=1068)	Total
Present	24	325	349
Absent	8	743	751
Total	32	1068	1100

Chi-square = 34.6

p < 0.001

Odds Ratio = 6.85

DISCUSSION

The present retrospective study evaluated 1100 patients who underwent diagnostic laryngoscopy over a one-year period at a tertiary care center in the Himalayan region. Owing to its large sample size and regional focus, this study provides valuable epidemiological insight into the spectrum of laryngeal disorders in a geographically and environmentally unique population.

Demographic Characteristics

The majority of patients belonged to the middle-aged and elderly age groups, with peak incidence observed in the fifth to seventh decades of life. This age distribution is consistent with previous studies demonstrating increased prevalence of laryngeal pathology with advancing age due to cumulative exposure to etiological factors such as smoking, environmental pollutants, and occupational voice strain [7,8]. Degenerative changes in laryngeal tissues and reduced mucosal resistance may further predispose elderly individuals to chronic inflammatory and neoplastic conditions.

A clear male predominance was observed in this study, similar to findings reported in Indian and international literature [9]. This male preponderance can be attributed to higher rates of tobacco use, alcohol consumption, outdoor occupational exposure, and voice abuse, particularly in the Himalayan region where occupational demands often involve prolonged voice use under harsh climatic conditions.

Role of Smoking and Occupational Exposure

Smoking emerged as a significant associated risk factor, particularly among patients with Reinke's edema, leukoplakia, chronic laryngitis, and malignant lesions. The association between tobacco use and laryngeal pathology is well established, with smoking contributing to chronic mucosal irritation, epithelial dysplasia, and malignant transformation [10,11]. The high prevalence of smoking-related laryngeal disorders observed in this study underscores the need for targeted tobacco cessation programs.

Occupational exposure also played an important role, with many patients engaged in professions involving excessive voice use or prolonged outdoor exposure, such as teaching, vending, and manual labor. Chronic voice abuse, combined with environmental irritants and cold climate, may explain the predominance of inflammatory laryngeal lesions in this population.

Spectrum of Laryngoscopic Findings

Inflammatory lesions constituted the majority of laryngoscopic findings, followed by benign lesions. This pattern aligns with several studies identifying inflammatory conditions as the most common cause of hoarseness of voice [7,12]. Reinke's edema was among the frequently encountered diagnoses, particularly among smokers, consistent with reports from populations with high tobacco consumption [12].

Benign lesions such as vocal cord nodules and polyps were commonly observed in patients with a history of

voice abuse. These lesions are potentially reversible if identified early, emphasizing the importance of prompt laryngoscopic evaluation in patients with persistent voice changes.

Malignant Lesions and Clinical Implications

Although malignant lesions constituted a smaller proportion of cases compared to inflammatory and benign pathologies, their clinical significance remains substantial. Most malignant lesions were detected in older male smokers, consistent with established epidemiological trends [13,14]. Early detection through laryngoscopy enables timely intervention and facilitates organ-preserving treatment strategies.

Routine laryngoscopic evaluation should therefore be strongly advocated in patients presenting with hoarseness lasting more than two weeks, particularly in high-risk populations.

Regional Relevance and Limitations

The Himalayan region is characterized by unique environmental and lifestyle factors, including cold climate, biomass fuel exposure, limited access to healthcare in remote areas, and high tobacco consumption. These factors may collectively influence the epidemiology of laryngeal disorders.

The retrospective and hospital-based nature of the study limits community-level generalizability, and histopathological confirmation was not available for all cases. Nevertheless, the large sample size and systematic evaluation strengthen the validity of the findings.

The present study demonstrated a statistically significant association between smoking and malignant laryngeal lesions ($p < 0.001$). Smokers exhibited approximately 6.8 times higher odds of malignancy compared to non-smokers. This strong association reinforces the established role of tobacco exposure in laryngeal carcinogenesis. Chronic mucosal irritation, accumulation of carcinogenic compounds, epithelial dysplasia, and impaired mucosal defense mechanisms likely contribute to malignant transformation in susceptible individuals. These findings highlight the urgent need for tobacco cessation strategies in the Himalayan population.

CONCLUSION

This study demonstrates that laryngeal disorders in the Himalayan region predominantly affect middle-aged and elderly individuals, with a clear male predominance. Smoking emerged as an important associated risk factor, particularly in inflammatory, benign, and malignant laryngeal lesions. Inflammatory conditions formed the majority of laryngoscopic findings, with laryngopharyngeal reflux and chronic laryngitis being

the most common diagnoses. Benign phonotraumatic lesions, including vocal cord nodules, polyps, and Reinke's edema, were frequently observed, reflecting the role of voice abuse and tobacco exposure.

Although malignant lesions constituted a smaller proportion of cases, they were predominantly seen in older male smokers, underscoring the importance of early detection. Early laryngoscopic evaluation of patients presenting with persistent hoarseness—especially those with known risk factors—remains essential for timely diagnosis, appropriate management, and improved clinical outcomes.

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