



Research Article

**HOARSNESS OF VOICE AS A RESULT OF BENIGN VOCAL CORD LESIONS:
A CLINICAL STUDY**

Raphella Khan¹, Ayaz Rehman² and Asef A Wani³

^{1,2,3}ENT Department SKIMS, Medical College Hospital Srinagar, Kashmir

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ABSTRACT

Introduction Hoarsness of voice falls under the umbrella diagnosis of dysphonia. Hoarseness as a presenting symptom has a broad differential diagnosis, including many causes that are self-limiting or benign, where as others may be serious and voice-damaging, or even life-threatening. The objective of this study is to find out the incidence of various vocal cord lesions as a cause of hoarsness of voice and the factors affecting. Materials and methods A prospective study was conducted in the department of ENT at a tertiary centre in Kashmir. 140 patients presenting with hoarseness of voice, evaluated by indirect laryngoscopy followed by Hopkin's rigid laryngoscopy and diagnosed with benign lesion of larynx in the OPD were included in the study after taking their consent and a detailed history was taken in all patients with special reference to addiction like smoking, tobacco chewing, gastritis, drug allergy and past history of operative procedure and intubation. Observation Majority of the benign lesions of vocal cords encountered were vocal polyps in 37.85% patients followed by vocal nodules in 25% patients, LPR in 22.85% patients, Reinke's oedema in 5.71% patients, vocal cord cysts in 5% patients, contact ulcer in 2.14% patients and a single case of Tubercular laryngitis and papilloma each. Vocal abuse was the main predisposing factor noticed in 56 (40%) patients. The most predominant presenting complaints was Hoarsness of voice and was seen in about 72.85% patients. The professional group most commonly affected was the teachers being 51 (36.42%) and the most commonly affected non professional group was the housewives being 32 (22.85%). Conclusion It was observed that vocal polyps were the most common benign lesion as a cause of hoarsness of voice with vocal abuse being the most common predisposing factor for benign lesions of larynx.

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INTRODUCTION

Voice change is a common complaint in today's fast paced, high stressed life, which can cause noticeable alteration in daily living, social and emotional adjustment¹. Normal voice requires laryngeal function to be coordinated, efficient, and physiologically stable. Any imbalances of this delicate system can affect phonation. Benign lesions of the vocal folds can cause imbalances in this system, which can result in varying degrees of dysphonia. Bernoulli's principle explains that when air passes from one large space to another i.e. from lungs to Pharynx, a vibratory pattern is developed at the vocal cords and the resultant sound produced is appreciated as voice². Benign lesions of the larynx are classified into the commonly occurring non-neoplastic lesions and relatively rare neoplastic lesions. The commonly encountered benign lesions of the larynx are: vocal cord polyps, vocal nodules, tuberculosis of larynx, laryngocele, laryngeal web, epiglottic cysts and subglottic haemangioma. Neoplastic lesions include papilloma, adenoma, chondroma and other non-neoplastic lesions like

intubation granuloma, contact ulcer granuloma are relatively uncommon³.

Several factors are responsible for the development of the benign vocal lesions such as vocal abuse, overuse or misuse of voice, chronic infections of upper airway, allergy, smoking and gastroesophageal reflux. Frequent coughing and throat-clearing also contribute to the mucosal irritation which worsens the voice^{4,5,6}. The symptomatology has shown a change in trend. This can be attributed to lifestyle changes, increased level of mental stress, long gaps between meals, no physical exercise and odd working hours. The most important predisposing factor after vocal abuse is laryngopharyngeal reflux⁷.

MATERIALS AND METHODS

A prospective cross sectional study was conducted in the department of ENT at a tertiary centre in Kashmir. 140 patients presenting with hoarseness of voice, evaluated by indirect laryngoscopy followed by Hopkin's rigid

*Corresponding author: **Raphella Khan**

ENT Department SKIMS, Medical College Hospital Srinagar, Kashmir

laryngoscopy and diagnosed with benign lesion of larynx in the OPD were included in the study after taking their consent and the study was carried out for a period of 4 years. A detailed history was taken in all patients with special reference to addiction like smoking, tobacco chewing, gastritis, drug allergy and past history of operative procedure and intubation.

Inclusion criteria

All patients with Hoarsness of voice with documented possible benign vocal cord lesions on endolaryngeal examination or with signs of laryngopharyngeal reflux.

Exclusion criteria

1. Age below 3 years and above 70 years.
2. Patients with clinical diagnosis of malignancy of larynx.
3. Patients with speech defect due to central cause.
4. Patients with oral, nasal and nasopharyngeal pathology leading to change in voice.
5. Patients earlier diagnosed as benign lesions, which subsequently proved malignant on histopathology.

Observations

The most predominant presenting complaints was Hoarsness of voice seen in about 72.85% patients, which was followed by cough in 19.28% patients, foreign body sensation in throat in 5%, and lastly heart burn in 2.85% patients.(Table 1).

Table 1 Chief complaints

Symptoms	No.of patients	% of cases
Hoarsness of voice	102	72.85%
Cough	27	19.20%
Foreign body sensation in throat	7	5%
Heart burn	4	2.85%

In the present study, 47 (33.57%) patients presented to us with a history of less than 1 month duration (Table 2).

Table 2 Duration of the symptoms

Duration of Hoarsness of voice		
Duration	Percentage	% of cases
< 1 month	33.57%	47
1-3 months	27.85%	39
3-6 months	20.71%	29
6-9 months	7.85%	11
9-12 months	5%	7
> 12 months	5%	7

Majority of the benign lesions of vocal cords encountered were vocal polyps 37.85% (Fig 1,2), followed by vocal nodules 25% (Fig 3), LPR 22.85% (Fig 4), Reinke’s oedema 5.71%, vocal cord cysts 5%, contact ulcer 2.14% and a single case of Tubercular laryngitis and papilloma each (Table 3).

Table 3 Vocal cord examination finding

LESION	Males (Total no. 89)		Female (Total no 51)		Total No. 140	
	No. of Patients	% of patients	No. of Patients	% of patients	No. of Patients	% of patients
Vocal polyps	37	41.57	16	31.37	53	37.85
Vocal nodules	25	28.08	10	19.60	35	25
LPR	11	12.35	21	41.17	32	22.85
Reinke’s Odema	7	7.86	1	1.96	8	5.71
Vocal cord Cysts	5	5.61	2	3.92	7	5
Contact ulcer	2	2.24	1	1.96	3	2.14
Tuberculous laryngitis	-	-	1	1.96	1	0.714
Papillomatosis	1	1.12	0	-	1	0.714

Vocal abuse was the main predisposing factor noticed in 56 (40%) patients, others being smoking 43 (30.71%) patients, vocal abuse and smoking 25 (17.85%) patients, vocal abuse and other irritants 14 (10%) patients and alcohol consumption 2 (1.42%) patients (Table 4). The professional group most affected was the teachers being 51 (36.42%) and the most affected non professional group was the housewives being 32 (22.85%).

Table 4 Predisposing factors.

Predisposing factors	% of cases	% of cases
Vocal abuse only	40%	56
Smoking	30.7%	43
Vocal abuse and smoking	17.85%	25
vocal abuse and other irritants	10%	14
Alcohol consumption	1.42%	2

Table 5 Type of occupation of patients.

Occupation	Percentage	% of cases
Teachers	36.42%	51
Housewives	22.85%	32
Labourers	15%	21
Students	10.71%	15
Clerk	9.28%	13
Others	5.71%	8



Fig 1 Illustration shows a vocal polyp arising from the posterior 1/3rd of left vocal cord seen on endolaryngeal examination.

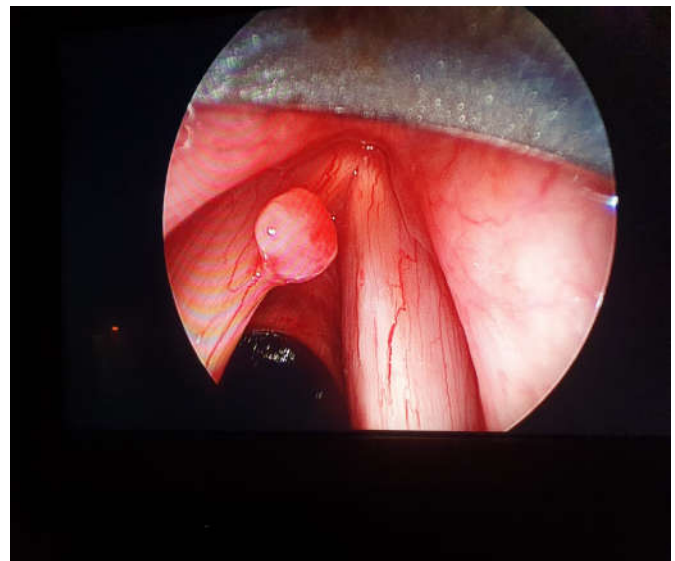


Fig 2 Illustration shows polyp arising from the anterior 1/3rd of the left vocal cord seen on direct laryngeal examination

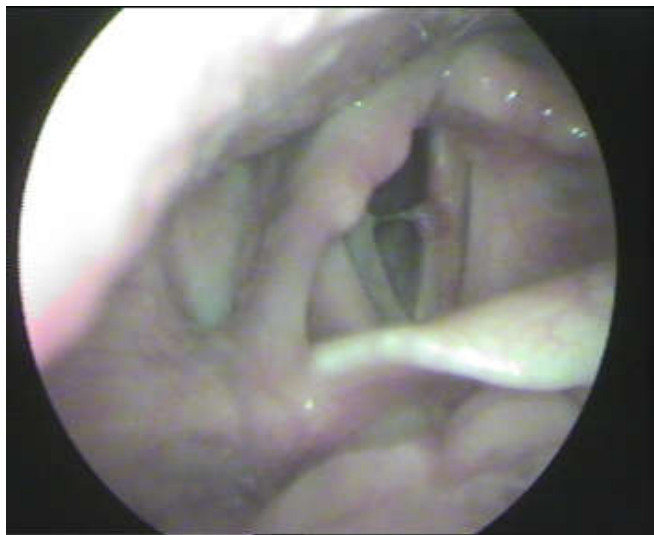


Fig 3 Illustration shows vocal nodule at the middle 1/3rd of the vocal cord seen on endolaryngeal examination.



Fig 4 Illustrates changes seen on endolaryngeal examination in a patient diagnosed with laryngopharyngeal reflux with a co-existing vocal cord polyp.

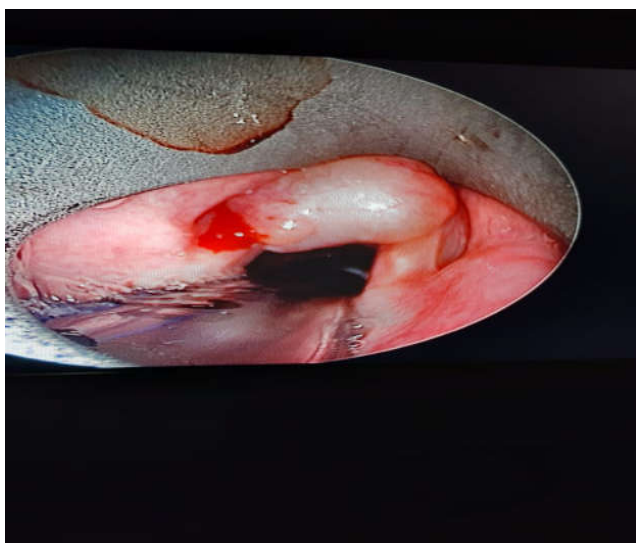


Fig 5 Cyst arising from left vocal cord (DL picture).

DISCUSSION

Hoarseness of voice is a common presenting symptom and refers to a rough, raspy, breathy, weak or strained voice or to changes in pitch and perceived effort^{4,5}. The etiology of the

nonneoplastic vocal fold lesions is usually multifactorial, including phonotrauma (excessive loudness and cough, excess tension while speaking or singing, etc.), laryngeal trauma (endotracheal intubation), hypothyroidism, cigarette smoking, alcohol abuse, and gastro-esophageal reflux (GERD)^{8,9,10,11,12}.

In this study the most common benign lesion of the vocal cords to predominate as a cause of hoarseness of voice was vocal polyps seen in 37.85% patients. Vocal fold polyps are benign lesions that are generally unilateral. They can be sessile or peduncular, and their histological characteristics as gelatinous or translucent, fibrous or organised, and angiomatous or hemorrhagic^{13,14,15,16,17}. The origin of the vocal polyp is phono-traumatic, with a higher prevalence in men.^{18,19} Individuals inadequately using or abusing their voice, whether by talking excessively or at high intensity, are more susceptible to developing morphological changes in the vocal folds, which favours the emergence of lesions²⁰. The size of polyps varies from small to large masses²¹, and a criterion to distinguish polyps from nodules is defined as mass bigger than 0.3 mm whereby bigger masses could be classified as polyps²². Besides the repetitive trauma, the addition causes that may contribute to polyp formation are airway infections, allergies, nicotine, gastro-oesophageal reflux, aspirin and other blood thinning medications²³. A study conducted by Wang L, *et al* on 32 patients submitted to laryngeal surgery for vocal polyp biopsy investigating pepsin by immunohistochemical staining revealed a significantly higher presence of pepsin (75%) in patients with vocal polyps when compared with the control group (31.25%), suggesting pharyngeal-laryngeal reflux as a risk factor for vocal fold polyp development²⁴.

In 25% patients vocal fold nodules were seen in this study. Vocal cords are subjected to collision forces at each vibratory cycle. High-pitched vibration causes mechanical stress confined to the edge of the vocal folds, which is associated with a predisposition to nodule formation by activating sub-epithelial fibroblasts leading to excessive collagenous fibre deposition. Over the time, the vocal abuses generate firstly soft and swollen spots, which then evolve into nodules and become bigger and stiffer if the incorrect vocal use persists²⁵. An increased vocal load, for example, due to the patient's profession, is usually, responsible for the formation of nodules. Boys, young women and teachers are particularly affected²⁶.

In this study 22.85% patients were diagnosed with laryngopharyngeal reflux which is considered as one of the causes of hoarseness of voice, these patients were having a positive history of globus sensation, repeated throat clearing, heartburn, excessive cough, or indigestion. The major etiologic factor for hoarseness of more than 3 months duration is laryngopharyngeal reflux, with a prevalence of 55 to 79 % in hoarse patients^{27,28,29}. In comparison with healthy subjects, LPR patients often reported abnormal subjective voice characteristics such as musculoskeletal tension, hard glottal attack, glottal fry, vocal forcing, forcing sensations, clamping, vocal fatigue, prolonged voice warm-up time, and restricted tone placement^{30,31,32}. Otorhinolaryngologists encountering reflux related disease cases in the present scenario is no more considered rare. Moreover, patients with oesophagitis are found to be at double risk of getting laryngitis than those who do not have it³³.

In this study Reinke's edema was noted in 5.71% patients. Reinke's edema is also known as polypoidal degeneration, in which a chronic accumulation of gelatinous mucoid material

develops in Reinke's space³⁴. The main risk factor has been found to be cigarette smoking. Treatment is focused on decrease of risk factors, such as implementation of smoking cessation, voice therapy, and reflux control³⁵.

Vocal cord cysts as a cause of hoarsness of voice was seen in 5% of the patients in this study. Intracordal cysts are benign lesions that are most typical in mid-membranous vocal folds and derive from the superficial layer of the lamina propria but can extend to embrace the middle and, rarely, the deep layers of the lamina propria^{36,37}. These lesions require challenging treatment methods and a prolonged recovery period compared with either vocal nodules or polyps³⁸.

Laryngeal contact ulcers (also known as laryngeal granulomas or vocal process granulomas) are a benign condition of the vocal cords. These lesions are most commonly caused by vocal cord overuse/abuse, endotracheal intubation, and gastroesophageal reflux (GERD)^{39,40}. There is a slight overall male predominance^{40,41}. Laryngeal contact ulcers are typically located on the posterior third of the vocal cords. Clinically, they are commonly ulcerated, however they may also present as a tan-brown to red exophytic or nodular lesion^{39,40,42}. The treatment of laryngeal contact ulcers is multifactorial, but the principle notion is the removal of the inciting factor. Common treatments include anti-reflex medications and speech and language therapy, followed by anti-inflammatories and/or inhaled or oral steroids^{41,43,44}.

We encountered one case of tubercular laryngitis and one case of laryngeal papilloma. Laryngeal tuberculosis is the most common granulomatous disease of the larynx and has usually been considered to result from pulmonary tuberculosis, although it might be localized in the larynx as a primary lesion without pulmonary involvement⁴⁵.

Histologically, papilloma is composed of finger-like epillary structures consisting of a vasculo-connective axis covered with well-differentiated stratified squamous epithelium (sometimes including keratosis or atypical hyperplasia) which has an intact basal membrane^{46,47}.

Based on the occupation in our study we observed most commonly affected group was that of the teachers 51(36.42%). Teachers are one of the most affected occupations with respect to voice disorders^{48,49,50}. Vilkmán classifies voice professionals according to the demands put on their voice and the vocal load. Actors and singers need a high voice quality and their vocal load is high. Teachers, telephone operators, clergy, etc. need a moderate voice quality, but they have a high vocal load. Physicians, nurses, lawyers, etc. need moderate voice quality and have a moderate vocal load⁵¹. Voice disorders were more prevalent in teachers in nurseries (36.4%) than for those in elementary school (25%) and in high school (20.8%). The width and depth of classrooms, a larger number of students, longer classroom hours and the level of noise were related to the frequency of voice disorders⁵².

CONCLUSION

It was observed that vocal polyps were the most common benign lesion as a cause of hoarsness of voice with vocal abuse being the most common predisposing factor for benign lesions of larynx.

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