

Research Article

Prevalence of age, gender and pathological conditions of vocal cords leading to hoarseness of voice in a tertiary care hospital

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ABSTRACT

Background: Voice disorders that affect children and adults have different causes with respect to different age groups. Factors associated with voice disorder ranges from the medical to emotional stress. This study was aimed to analyze the different pathological causes leading to hoarseness of voice in population attending a tertiary care hospital.

Methods: Subjects with symptoms of hoarseness of voice visited the tertiary care hospital was included in the study. The etiologies such as vocal nodules, vocal cord polyps, vocal cord cysts, cancer of larynx, vocal cord paralysis and vocal cord oedema were evaluated using the video laryngoscopy. The prevalence was statistically analysed.

Results: Ninety nine subjects of both gender (age 10-79 years) were included in the retrospective study. Among the total subjects, 51 subjects were males and 48 were females. Maximum prevalence of hoarseness was 41%, found in the age group of 50-79 years. The most common cause for the hoarseness was due to vocal nodule (22%), vocal polyp (19%) and cancer of larynx (17%). Number of subjects with the vocal nodule was significantly differ from that of vocal polyp ($p = 0.01$, $p < 0.05$). No significant difference ($p > 0.05$) was found among the gender. However, the cancer of larynx was more associated with the age group 50-69 years with male dominance ($p > 0.05$). Phonaesthesia was the minor cause (1%).

Conclusions: Among the causes for the hoarseness of voice, vocal nodules were the major. Causes such as vocal cord polyps, laryngeal cancer, chronic laryngitis, were found in a descending order of prevalence.

Keywords: Hoarseness of voice, Vocal cord, Polyp, Cancer of larynx, Cysts, Laryngitis, Phonaesthesia, Laryngopharyngeal reflux

INTRODUCTION

Vocal production is a complex behavioral act involving coordination between the systems of respiration, phonation, and articulation. These are influenced by an individual's vocal technique and emotional status. The final vocal result reflects the three different but interrelated actions. Voice disorders are among the most common speech and language disorders, afflicting approximately 6% of children under 14 years of age, and 3-9% of the adult population.¹ The definitions, nomenclature and mechanisms of functional voice disorders are not clearly defined. Broadly voice disorders

are grouped into functional disorders and organic disorders. Functional group of voice disorders involves in voice abnormalities where vocal cord structure and Reinke's space morphology remain normal, and voice abnormalities are secondary to muscle tension disorders.²

Previous study reported that the vocal abuse and faulty techniques was the main factor in patients with vocal nodules.³ Epidemiology of laryngeal cancer revealed the smoking and alcoholism were the major risk factors that present in most patients.^{4,5} Vocal cord paralysis more often was due to RLN involvement in thyroid and thoracic surgeries, and some of them due to CVA. Sulcus

vocalis is often over looked and considered part of functional voice disorder as it sometimes not easily recognized by indirect laryngoscopic examination or by video laryngoscopy and required micro laryngeal examination under general anaesthesia.⁶ Voice disorders that affect adults and children has different causes with respect to different age groups. Nodules and cysts were predominant in children, functional dysphonia and reflux in adults, and presbyphonia and Reinke's edema in the elderly.⁷ Nevertheless the etiology, the presence of voice disorders with duration more than 3 weeks should be considered a warning sign of a serious underlying disorder so that an early evaluation should help us in diagnosis and thus eliminate more radical procedures like laryngectomy. Report on the various pathological causes associated with the hoarseness of voice remains fragmentary in our population. The results of such study may make awareness in clinicians to do an early diagnosis for the appropriate therapy. Therefore, this study was aimed to find the prevalence of different pathological conditions contributing to hoarseness of voice presented in a tertiary care hospital.

METHODS

Selection of subjects

Subjects who visited the department of Otorhinolaryngology of our tertiary medical care hospital with complaint of hoarseness of voice during the period between March 2014 and August 2015 were included in the study. The etiology such as vocal nodules, vocal cord polyps, vocal cord cysts, cancer of larynx, vocal cord paralysis and vocal cord oedema were evaluated by the laryngeal visualization using endoscopy. A detailed history had been taken for the social and medical contributing factors diagnosis of chronic laryngitis and cancer of larynx were confirmed by histopathologically. Vocal cord paralysis was evaluated radiologically in addition and if was not confirmed radiologically, confirmation was made by endoscopy. Subject below age 10 and above 80 years were excluded from the study. Subjects with static neurologic event like neuromuscular disease, multiple sclerosis or myasthenia gravis were also excluded from the study. Patients presented with cardiac or under medication for any other chronic illnesses concerned to lungs were excluded. The study design was approved by the Institutional Research Ethics committee.

The causes of hoarseness of voice were subjected to statistical analysis.

Statistical analysis

The statistical analysis was performed using SPSS (version 16.0). Fisher's exact test was used to find out the significant difference between the gender and various causes for hoarseness of voice. P less than 0.05 was considered as significant.

RESULTS

Ninety nine subjects of age ranges from 10-79 were enrolled in the study. The mean age was found to be 44.5 years with the male to female ratio was found to be 1:1 (Figure 1). The prevalence of 41% was found in the age group of 50-79 years (Figure 2) whereas the age group 10-29 years showed fewer incidences (24%). The distribution of various causes for the hoarseness of voice is depicted in Table 1. Among the total number of subjects, the incidence of vocal nodules associated hoarseness was the highest (22%) with female dominance (14/22). However, the association of number of male and female subjects with vocal nodules did not differ significantly among the age group studied ($p = 1; >0.05$). The incidence of vocal polyp was the second most common reason for hoarseness (19%) with male dominance (15/19). No statistically significant difference obtained between the number of male and female cases with vocal polyp among the age group studied.

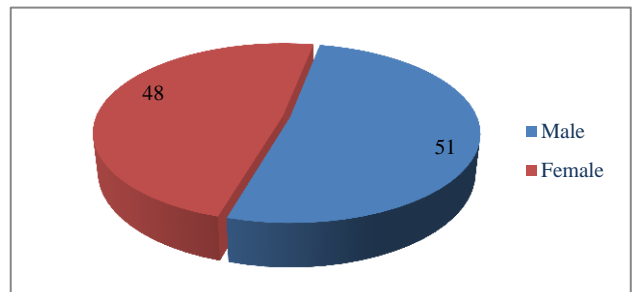


Figure 1: Distribution of gender with hoarseness.

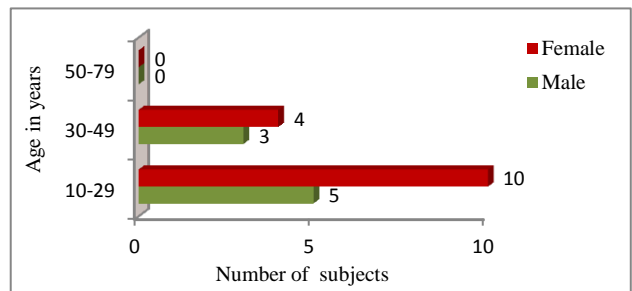


Figure 2: Distribution of age and gender with vocal nodule leading to hoarseness.

The total incidence of vocal nodule (22/99) significantly differ from that of vocal polyp (19/99) ($p = 0.01, p < 0.05$). Further, the incidence of vocal nodules and polyp in the age group 10-29 years was significantly different from that of 30-59 years ($p = 0.01, p < 0.05$). Cancer of larynx was the third most common reason for the hoarseness. The incidence was found to 17% with more male subjects that were belonging to 50-69 years group (13/17). However, no statistically significant difference obtained between the gender among any of the age groups ($p = 1.0, p > 0.05$). There were 5 cases of sulcus vocalis, 2 cases with laryngopharyngeal reflux and only 1 case of phonaesthesia.

Table 1: Distribution of pathologic causes (in number) leading to hoarseness of the voice.

Age (years)	Gender	VN	VCP	VCC	CLR	CA-LX	VCP	LPR	SV	VCE	PA
10-29 (N= 24)	Male (N=8)	5	1	-	-	-	-	-	2	-	-
	Female (N=16)	10	-	3	1	-	-	-	1	1	-
30-49 (N=34)	Male (N=18)	3	6	0	2	3	2	-	2	-	-
	Female (N=16)	4	1	5	2	-	2	-	-	2	-
50-79 (N=41)	Male (N=33)	-	8	-	6	13	4	2	-	-	-
	Female (N=8)	-	3	1	-	1	2	-	-	-	1
Total (N=99)	Male (N= 51)	8	15	0	6	16	6	2	4	-	-
	Female (N=48)	14	4	9	5	1	4	-	1	3	1

VN: vocal nodules; VCP: vocal cord polyps; VCC: vocal cord cysts; CLR: chronic laryngitis; CA-LR: cancer of larynx; VCP: vocal cord paralysis; LPR: laryngopharyngeal reflux; SV: sulcus vocalis; VCE: vocal cord oedema; PA: phonaesthesia.

DISCUSSION

Results of this study revealed that 58/99 subjects with hoarseness of voice was <49 years of age with more prevalence of 34/58 in the 30-50 years of age. Among the total subjects, male to females ratio was approximately 1:1. However, among the subjects with age <49 years, the female dominance whereas subjects above 50 years, male dominance was found. Though the preliminary epidemiologic study confirmed that voice disorders are common among the elderly (age >65 years), no significant difference in prevalence according to age in elder people was reported.^{8,9} Similarly, in this study no significant difference among the number of cases between the age group was evidenced.

Of all organic causes of hoarseness, in this study vocal nodules were found to be the most common cause. Female subjects in the younger to middle age had maximum number of vocal nodules. Vocal abuse or misuse leading to phonotrauma considered to be the cause of vocal nodules. In the initial phases it may be a functional voice disorder, which later develops an organic lesion on the vocal cords - which means vocal nodules are resultant lesions of a faulty phonatory function. Histological studies demonstrated only exudative pathology with normal epithelium.¹⁰

The other two lesions of Reinke's space exudative pathology are vocal cord polyp and Reinke's edema (vocal cord edema). The gender and age for the vocal cord polyp in our study shows a male predominance and elderly age group. The epidemiological study by García et al. found that the main factor for the vocal fold nodule was voice abuse or misuse, whereas for the polyps and edema was smoking.³ History of most of our elder male subjects revealed the etiology as tobacco smoking. Unlike vocal nodules and vocal cord edema, polyps are found to be unilateral. Reinke's edema involves both vocal cords and throughout its length. Prevalence of Reinke's edema is less compare to nodules and polyp, but a female predominance is observed. The result of this study is in agreement with previous studies.^{11,12}

Carcinoma of larynx makes a large cause of hoarseness, particularly in elderly male above the age of 50 with far less prevalence in females. Only one case of female reported in our study. Smoking and alcoholism were present in the history of all patients, including the female patient who was a smoker but not alcoholic. The history of smoking and alcoholism with the gender distribution observed in this study were also in accordance with previous studies. But the proportion of carcinoma larynx was higher in our study than the previous ones. Glottis and supraglottic tumours were more than subglottic growths which is also in agreement with previous studies by Nwaorgu et al and Cattaruzza et al.^{4,13}

The laryngeal cancer, the second most common respiratory cancer, has a positive correlation with the amount of alcohol consumption. Meta-analysis conducted in North America, Europe, Japan and Korea revealed that the multivariate relative risks for laryngeal cancer were about 2 and 4 respectively in 50 (~4 drinks) and 100 g/day alcohol drinkers when compared to nondrinkers.⁵ Therefore, majority of laryngeal cancers could be prevented to great extent by eliminating smoking of tobacco as well as reducing the consumption of alcohol.⁴ Occupational exposures to asbestos and coal dust, intake of salt-preserved meat and fish were also reported as etiological factors.¹⁴

Vocal cord paralysis had significant proportion of contribution to hoarseness. In our study thyroid surgery was most common cause of injury. One patient had papillary carcinoma of thyroid. Three patients had bilateral paralysis, all of them had vocal cord in paramedian position requiring tracheostomy. Of them, one had tuberculous meningitis and another had cerebrovascular accident. Two cases were idiopathic. Unilateral vocal cord palsies were more on left side which is like in any other previous studies.^{15,16} Sulcus vocalis is an entity not easily recognized on routine evaluation and hence wrongly named functional voice disorder and sent for voice therapy. Our series had 5% of sulcus vocalis all of them diagnosed by videostroboscopy and micro laryngeal examination under general anaesthesia.⁶

The diagnoses of hoarseness by laryngoscopy and treatment such as voice therapy, vocal cord surgery and drug therapy for appropriate groups of patients with hoarseness were well documented.¹⁷ While the voice therapy was found often successful in the functional and organic vocal disturbances, surgery on the vocal cords was recommended to treat tumors. Despite the various therapeutic interventions described for treating laryngeal cancer a protective effect with the intake of fruits, dark green and yellow vegetables and garlic was observed.¹⁴

Since, an early appropriate treatment especially in patients with cancer of larynx is emphasized, the epidemiological study on the prevalence of pathological conditions associated with the hoarseness of voice will be welcome addition to the diagnosis. The limited number of patients and the short duration are the major limitations of this study. Hence, a multicenter study including a wide population is warranted.

CONCLUSION

Among the various factors that cause the hoarseness of voice vocal nodules was the major one and others such as vocal cord polyps, laryngeal cancer, chronic laryngitis, were found in a descending order of prevalence. Alcoholism and smoking were found to be the major risk factors for the laryngeal cancer. Hence, a social awareness is warranted to prevent the incidence.

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