

Original Research Article

Hoarseness of voice-prospective study: etiology, evaluation and treatment

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ABSTRACT

Background: Despite advances in medical technologies and improvement in diagnostic armamentarium in laryngology about 20% of cases remain undiagnosed until suspension laryngoscopy. The study was undertaken to identify etiological factors, type of lesions, age and sex distribution, sites of involvement, efficacy of different diagnostic and treatment modalities.

Methods: A prospective study of 45 cases of benign vocal cords lesions was carried out. Patients with hoarseness of voice for >3 weeks were investigated and treated with conservative management and surgery.

Results: Hoarseness of voice presented within 6 months after onset of symptom. The common age of presentation was between 21 to 40 years, with male:female ratio of 1.25:1. Vocal abuse, laryngopharyngeal reflux disease (LPRD) and smoking, were the most common etiological factors. Housewives were most common group. Wide angled 70° teleryngoscopy showed 80% accuracy rate. Suspension laryngoscopy showed 100% accuracy rate. Involvements of both the vocal cords were more common, vocal cord nodule being the commonest. 70% responded very well to conservative management.

Conclusions: Dysphonia is the most common presenting symptom having vocal cord lesion, non-professional voice user young females are most common sufferers with delay of 6 months in presenting to a laryngologist. Vocal abuse and LPRD are most common aetiologies. Teleryngoscopy can diagnose up to 80% of them which is cost effective Outpatient Department procedure. 70% of them respond well to medical therapy and voice training. Identification of causative factor and management of them is mandatory for treatment and prevention of recurrence.

Keywords: Hoarseness, Voice, Vocal, Polyp, Nodule, Benign

INTRODUCTION

The human voice is an extraordinary attainment which is capable of conveying not only complex thought but subtle emotions too. Production of voice is a complex mechanism. It is produced from larynx, also known as “voice box” as it houses the vocal folds which constitute the vibrator that generates the voice during speaking. The vocal folds produce tone that becomes modified by pharynx, palate, tongue and lips to generate the individual sounds of speech. Larynx must operate in close

synchrony with other parts of speech production apparatus if intelligible speech is to be produced.¹

Hoarseness or dysphonia is a common presentation of patients having laryngeal pathology to a laryngologist, but not much work has been carried out in this field and the role of predisposing factors for hoarseness is yet to be established. Although the voice is not visible to eyes during speech production, its absence or malfunction is obvious.¹

The etiological classification of hoarseness has been in two broad categories.² First category was organic, which was anything regarding organ and second category was functional, which was those resulting from voice abuse and misuse.

It is important to establish specific vocal needs in order to successfully treat the patient.

Correct diagnosis is essential, followed by appropriate treatment. This is not only due to the pathological condition per se, but also because surgery may cause dysphonia.

Objectives

Detection of the causes of dysphonia and role of common predisposing factors in various conditions, methods of evaluation and management was the purpose of this study.

METHODS

This is a prospective study of 45 cases of benign vocal cords lesions carried out at our institute with mean follow up of 3 months.

Inclusion criteria

Patients with hoarseness of voice for more than three weeks and having provisional diagnosis of benign vocal cord lesions and who gave written consent to be included in the study.

Exclusion criteria

Patients whose hoarseness of voice was secondary to other causes like malignancy, vocal cord palsy, laryngeal trauma, puberphonia, functional dysphonia.

Prerequisite

Institutional review board permission was obtained from our institute and informed, voluntary, written consent was taken from all participants.

Protocol

Patients with change of voice for more than three weeks presented to our ENT OPD were posted for detailed history taking especially duration of symptoms, smoking, tobacco chewing, alcohol intake, occupation, laryngopharyngeal reflux disease (LPRD) etc. They were examined with regard to indirect laryngoscopy, wide angled telescopic examination; suspension micro laryngoscopy examination. Diagnosis was noted and managed according to the pathology.

Patients were treated initially with conservative treatment with voice therapy and medical treatment. Medical

treatment included proton pump inhibitor and anti-allergic medications. Surgical treatment was given to those who did not respond to conservative treatment and those in which direct surgery was indicated. All patients treated surgically were given voice therapy and pharmacological treatment postoperatively too, for 2 to 3 weeks.

All data were entered in Microsoft Excel and analyzed using OpenEPI software.

RESULTS

Age and gender

Majority of our patients were in 21 to 40 years age group followed by >40 years age group. The youngest patient was 5 year, the oldest 66 year with mean age of presentation 36 yrs.

Male predominance was observed with male to female ratio of 1.25:1.

Table 1: Number of cases according to age and gender.

Age (in years)	Female	Male	Total
<20	1	2	3
21-40	16	13	29
>40	3	10	13
Total	20	25	45

Table 2: Number of cases according to occupation.

Occupation	No. of cases	%
House wife	16	35.55
Mill worker	14	31.11
Student	4	8.88
Teacher	2	4.44
Shopkeeper	1	2.22
Speaker	1	2.22
Jail	1	2.22
Electrician	1	2.22
Anganwadi workers	1	2.22
Pandit	1	2.22
Supervisor	1	2.22
Retired	1	2.22
Child	1	2.22
Total	45	100.0

Habits

History of voice abuse was present in 71% cases with mean duration of 13.15 years. 56% cases had history of LPRD with a mean duration of 3.32 years. 35.56% cases had history of smoking with mean duration of 26.18 years, 26.67% cases had habit of alcohol intake with mean duration of 26.66 years and 20% had habit of tobacco chewing with mean duration of 17.66 years.

Table 3: Habit versus vocal cord lesion.

Type of lesions	Smoking			Alcohol			Tobacco chewing			LPRD			Vocal abuse		
	No. of cases	Yates corrected chi square	P value (2-tail)	No. of cases	Yates corrected chi square	P value (2-tail)	No. of cases	Yates corrected chi square	P value (2-tail)	No. of cases	Yates corrected chi square	P value (2-tail)	No. of cases	Yates Corrected chi square	P value (2-tail)
Vocal nodule	3	2.671	0.1022	1	4.448	0.0349	3	0.4547	0.5001	8	0.3415	0.5590	17	6.3410	0.0118
Reinke's oedema	3	3.053	0.0806	2	1.264	0.2618	4	0.0677	0.7947	7	0.1820	0.6697	8	0.2337	0.6288
Vocal polyp	6	6.694	0.0096	6	11.42	0.0007	0	0.8564	0.3547	6	0.1416	0.7077	4	0.188	0.6646
Granuloma	1	0.1018	0.7497	0	0.00297	0.9565	1	0.8403	0.3593	1	0.3205	0.5713	1	0.0154	0.9012
Papilloma	1	0.2927	0.5885	1	0.1644	0.6852	0	0.8403	0.3593	0	0.0858	0.7697	1	0.6973	0.4037
Vocal keratosis	1	Undefined	< 0.000	1	Undefined	< 0.000	1	0.5753	0.4482	1	0.0128	0.91	1	Undefined	< 0.000
Vocal cyst	0	0.09313	0.7602	1	0.2847	0.5936	0	0.5753	0.4482	1	0.0128	0.91	0	0.2219	0.6376
Web	0	Undefined	< 0.000	0	0.2847	0.5936	0	0.5753	0.4482	0	0	< 0.000	0	0.2219	0.6376
Myxoma	1	0.09313	0.7602	0	0.2847	0.5936	0	0.5753	0.4482	1	0.0128	0.91	0	0.2219	0.6376

Table 4: Number of cases according to duration of hoarseness.

Duration	Number of cases	Percentage (%)
< 6 months	31	68.89
7-12 months	5	11.11
>12 months	9	20.0
Total	45	100.0

Symptoms

All patients presented with hoarseness of voice ranging from 1 month to 3 years. 68.89% presented within 6

months of symptom followed by, >1 year (20.0%), 7 to 12 months (11.11%).

Diagnostic modality

Diagnosis by telaryngoscopy using 70° Hopkin's wide angle telescope was done in (36)80% cases. We did suspension laryngoscopy in 15 (33.3%) cases

Laterality

On analyzing the laterality, we observed that lesions were more common on both vocal cords, 25(55.56%) and unilateral 20 (44.44%) cases.

Table 5: Type of lesion with respect to gender and laterality was as mentioned.

Type of lesion	Female	Male	Unilateral	Bilateral	Percent out of total 45 cases (%)	Number out of 45 cases
Vocal nodule	12	5	3	14	37.78	17
Reinke's oedema	6	7	3	10	28.89	13
Vocal polyp	1	6	7	0	15.56	7
Granuloma	0	2	2	0	4.44	2
Papilloma	1	1	2	0	4.44	2
Vocal keratosis	0	1	1	0	2.22	1
Vocal cyst	0	1	1	0	2.22	1
Web	0	1	0	1	2.22	1
Myxoma	0	1	1	0	2.22	1
Total	20	25	20	25	100.0	45

Management

41 patients were treated initially with conservative treatment. One case of vocal cord cyst, 2 cases of laryngeal papilloma and one case of myxoma of vocal cord underwent direct surgical excision. Two cases of vocal nodule, four cases of vocal polyp and two cases of Reinke's oedema did not respond to conservative treatment, so were excised surgically.

DISCUSSION

Hoarseness of voice is the most common symptom presenting to laryngologist, its aetiology varies from most benign to very malignant lesion requiring due attention of laryngologist. Influence of voice disorder varies from personal, social, professional and emotional aspect of individual.

In our study, majority patients were in 21 to 40 years (64.44%) age group, followed by >40 years (28.88%) age group. Our observation is supported by Ghosh et al, Batra et al and Baitha et al.²⁻⁴ who reported the incidence in the age group of 20-50 years to be 66%, 70% and 61.81% respectively. It is known that individuals in younger age group are more ambitious, active and use their vocal skills maximally.

Male: female ratio of 1.25: 1 was observed in our study. Our finding is in confirmation with Banjara et al (1.9:1), Baitha et al (2:1) and Khurshid et al (1.37:1).⁴⁻⁶ Male preponderance was observed by Ghosh et al, 56% male and 46% females.³

The highest incidence was seen in housewives (35.55%), followed by mill workers (31.11%). These findings are in confirmation with Ghosh et al (29%), Chopra et al (25.3%) and Khurshid et al (46%).^{3,6,7} The system of joint families and the large number of children in each family probably accounts for the common occurrence of glottis lesions like nodules and polyps in young women.

We found that voice abuse (71%), LPR (55.56%), smoking (35.56%) were most common predisposing factors. All 17 cases of vocal nodule had history of vocal abuse (p=0.0118). One patient of vocal keratosis had vocal abuse (p≤0.000).

LPRD was the second most common aetiological factor 25/45 (55%) cases, the commonest being vocal nodules 8/17 (p=0.3415).

Majority of our patients were chain smokers for mean duration of 13.15 years. Vocal polyp was most common lesion 6/7 (85%) among smokers (p=0.0096).

Among alcoholics we observed that vocal polyps 6/7 ($p=0.0007$) were more prevalent. It is difficult to attribute either smoking or alcohol in isolation as aetiological factor as 26.66% of our patients had both habits together.

Voice abuse and smoking was associated with 74% and 83% cases respectively, in the study of Goswami et al, 30% and 82.22% in study of Banjara et al and 40% and 19% cases in the study of Khurshid et al.^{5,6,8} Kuhn et al and Koufman et al observed 63% and 43% cases were associated with h/o LPRD respectively.^{9,10}

Hoarseness of voice was the most common presenting complaint which is similar to other study of Banjara et al, Baitha et al.^{4,5}

Majority of patients 68.89% presented within 6 month of symptom, followed by >1 year (20.0%), 7-12 months (11.11%). Chopra et al and Khurshid et al have noted 68.6% and 68% patients with duration of hoarseness of less than one year respectively.^{6,7}

We had 25(55.56%) cases as bilateral and 20 (44.44%) as unilateral involvement of vocal cords with a ratio of unilateral: bilateral 1:1.8 the same reported by Ghosh et al as 5:4.³ The most common bilateral lesion in our study was Vocal nodule (31.11%) followed by Reinke's oedema (22.22%) with a ratio of 1:4.7 and 1:3.3 respectively. Ghosh et al reported ratio of unilateral: bilateral for vocal nodule as 1:2 and for vocal polyp as 5:1.³

Diagnosis by indirect laryngoscopy was possible in 22.22% cases. There were various reasons for inability to diagnose by indirect laryngoscopy e.g. elongated epiglottis, anteriorly placed larynx, hypersensitive gag reflex, anxious and uncooperative patient, large tongue etc.

Diagnosis by telelaryngoscopy was possible in 80% cases. Telelaryngoscopy is simple, quick and easy, making thorough examination of larynx possible. Difficulties frequently encountered while performing an indirect laryngoscopy were easily overcome by this procedure. Problem faced during telelaryngoscopy were difficulty in passage, excessive coughing, and anxiety. Batra et al and Jose et al were able to diagnose in 61% and 64.5% cases respectively.^{2,11}

We did suspension laryngoscopy in 15 cases. It gives better visualization with magnification and with 100% accuracy. Jose et al stated that more accurate diagnosis can be achieved by suspension laryngoscopy.¹¹

Most common type of lesion was vocal nodule (37.78%) followed by Reinke's Oedema (28.89%), vocal polyp (15.56%), papilloma (4.44%), granuloma (4.44%). Chopra et al, Baitha et al, Ghosh et al observed that vocal nodule was most common type of lesion in 30%, 50% and 30% cases respectively.^{3,4,7}

15 cases out of 17 of vocal nodule were treated with conservative treatment. The treatment of choice is voice therapy. Only infrequently is microsurgical excision necessary in adults. In over 80% of patients the voice is restored to normal by voice therapy alone. Recurrence rates of 30% after voice therapy and 13% after phonosurgery have been reported by Reiter et al.¹²

Johns et al suggested that benign vocal fold lesions arise from phonatory trauma and vocal misuse is the culprit.¹³ Changes in the molecular characteristics of the lamina propria may be the cause. Hence voice therapy in form of behaviour modification is effective. McCrory et al observed that post-therapy over 80% of patients presented with either a normal voice quality or a mild degree of Dysphonia.¹⁴ Kuhn et al observed prevalence of pharyngeal acid reflux is significantly higher in patients with vocal cord nodules compared with normal controls and suggested a contributory role for gastroesophagopharyngeal acid reflux in the pathogenesis of some vocal cord nodules.⁵ Karkos et al reported allergic cause to be included in etiopathogenesis of benign vocal cord lesions, so antihistaminic were given.¹⁵

In our study 4 cases of vocal polyp were treated with micro laryngeal surgery, other 3 cases got resolved with conservative treatment. Men are frequently affected (55%) as reported by Reiter R.¹², we found 85% (6/7) male affected. The treatment of choice for polyps is phonosurgical excision at the base. Cysts must be removed in toto with the capsule.¹² Stajner-Katusic et al showed significant improvement in the variables investigated and improved patient's satisfaction with their vocal health after the surgery.¹⁶ Srirompong et al reported small vocal polyp that completely resolved using conservative treatment.¹⁷ Not every case of polyp requires surgical removal. Nakagawa et al stated at least 9.7% of vocal fold polyps might resolve without surgery.¹⁸ Conservative treatment should be considered as an option for selected patients with smaller and more recent-onset polyps.

2 cases (15%) of Reinke's oedema were treated with micro laryngeal surgical treatment as they did not respond to conservative management. Reinke oedema is caused predominantly by tobacco, smoke and mainly affects women (80%) between the ages of 40 and 60 years. Phonosurgical removal of the oedema results in improvement of the pitch, resonance, and also resilience of the voice.¹² Chopra et al suggested that the treatment of Reinke's oedema consists of a combination of surgery and vocal rehabilitation.⁷

2 cases of papilloma were treated with micro laryngeal surgery. Hoarseness is the cardinal symptom of recurrent adult papilloma, the occurrence of which peaks between the ages of 20 and 40 years. Papilloma are excised microsurgically.¹⁹ There is insufficient evidence to support adjuvant antiviral treatment with intralesional administration of cidofovir, which is currently licensed

only for the treatment of cytomegalovirus (CMV) retinitis in AIDS patients.²⁰

We had 1 case of myxoma which was treated with micro laryngeal surgery. Nakamura et al reported that Myxoma should be surgically excised with surrounding normal tissue.²¹ Although no local recurrence has been detected, as Myxoma is characterized by a slow growth rate, long-term follow-up is needed in this case.

CONCLUSION

Benign lesions of vocal cords are more prevalent among voice abuser, females' especially non-professional voice users. LPRD is the second most common aetiological factor. Smoking along with alcohol too is high risk factors for benign vocal cord lesions. Identification of causative factor and management of them is mandatory for treatment and prevention of recurrence.

70-degree wide angle teleryngoscopy is most useful OPD tool which diagnoses with 80% accuracy. One should be ready for the surprises in 20% cases.

70% of the benign lesions respond very well to speech therapy and proton pump inhibitors (PPI) therapy. Maintenance of vocal hygiene and use of recent technology by professional voice users to minimise strain on voice box goes a long way to keep recurrences in check

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