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A Clinicopathological Study of Benign Vocal Cord Lesions

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Abstract: ***Background: Benign vocal lesions are non-malignant growths of abnormal tissue on the vocal cords. Their significance lies in the importance of its function in speaking and the contribution of the voice to one's identity. Often, voice disorders cause a communication handicap, especially in professionals like teachers. Methods: This study was done over a period of two years in 40 patients in the age group of 15-70 years of either sex, with clinical diagnosis of benign lesion of vocal cords. The patients were preoperatively assessed using VHI-10 score (Voice Handicap Index). After routine investigations and consent, the patients underwent surgery under GA to excise the lesion on vocal fold, using a suspension video laryngoscope. The excised tissue was sent for histopathological evaluation (HPE). Voice handicap was evaluated through postoperative VHI-10. The data was compiled and statistically assessed. Results: The association of risk factors i.e. drinking of tea/coffee, smoking and alcohol drinking were found to be statistically insignificant (p>0.01). The difference between pre and post-op VHI-10 score was highly significant (p<0.01). Conclusions: VHI-10 score was found to be a useful tool to assess the improvement after surgery. Avoiding risk factors like tea/coffee, smoking and alcohol drinking can significantly reduce the incidence of the benign vocal cord lesions.***

Keywords: Benign, vocal cord, histopathology

1. Introduction

The human voice is a potent and fundamental part of who we are and how we express ourselves, we use our voices to convey emotions like to comfort, cajole, argue, order, persuade and soothe. Our voices have character, personality, even soul; they give an indication of our mood, our health, our level of fatigue. We make assumptions and build stereotypes based on the sound of others' voices. Politicians, actors and singers undertake years of voice coaching to train their voices to sound a particular way, to promote a particular message or image.

Only vertebrates with their thoraco-abdominal diaphragms are able to use their larynges as flutter valves; altering air flow from their respiratory bellows to produce sound. The production of sound for communication of complex information is limited to the highest orders. Thus, only in humans is the larynx significantly altered for voice production. The larynx serves three basic functions in humans. In order of functional priority they are;

- Protective
- Respiratory and
- Phonatory.[1]

The term vocal cord lesion refers to a group of noncancerous (benign), abnormal growths (lesions) within or along the covering of the vocal cord. More than 50% of patients seeking medical attention because of voice change have a benign mucosal disorder. When a patient is observed to have a nodular swelling, i.e. a localized swelling on the membranous portion of one or both the vocal cords, it is important to consider the differential diagnosis. Accurate diagnosis can be challenging and depends on a detailed history, and to some extent objective measures. Even then, a working diagnosis should be made and a decision needs to be made as to whether to try an empirical trial of therapy or proceed to a diagnostic microlaryngoscopy.[2,3,4]

Benign vocal fold lesions that we otorhinolaryngologists deal in the current scenario are vocal nodules, vocal polyps, intrachordal cysts, Reinke's edema, laryngopharyngial reflux disease, contact ulcers, laryngeal webbing and papillomatosis.

Benign, non-neoplastic lesions make up the majority of vocal fold lesions. Most of the lesions are associated with vibratory injury of the vocal cords. But, multiple factors can also lead to the development of these lesions. The most common ones include extroverts with a talkative personality and occupations with high voice demands.[5]

Though vocal nodule, also called singer's nodule, screamer's nodule, is not only associated with singers, and screaming people, but also associated with other factors that can potentiate vibratory injury like smoking, acid reflux, uncontrolled allergies, and infections. However, singers, who tend to vary their pitch and tone while singing in order to demonstrate their capability and uniqueness, lecturers, who are used to continuous speaking for hours are the commonest affected people.

Hoarseness is a common presentation. It could be the initial or the only symptom of an underlying malignancy, and thus requires a detailed examination. Ideally the term "Hoarseness" refers to laryngeal dysfunction caused by abnormal vocal cord

vibration.[6] 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 voice.[7] Cohen (2011), found 11% of patients with dysphonia had benign vocal pathology listed as a diagnosis.[8]

As benign vocal cord lesions impair communication and have important effect on public health, it was proposed to assess clinicopathologic relation of benign lesions of vocal cords to identify predisposing factors and manage them correctly.

2. Material and Method

Retrospective study was conducted in the department of ENT PGIMS, Rohtak, on 40 patients of either sex, in the age group of 15-70 years over a period of 2 years. Patients presenting with hoarseness were clinically examined and patients found to have benign lesions on indirect laryngoscopy were selected for the study. All laryngeal cancers and vocal cord palsies were excluded from the study.

In our voice clinic, patients were preoperatively assessed using VHI-10 score (Voice Handicap Index, Appendix-1). After taking detailed history, routine investigations were done and consent was taken. Patients underwent surgery under GA to excise the lesion on vocal fold, using a suspension video laryngoscope (Fig 1, 2, 3). The excised tissue was sent for histopathological evaluation (HPE).

After the surgery patient was advised strict voice rest for first two days. Oral antibiotics (for 5 days), anti-histaminics (for seven days) and proton pump inhibitors (for two months) were administered post operatively. Patient was advised steam inhalation and speech therapy at the time of discharge and was kept on regular follow up. Voice handicap was evaluated through postoperative VHI-10 after a period of 4 weeks. The data was compiled in the master chart and results were statistically assessed by using paired t-test, chi-square test, ANOVA and by calculating the value of cronbach alpha.

Figure 1: Performing Endoscopic Laryngeal Surgery

Figure 2: Right Vocal Cord Polyp

Figure 3: Monitor showing ELS in progress.

[Appendix-1]

Voice Handicap Index (VHI-10)

Following are the statements that many people have used to describe their voices and effects of their voices on their lives. Circle the response that indicates how frequently you have the same experience.

0 = never 1 = almost never 2 = sometimes 3 = almost always 4 = always1.

1. My voice makes it difficult for people to hear me. 0 1 2 3 4
2. I run out of air when I talk. 0 1 2 3 4
3. People have difficulty understanding me in a noisy room. 0 1 2 3 4
4. The sound of my voice varies throughout the day. 0 1 2 3 4
5. My family has difficulty hearing me when I call them 0 1 2 3 4
6. I use the phone less often than I would like to. 0 1 2 3 4
7. I'm tense when talking to others because of my voice. 0 1 2 3 4
8. I tend to avoid groups of people because of my voice. 0 1 2 3 4
9. People seem irritated with my voice. 0 1 2 3 4
10. People ask, "What's wrong with your voice?" 0 1 2 3 4

3. Results

Total of 40 cases were evaluated retrospectively. Out of 40, males were 25 and females 15.

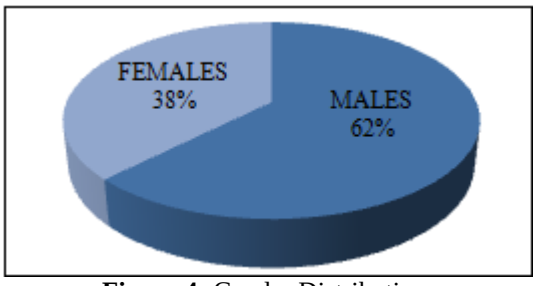

Figure 4: Gender Distribution

Out of the 40 cases no of polyps were 21, nodules 15 and cysts 4.

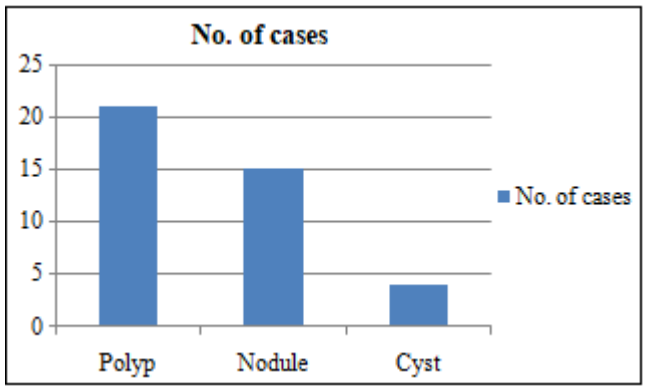

Figure 5: Case distribution

Mean duration of hoarseness for polyps were 10.76 ± 6.87 months, nodules 9.41 ± 6.31 months and cysts 12.0 ± 6 months. The duration of hoarseness association with type of benign mucosal vocal cord lesion is non-significant as p-value (0.778) is >.001 according to ANOVA test.

Table 1: Mean duration of hoarseness

Benign Lesion of the vocal cord	Mean +/- SD (months)
Polyp	10.76 +/- 6.87
Nodule	9.41 +/- 6.31
Cyst	12.0 +/- 6.0

Association of tea, smoking and alcohol with occurrence of benign vocal cord lesions was also evaluated and was not significant as p-value was found to be >.001 on application of Chi-Square test.

Table 2: Occurrence of risk factors

Benign lesions of vocal cord	Smoking		Alcohol		Tea/Coffee	
	No	%	No	%	No	%
Polyp	10	71.4	15	65.2	21	65.6
Nodule	3	21.4	6	26.1	8	25
Cyst	1	7.1	2	8.7	3	9.4

Concordance between DL and HPE on calculating Cronbach alpha was found to be 89.5% . Mean pre-op VHI was 23.17 ± 1.61and post-op VHI was 11.72 ± 1.63. The difference was found to be significant as p-value according to paired t-test came out to be <0.001.

Table 3: Assessment of VHI score pre and post-operatively

Benign lesion of Vocal cord	Mean Preop VHI-10	Mean postop VHI-10	P-value (on applying paired t-test)
Polyp	23.44 ± 1.70	12.12 ± 1.71	<.001
Nodule	22.58 ± 1.37	10.83 ± 1.02	<.001
Cyst	23.33 ± 1.52	12.0 ± 2.0	0.006

4. Discussion

Phonotrauma is largely responsible for the formation of the benign laryngeal lesions more frequently seen in daily practice[9,10]. The clinical diagnosis of these lesions is usually difficult, generating many questions vis-à-vis the ultimate ENT diagnosis and speech therapy treatment. Usually, the lesions unresponsive to speech therapy are surgically removed and sent to pathology to define the type of lesion, with the aim of reaching the proper diagnosis. However, even from the standpoint of pathology, the differentiation of these lesions, especially among nodules and polyps, does not always occur, and it is often misdiagnosed as a nonspecific inflammatory process.

New and Erich have published in the Mayo Clinic, the experiences of 722 patients presenting with benign laryngeal pathology. Since then, some authors have revised the concept, classifying vocal fold nodules, polyps, cyst and nonspecific granulomas to be mucosal reactive inflammatory disorders and therefore non-neoplastic in nature.[11]

Hegde et al.; and Singhal et al.; in their study reported maximum number of the patient in the age group of 20 to 40 years.[12,13] Most patients (more than half) with voice complaints are known to have benign vocal fold lesions.[14] Brodnitz reported 45% of nodules, polyps or polypoidal thickenings. Kleinsasser also reported similar findings.[15,16] Chandra et al. reported an incidence of 28.57% and 24%, of vocal nodules and vocal polyps respectively in their study.[17] Kotby et al. reported similar results.[18] In studies by Kambic et al. and Chopra et al., the incidence varied from 68.3 to 16%.[19,20]

To assess voice handicap several scales have been developed e.g. VHI (Voice Handicap Index), V-RQOL (Voice related quality of life), VAPP (Voice activity and participation profile), VOS (The Voice Outcome Survey).

The patient based voice specific outcome measures can potentially provide more information than the biological and physiological variables that are associated with voice production, functional abilities and quality of life. VHI-10 is a powerful representation of the VHI that takes less time for the patient to complete, without loss of validity, the measurement properties of VHI-10 have been validated in other languages as well, which has rendered the tool essential to better understanding the impact of dysphonia in several life areas.[21,22]

In our study we evaluated 40 patients with benign lesions of vocal cord, out of which males were 25 and females 15, in the age group of 15-70 years. Total cases of polyps were 21, nodules 15 and cysts were 4. Mean duration of hoarseness was not found to be significantly associated with the occurrence of different types of benign lesions of the vocal cord. Association of risk factors like tea/coffee, smoking and alcohol was not found to be significant among patients with benign lesions of vocal cords.

DL and HPE findings were found to be significantly correlated with each other. The cronbach alpha value gave concordance of 89.5%. VHI-10 score was used to assess the voice handicap. Preoperative and 4 weeks postoperative VHI score was calculated. The results were statistically analysed using paired t-test and was found to be significant i.e p value <0.001.

5. Conclusion

The benign lesions of vocal cords produces symptoms which can vary from hoarseness to stridor, can affect social functioning and work performance, and as a result have a significant emotional impact. Speech therapy following microlaryngeal surgery forms an essential part of treatment, to avoid recurrence. VHI-10 scale was found to be a useful and convenient tool in measuring patient voice handicap and to see improvement after surgery.

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