Clinicopathological Spectrum of Benign Lesions of Larynx: A Prospective Observational Study

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ABSTRACT

Introduction

Every human voice is unique because of anatomical, physiological, cultural, sociolinguistic and behavioural factors. Any disorder interfering with approximation, tension or vibration of vocal cord will change the quality, pitch and loudness of voice. The objective was to study the clinical profile, histopathological patterns and treatment options of benign lesions of the larynx.

Materials and Methods

A prospective observational study was conducted for 80 patients' clinically diagnosed as benign lesion of larynx. The inflammatory lesions were treated by conservative medical and speech therapy. Surgical intervention was done for neoplastic lesions of vocal cord.

Results

In our study, majority of patients 28 (35%) were between 21-30 years of age. Male preponderance was seen. Voice abuse in 53 cases was the common predisposing factor. The most frequent symptom Hoarseness or voice change together constituted 66 (82.5%), followed by vocal fatigue. Vocal cord polyp was the most frequent benign lesion in 17 (21.25%) patients, followed by vocal cord nodule in 14, chronic laryngitis in 8 and vocal cord palsy in 7 patients. Microlaryngeal surgery was done in 49 patients.

Conclusion

The vocal cord polyp is the commonest benign laryngeal lesions producing hoarseness in voice as the chief complaint. There was a high correlation between clinical and pathological diagnosis of benign lesions of larynx.

Keywords

Larynx; Benign Lesion; Hoarseness of Voice; Vocal Cord Polyp; Microlaryngeal Surgery

Larynx is an eloquent organ. The primary function of the larynx is to provide protection to the lower airway. It secondarily evolved to serve as a vocal generator of sound. The larynx lodges the vocal cords and ligaments which on vibration produces voice. Any disease or disorder which affects vibration will produce phonatory and laryngeal dysfunction.

Larynx can be involved with benign lesions of various causes such as infective, inflammatory, traumatic, neurogenic, congenital, functional and benign neoplasms.[1] A benign lesion of the larynx was defined by Hollinger as any mass of tissue in the larynx which does not present characteristics of malignancy.[2] The benign laryngeal lesions occur in a ratio of 2:3 to the malignant lesions. The common benign lesions of vocal cord are singer's nodule, polyps, papilloma, polypoidal degeneration and cysts. Others are sulcus vocalis, mucosal bridge, intracordal cysts and anterior webs. Some of these tumors may even undergo malignant changes like papilloma (4%), granular cell tumor (2%).[3,4]

Smoking, infection, voice abuse seems to be the most common causative factors of laryngeal lesions.[5] Inspite of the various etiologies, when diagnosed early and treated properly these lesions can have remarkable recovery. The

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aim of the present study was to study the clinical profile and histopathological patterns and treatment options of benign lesions of the larynx.

Materials and Methods

Study design: A prospective observational study was conducted for the patients came to the department of ENT and HNS with benign lesions of larynx. The study was done from Jan 2021 to March 2022. The sample size of the study was 80 cases.

Ethical clearance was obtained from Institutional ethical committee prior to the study. A written informed consent was obtained from the patients before their participation in the study.

Methodology: An observational study of 80 patients clinically diagnosed as cases of benign lesion of larynx was conducted in the department of Ear, Nose and Throat (ENT) at our tertiary care hospital. The malignant lesion of vocal cord and speech defect due to CNS lesions were excluded. Detailed routine ear, nose and throat examination of the patient with indirect laryngoscopy or video laryngoscopy was done. Diagnostic hematological, radiological and laryngoscopic investigations were done. This study describes the clinical profile and spectrum of diseases prevailing in this region. In the present study, the benign lesions are divided as inflammatory and neoplastic lesions, the inflammatory lesions were treated by conservative medical and speech therapy. Surgical intervention was done for neoplastic lesions of vocal cord.

Procedure: Microlaryngeal surgery (MLS)[6]: Patients were admitted a day before surgery after taking informed written consent. Surgery, to excise the lesion on vocal cord, was performed under general anaesthesia using a suspension video laryngoscope. The general surgical sequence was: general anaesthesia was given. The patient was placed in direct laryngoscopy position (Boyce position).The laryngoscope was placed and stabilised so that the glottis was clearly visualized. Under microscopic vision, the lesion was excised with cold steel conventional dissection i.e. truncation surgery was done. Haemostasis was achieved and laryngoscope was withdrawn after spraying the larynx with 10% xylocaine. There was no serious complication during and after microlaryngoscopic surgery. Excised lesion of vocal folds was preserved in 10% formalin and was sent for histopathological examination.

Post-operative Patients were advised strict voice rest for first 2 days post operatively. Oral antibiotics, anti-histaminics and proton pump inhibitors were prescribed. Patients were also advised steam inhalation and speech therapy for 3 months at the time of discharge and were kept on regular follow up. The preoperative and post operatively 4 weeks assessment of benign lesions of vocal folds for voice handicap was assessed by VHI-10 score. (Voice Handicap Index-VHI).[7]

Statistical Analysis: Data were pooled and analysed using SPSS v20 software. Data is compiled and described in tabular format.

Results

In the present study, majority of patients 28 (35%) were between 21-30 years of age, followed by 23 (28.75%) patients in 31-40 years of age. Youngest age of the patient was 8 years of age.

Males 44 (55%) were more commonly affected than females 36 (45%). Among the occupation, manual labourers (42.5%) were more affected by benign lesions of larynx followed by housewife (20%), teachers (17.5%) and students (17.5%).

Among the risk factors involved, voice abuse in 53 (66%) cases was found to be commonest habit as a predisposing factor, followed by smoking and alcohol in 26 (59%) cases in male population. Acid reflux was found in 18 (22%) cases.

Among the symptom distribution, hoarseness or voice change together constituted 66 (82.5%), was the most frequent symptom, followed by vocal fatigue in 14 (17%) patients. Reduced voice range was seen in 8 (10%) cases, foreign body sensation in 6 (7.5%) cases, aphonia in 3 (3.7%) and stridor in 1 (1.25%) of patients. Symptom distribution is shown in Table I.

In the present study, among the benign lesions of larynx, vocal cord polyp was the most frequently seen benign

lesion in 17 (21.25%) patients, next most common lesion was vocal cord nodule in 14 (17.5%) patients, followed by chronic laryngitis 8 (10%) and vocal cord palsy in 7 (8.75%) patients. Disease distribution is shown in Table II. The histopathological diagnosis of various lesions is described in Table III. Images showing histopathological sections of: a) vocal nodule, b) papilloma, c) laryngeal tuberculosis and d) Reinke's edema is shown in figure 1. All histopathological sections were stained with hematoxylin and eosin stain and observed under 20x magnification.

In the present study, management in the form of conservative treatment was done with medical therapy and speech therapy in 26 patients, anti-tubercular drugs in 2 patients. Among the surgical treatment, microlaryngeal surgery was done in 49 patients, 2 patients underwent open surgery and 1 patient needed stricture release procedure. Post treatment, complete recovery was seen in 71 (88.75%) patients, 7 (8.75%) patients had partial recovery of symptoms and recurrence of lesion was seen in 2 patients.

Post operatively VHI-10 score was recorded to determine improvement in voice of patients. Preoperatively mean VHI-10 was 23.60 ± 2.15 and it was 10.26 ± 1.42 postoperatively. Mean difference between preoperative and postoperative VHI-10 score was 10.84, depicting significant improvement in voice of the patients. The difference between pre and post-op VHI-10 was found to be statistically significant ($p < 0.01$)

Table I: Symptoms Distribution of Benign Lesions of larynx.

SL. NO	SYMPTOMS	NO. OF CASES (%)
1	Hoarseness or voice change	66 (82.5%)
2	Vocal fatigue	14 (17%)
3	Reduced voice range	8 (10%)
4	Foreign body sensation throat	6 (7.5%)
5	Aphonia	3 (3.7%)
6	Stridor	1 (1.25%)

Table II: Disease distribution of benign lesions of larynx

BENIGN LESIONS OF LARYNX	MALE	FEMALE	TOTAL	PERCENT %
Acute laryngitis	2	3	5	6.25
Adult papilloma	2	2	4	5
Chronic laryngitis	3	5	8	10
Habitual dysphonia	3	1	4	4
Haemangiopericytoma	0	1	1	1.25
Intubation granuloma	1	1	2	2.5
Keratosis	0	2	2	2.5
Laryngocele	0	1	1	1.25
Laryngeal stenosis	1	1	2	2.5
Recurrent respiratory papillomatosis	0	3	3	3.75
Reinke's edema	1	1	2	2.5
Sulcus vocalis	0	1	1	1.25
Tuberculosis larynx	1	3	4	5
Vocal cyst	1	2	3	3.75
Vocal cord nodule	9	5	14	17.5
Vocal cord palsy	2	5	7	8.75
Vocal cord polyp	10	7	17	21.25
Total	36	44	80	100

Table III: Histopathological Diagnosis of Benign Lesions

SL. NO	LESIONS	HISTOPATHOLOGICAL DIAGNOSIS
1	Vocal cord polyp	Chronic inflammatory tissue with hyperplasia and edema
2	Vocal cord nodule	Epithelial type hyperplasia
3	Chronic laryngitis	Epithelial hyperplasia with dilated vessels and mononuclear cell infiltration.
4	Adult papilloma	Fibrovascular core covered by squamous epithelium.
5	Vocal cyst	Columnar epithelium with mucus.
6	Reinke's edema	Edema of subepithelial space.
7	Keratosis	Thickened mucosa with reactive squamous epithelial hyperplasia.

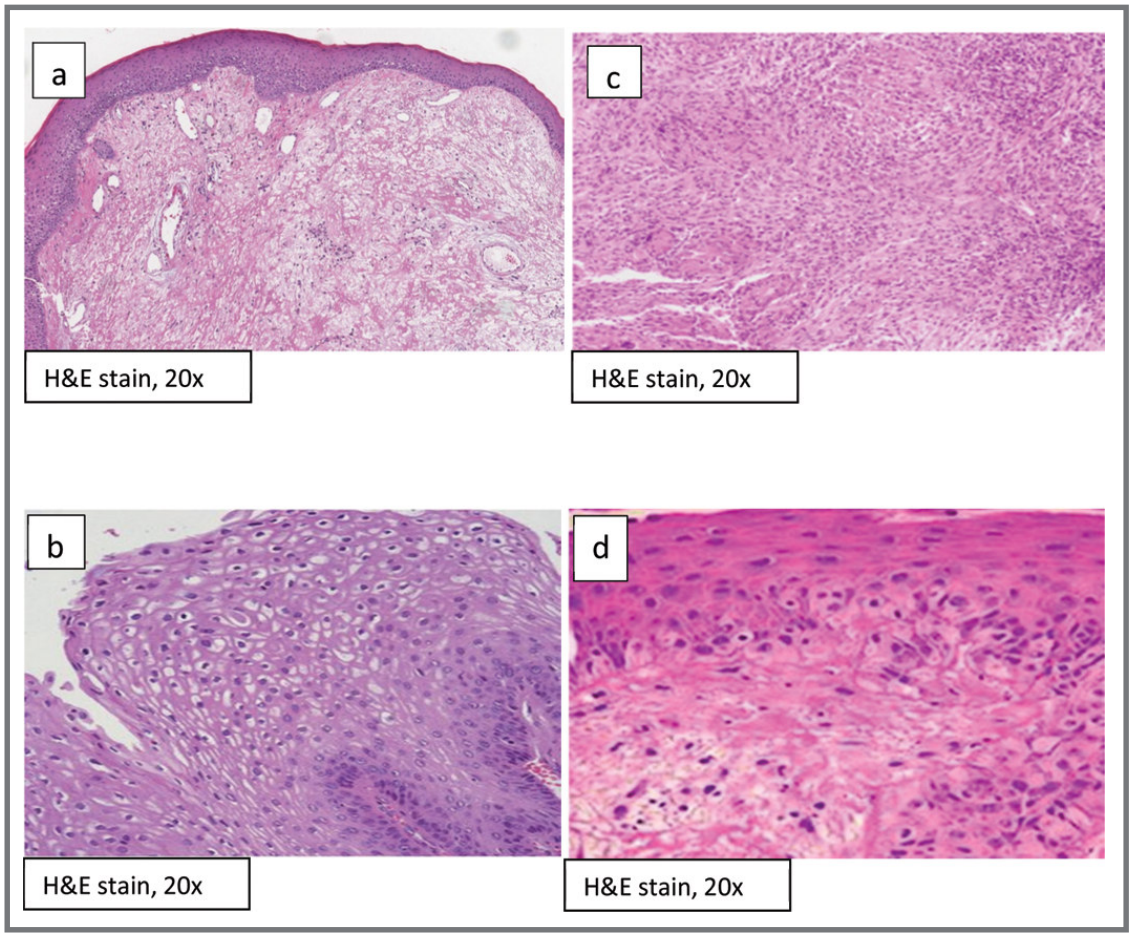

Fig. 1. Images showing histopathological sections of: a) vocal nodule, b) papilloma, c) laryngeal tuberculosis and d) Reinke's edema.

Discussion

In 1938, New and Erich published the Mayo Clinic experience of presenting with benign laryngeal lesions. They proposed that as true proliferative neoplasms were often clinically indistinguishable from nonproliferative inflammatory or hyperplastic growths, the term benign tumor should be used to encompass all abnormal growth of tissue in the larynx that lacked malignant or metastatic properties. 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 nonneoplastic in nature.

In the present study, majority of patients 28 (35%) were between 21-30 years of age, followed by 23 (28.75%) patients in 31-40 years of age. Youngest age of the patient was 8 years of age. Our observation is supported by Hegde MC et al.[8] and Singhal P et al.,[9] who also reported maximum number of the patient in the age group of 20 to 40 years.

Benign lesions of larynx were found to be more common in males (i.e. 44 cases; 55%). These results were comparable with the other study by Wani et al[10] and Batra et al[11]. The male preponderance could be attributed to vocal overuse, occupation and smoking and drinking alcohol habits in the males. Prakash et al showed male to female ratio of 2.5:1.[12] Study by Shaha et al.[13] showed a female preponderance in cases of vocal cord nodules.

Among the occupation, manual labourers (42.5%) were more affected by benign lesions of larynx followed by housewife (20%), teachers (17.5%) and students (17.5%). Singhal P et al.[9] in their study, observed benign tumours of larynx among professional voice users and teachers (16%), salesman (16%) politicians (4%), bus conductors (6%) which were similar to our study. Chopra et al.[14] noted highest incident in housewives (25.3%), followed by shopkeepers (16.4%), businessmen (14.9%), students (12%), and teachers (10.4%), farmers (5.97%), salesman (3%) and others (10%).

Vocal abuse describes vocal behaviors associated with normal voice quality that often leads to vocal fold abnormalities and resultant dysphonia. In present study, vocal abuse was found to be commonest habit 53 (66%) present both in males and females as a predisposing factor followed by smoking and alcohol habits in 26 (59%) males. In a study by Ghosh et al.,[15] 72% patient had vocal abuse/ overuse as predisposing factor. Wani et al.[10] also quoted 56% cases with vocal abuse.

The other contributory factors were dyspepsia (22%), alcohol consumption and smoking (59%) and exposure to external irritants like smoke, dust, incense. Association of all risk factors with various lesions were studied, among which smoking and alcohol showed a strong relation in contributing to the lesions with a statistically significant p value. Prakash et al in their study supported the view that these lesions may also be caused by some sort of nonoccupational abuse of voice[12]. This group constituted 38% of the cases in their study. Tobacco smoke and alcohol acted as aggravating factors in the causation of most benign lesions.

Hoarseness is the commonest symptom and often the first symptom which brings the patient to the clinician. Among the symptom distribution, hoarseness or voice change together constituted 66 (82.5%), was the most frequent symptom, followed by vocal fatigue in 14 (17%) patients. Reduced voice range was seen in 8 (10%) cases, foreign body sensation in 6 (7.5%) cases, aphonia in 3 (3.7%) and stridor in 1 (1.25%) of patients. Mean duration of hoarseness with benign lesion of vocal cords observed were similar to various other studies. Cecatto et al.[16] found hoarseness was present in all cases (100%). Singh et al.[17] reported hoarseness in 69% cases

Lesions: Excessive mechanical trauma and stress in the midmembranous area of vocal cord leads on to wound formation occurs. Subsequently remodeling of the superficial layer of the lamina propria and to a lesser extent epithelium results in the formation of vocal cord nodules, polyps and cysts.

Vocal Cord Polyp : The most common lesion observed was vocal polyp (21.25%). Ten of them were pedunculated (62.5%) and seven (37.5%) were sessile. Two of them were of angiomatous type. All of the polyps were visualized videoendoscopically and MLS done. No recurrence was observed.

Vocal Cord Nodules : The second most common lesion observed was Vocal Nodule (17.5%). The lesion ranged from 1-4mm in size. Nine of them were less than 2 mm in size and five of them were less than 1mm in size. Eight were bilateral and six were unilateral lesion. Under video endoscopic control, all were excised. No recurrence was observed. McGlashen reported that vocal nodules were bilateral, small swellings (less than 3 mm in diameter) that develop on the free edge of the vocal cord at approximately the mid-membranous portion,[18] as was also observed in the present study.

Papilloma : Four cases of Papillomas were observed in this study (5%). The papillomas are solitary, small and less aggressive in behaviour. It occurs on the vocal cord, hence considered to be a true neoplasm of vocal cord. In two cases the mass was seen in the supra glottic region while in the other two, the lesions were seen occupying the vocal cords. In all cases under video endoscopic control, MLS was done. There was one case of recurrence, was observed after a follow up of 6-8 months.

Laryngitis due to gastro esophageal reflex disease is one of the established etiology, was mainly diagnosed with the associated symptoms and by ruling out other causes. They got symptomatic relief with medical therapy. In vocal cord palsy most common cause is idiopathic. Medical line of treatment was given and was followed up for 6 months for symptomatic improvement. Tuberculosis larynx more common in males. Most of them had congested mouse nibbling appearance of vocal cord. They were found to be sputum positive for Acid fast bacilli. Some of them had granulomatous lesion in the larynx which mimicked the growth. Tuberculosis lesion was confirmed by biopsy.

Hegde et al.[8] found vocal cord polyp in majority (40.47%), other lesion in decreasing order were vocal nodules (28.57%); tuberculosis of larynx (14.30%), laryngocele (4.76%), laryngeal web (4.76%), epiglottic cysts (4.76%) and subglottic hemangioma (2.38%). Singh et al.[17] reported most common lesion to be vocal polyp (40.7%), followed by nodule (28.4%), papilloma (22.2%) and cyst (0.05%).

In vocal Polyp, Kambic et al.[19] observed most common age group of 40–50 year, and female predominance (52%) as compared to males (48%). Martins et al.[20] reported vocal polyp more common in the age group of 41–60 years (51.31%) and reported slight preponderance among females.

On histopathological examination, we found a correlation of 92% between the clinical and pathological diagnoses. Nunes RB et al.[21] found 93.18% correlation whereas Wallis L et al.[22] found 91.5% correlation when compared their clinical diagnosis with histopathological diagnosis.

Management in our study was done with mainly by MLS. Surgery was the prime mode of treatment (61.25%) which is supported by Singhal et al (94%) and Hegde et al (83.29%). Post treatment, complete recovery was seen in 71(88.75%) patients, 7 (8.75%) patients had partial recovery of symptoms and recurrence of lesion was seen in 2 patients.

In our study, VHI-10 was used to assess the impact of voice complaints on patients' quality of life. It was easily self-administered and scored quickly at the time of evaluation. The difference between pre and post-op VHI-10 was found to be statistically significant ($p < 0.01$). Rosen et al.[23] noted statistically significant reductions in patients VHI scores following microsurgical excision and a program of pre and postoperative voice therapy.

Conclusion

A benign laryngeal lesion produces symptoms that can vary from mild hoarseness to life-threatening stridor. We conclude that the most common benign lesion causing hoarseness was the vocal cord polyps. The present study emphasises that it is not only the surgery that is important in managing vocal fold lesions but also certain life-style modifications like proper vocal hygiene, cessation of smoking, avoidance of alcohol play a vital role in reducing the incidence of these non-malignant laryngeal lesions significantly. Early diagnosis also leads to identification of malignancy in early stages and better prognosis. As such, the standard treatment of choice in all types of benign lesions of the larynx should consist of a triad of approach by micro laryngeal surgery (either microscopic or endoscopic, with or without the use of lasers and other

tools like coblator, microdebrider), voice rest and vocal rehabilitation.

References

1. Robin PE, Olofsson J. Tumours of the larynx. In: Hibbert J Laryngology and head and neck surgery, 6th edn. Heinemann International, Great Britain, 1997; 1–9
2. Hollinger PH, Johnston KC. Benign tumors of the larynx. Ann Otol 1951;60:496-509
3. Winston P, Epstein SS. Papilloma of the larynx: A clinicopathological study. J Laryngol Otol 1958;72:452-64
4. Sataloff RT, Ressue JC, Portell M, Harris RM, Ossoff R, Merati AL, et al. Granular cell tumors of the larynx. J Voice Mar 2000;14(1):119-34
5. Johns MM. Update on the etiology, diagnosis andtreatment of vocal fold nodules, polyps and cysts. CurrOpinOtolaryngol Head Neck Surg 2003; 11(6):456–61
6. Rosen CA, Simpson CB. Operative Techniques in Laryngology. 1st ed. New York, NY: Springer; 2008: 63-75
7. Rosen CA, Lee AS, Osborne J, Zullo T, Murry T. Development and validation of the Voice Handicap Index-10. Laryngoscope 2004;114:1549–1556
8. Hegde MC, Kamath PM, Bhojwani K, Peter R, Babu PR. Benign lesions of the larynx: A clinical study. IJLO 2005;57(1):35-38
9. Singhal P, Bhandari A, Chouhan M, Sharma MP, Sharma S. Benign tumors of the larynx: A clinical study of 50 cases. IJLO 2009;61(1):26-30
10. Wani AA, Rehman A, Hamid S, Akhter M, Baseena S. Benign Mucosal Fold Lesion as a Cause of Hoarseness of Voice. A Clinical Study. Otolaryngol 2012; 2(3):120
11. Batra K, Motwani Ani G, Sagar PC. Functional voice disorders and their occurrence in 100 patients of hoarseness as seen in fibreoptic laryngoscopy. Indian J Otolaryngol Head and Neck Surgery 2004;56(21):91-95
12. Prakash O, Singh P, Sharma M, Kapoor M. Pattern of benign lesions of larynx. Int J Med Sci Public Health. 2016;5(9):1808
13. Saha PP, Jana S. A Clinicopathological Study of Benign Lesions of the Vocal Fold. IOSR J Dent Med Sci. 2017;16(2):9-12
14. Chopra H, Kapoor M. Study of benign lesions undergoing microlaryngeal surgery. Indian J Otolaryngol Head Neck Surg.1977; 49:276–279
15. Ghosh SK, Chattopadhyay S, Bora H, Mukherjee PD. Microlaryngoscopic study of 100 cases of hoarseness of voice. IndJOtolaryngolHead Neck Surg 2001; 53(4):270-72
16. Cecatto SB, Costa KS, Garcia RID, Haddad L, Angelico Junior FV, Rapoport P. Vocal cord polyps: clinical and surgical aspects. Rev Bras Otorrinolaringol. 2002;68:543–548
17. Singh M, Bandyopadhyay S, Gupta SC, Rai A. A study of manifestations of extrapulmonary tuberculosis in the ENT region. Indian J Otolaryngol Head Neck Surg. 2002;54:242–245
18. McGlashen J. Disorders of the voice. In: Hibbert J, Scott-Brown otolaryngology, head and neck surgery, 7th edn. Edward Arnold, London, 2008;pp 2192–2210
19. Kambic V, Radsel Z, Zargi M, Acko M. Vocal cord polyps: incidence, histology and pathogenesis. J Laryngol Otol. 1981;95:609–618
20. Martin RH, Defaveri J, Domingues MA, Silva RD. Vocal polyps: clinical, morphological and immunohistochemical aspects. J Voice. 2011;25:98–106
21. NunesRB, Behlau M, Nunes MB, Paulino JG. Clinical diagnosis and histological analysis of vocal nodules and polyps. Brazilian J Otorhinolaryngol2013; 79(4), 434-440
22. Wallis L, Jackson-Menaldi C, Holland W, Giraldo A. Vocal fold nodule vs. vocal fold polyp: answer from surgical pathologist and voice pathologist point of view. J Voice 2004; 18(1):125-9
23. Rosen CA, Murry T, Zinn A, Zullo T, Sonbolian M. Voice Handicap Index change following treatment of voice disorders. J Voice 2000;14: 619–623.