

Vocal Handicap Index Measurement as a Tool in Evaluation of Patients with Voice Disorders

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Abstract

Background: Benign lesions of the vocal cords and functional dysphonia cause voice changes in patients. Endoscopic evaluation helps in anatomical diagnosis, but functional assessment and subjective evaluation by the patient makes it efficient to assess the patient satisfaction and effect of different treatment modalities used.

Aim: The aim of this study is to use vocal handicap index (VHI) as a tool to assess the degree of functional deviation in patients with voice disorders.

Materials and Methods: A total of 82 patients with different organic (55) and functional lesions (27) of the vocal cord were included. The diagnosis was based on the endoscopy of the larynx and measurement of vocal handicap (VHI) in both organic lesions and functional dysphonia, and a subjective questionnaire filled by the patient including the VHI and the quality of life index (QoLI) (a measure of voice-related QoL).

Observations and Results: A mean score of 65.3 on VHI of organic lesions of vocal cords and 58.6 in patients with functional dysphonia at the time of diagnosis were noted. The QoLI scores were 21.2 and 19.4, respectively, before treatment. Following different treatment modalities, the scores were 36 among non-functional lesions and 32 among functional dysphonia were noted. Similarly, the QoLI scores were improved to 59 and 53, respectively.

Conclusion: VHI scores and QoLI scores help in assessing the impact of incapacity caused by voice disorders on work performance and associated social and emotional impacts on patients. VHI also helps in assessing the effect of treatment modalities on voice disorders.

Key words: Vocal cords, Dysphonia, Speech disorders and Vocal handicap

INTRODUCTION

Patients attending the ENT departments are usually evaluated by endoscopy to rule out organic lesions of vocal cords and objective measures of the degree of vocal incapacity. Very few centers adopt a subjective self-assessment of the voice by the patients to know the extent to which the vocal incapacity affects their social functioning and quality of life (QoL). In any given treatment, important determinant of treatment efficacy is

the patient's perception of improvements in his/her vocal capacity.¹ Vocal incapacity in patients has wide implications on their work depending on the importance of their voice in work. In a professional singer, slight variation in the tone of the voice may affect their professional work when compared to a subject with least voice demands. A benign lesion of the vocal cord in a professional singer or teacher may lead to stop the work, and the resulting impact on QoL cannot be effectively measured by objective measures¹ alone. Self-assessment instruments which are ideally effective for a wide range of types of disorders and evaluate specific aspects of voice in different social and professional groups are used nowadays. Older adults tend to be concerned about loudness, teachers fear about "losing their voice," and singers are worried about voice quality.² The pre-treatment evaluation procedure aims at determining the initial voice handicap in patients with voice disorders. Even though the procedure adopted is

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not in law in the USA or UK, it includes a detailed study of clinical record, physical examination including objective measures of voice, and estimation of general and voice-related QoL (VRQoL) using questionnaires such as the voice handicap index (VHI), the voice outcome survey, the voice symptoms scale, the VRQL index, and the QoL index (QoLI).^{1,3,4} Jacobson developed the currently used VHI in 1998⁵ which are being widely used instruments for the evaluation of patient-perceived vocal incapacity. It consists of patient's self-report questionnaire having three subscales covering the functional, organic, and emotional aspects; each with 10 questions. It explores the effects of the voice disorder on daily activity; the organic subscale explores the patient's perception of the characteristics of his/her vocal production, and of laryngeal discomfort; the emotional subscale explores the patient's effective responses to the problem. The test is applicable to all types of vocal disorders and has been statistically validated. On the other hand, the guidelines for the evaluation of permanent impairment of the American Medical Association, in its sixth edition published in 2008, consider problems of voice and speech as a single problem.

Aim

The aim of this study is to use vocal handicap as a tool to assess the degree of functional deviation in patients with voice disorders who use their voice as a profession.

MATERIALS AND METHODS

A total of 82 patients attending the OPD of Government ENT Hospital, Koti, Hyderabad, attached to Osmania Medical College were included in the present study. The study period was between April 2013 and March 2015. An institutional ethical committee clearance was obtained before the commencement of the study.

Inclusion Criteria

1. Patients aged above 20 years and below 57 years were included.
2. Patients of professional voice users were included.
3. Patients of both the sexes were included.
4. Patients with both organic lesions and functional dysphonia were included.

Exclusion Criteria

1. Patients below 20 years and above 57 years were excluded.
2. Non-professional voice users were excluded.
3. Patients who have undergone minor or major laryngeal surgeries were excluded.
4. Patients with blunt injuries to the larynx were excluded.
5. Paralytic conditions of the larynx were excluded.

All the patients were elicited with detailed history, initial ENT examination, and video-laryngoscopy was performed. Laryngeal stroboscopy was performed in all the patients. The final diagnosis was based on the endoscopy of the larynx and measurement of vocal handicap index (VHI) in organic lesions and with a subjective questionnaire filled by the patient including the VHI and the QoLI (a measure of VRQL). All patients filled up a questionnaire in Telugu version of the VHI and the QoLI. The 30 questions on the VHI are answered on 5-point scales (0: Never, 1: Hardly ever, 2: Sometimes, 3: Almost always, and 4: Always). For each patient, the score was calculated on each of the three subscales and total score. The QoLI developed by Wilson *et al.*⁶ comprises 6 questions designed to assess the participant's perceptions of symptom severity and effects on QoL; the questions are answered on 6-point scales (0: Never to 5: Always).

OBSERVATIONS AND RESULTS

Among the 82 patients, 55 were found to have organic vocal cord lesions and 27 were with functional dysphonia. There were 49 male patients and remaining 33 were female (Table 1). The youngest patient was 20 years old, and the eldest patient was 56 years with a mean age of 35.64 ± 2.30 . Among 55 organic disease patients of the vocal cords, 13 were in the age group of 20-35, 25 were in 36-41 years, and 17 were in 42-57 years age groups. Among 27 functional dysphonia patients of the vocal cords, 6 were in the age group of 20-35, 11 were in 36-41 years, and 10 were in 42-57 years age groups (Table 2). The mean age was 39.12 ± 2.20 among the organic disease patients and the mean age was 31.50 ± 1.30 in functional dysphonia patients. The different benign conditions of the vocal cords observed in the present study are illustrated in Table 3. The different functional dysphonia patients observed is illustrated in Table 4.

In both the groups of voice disorders, organic and functional dysphonia, the measurement of VHI indicated that most

Table 1: The gender incidence (n=82)

| Observation | Non-functional diseases of vocal cord (n=55) | Functional diseases of vocal cord (n=27) |
|-------------|----------------------------------------------|------------------------------------------|
| Male - 49 | 39 | 10 |
| Female - 33 | 16 | 17 |

Table 2: The age incidence (n=82)

| Age group (years) | Non-functional diseases of vocal cord (n=55) | Functional diseases of vocal cord (n=27) |
|-------------------|----------------------------------------------|------------------------------------------|
| 20-35 | 13 | 06 |
| 36-41 | 25 | 11 |
| 42-57 | 17 | 10 |

patients show significant voice deficits on the functional, organic, and emotional subscales. In both groups of patients, the organic subscale showed gross affection, followed by the functional and then the emotional domains. Likewise, the QoLI indicated a marked effect of both pathologies on voice-related QoL, with a high proportion of patients complaining of symptoms associated with the vocal dysfunction (e.g. cough, need to clear throat, dry mouth, and odynophagia), with negative effects on QoL (Tables 5 and 6).

Following different treatment modalities, the scores were 36 among non-functional lesions and 32 among functional dysphonia were noted. Similarly, the QoLI scores were improved to 59 and 53, respectively.

Table 3: The incidence of different benign conditions of the vocal cords (n=55)

| Benign conditions of vocal cords | Male (n=39) | Female (n=16) |
|----------------------------------|-------------|---------------|
| Vocal nodules | 04 | 03 |
| Sulcus vocalis | 02 | 00 |
| Vocal polyp | 03 | 01 |
| Fibroma of the vocal cord | 04 | 01 |
| Cyst of the vocal cord | 02 | 01 |
| Fibroangiomas of the vocal cord | 05 | 03 |
| Non-specific laryngitis | 04 | 05 |
| Contact ulcer | 03 | 00 |
| Granuloma | 02 | 02 |
| Papilloma | 04 | 00 |
| Leukoplakia | 06 | 00 |

Table 4: The incidence of different causes of functional dysphonia (n=27)

| Functional dysphonia of vocal cords | Male (n=10) | Female (n=17) |
|-------------------------------------|-------------|---------------|
| Spasmodic dysphonia | 01 | 05 |
| Functional aphonia | 01 | 03 |
| Puberphonia | 04 | 00 |
| Muscle tension dysphonia | 01 | 04 |
| Vocal cord bowing | 01 | 01 |
| Ventricular phonation | 01 | 01 |
| Hyperabduction | 01 | 03 |

Table 5: The mean, median, and SD of non-functional vocal cord lesions (n=55)

| Observation | VHI (total) | Functional subscale | Organic subscale | Emotional subscale | QoLI |
|-------------|-------------|---------------------|------------------|--------------------|------|
| Mean | 65.3 | 23.50 | 27.80 | 14.0 | 21.2 |
| Median | 63 | 21 | 24 | 13 | 19 |
| SD | 14.24 | 5.60 | 4.32 | 2.89 | 6.03 |

SD: Standard deviation, VHI: Vocal handicap index, QoLI: Quality of life index

Table 6: The mean, median, and SD of non-functional vocal cord lesions (n=27)

| Observation | VHI (total) | Functional subscale | Organic subscale | Emotional subscale | QoLI |
|-------------|-------------|---------------------|------------------|--------------------|------|
| Mean | 58.6 | 21.43 | 25.65 | 13.22 | 19.4 |
| Median | 56 | 19 | 22 | 12 | 17 |
| SD | 11.40 | 6.34 | 5.40 | 3.12 | 6.32 |

SD: Standard deviation, VHI: Vocal handicap index, QoLI: Quality of life index

DISCUSSION

The effect of organic diseases on the social well-being and emotional well-being was not considered in health sciences in the past.^{1,6} For the patients with voice disorders who use their voice extensively for professional earning, voice incapacitation represents a major problem. Few of these patients perceive their disorder as an alteration of critical capacity, causing emotional distress, and/or functional incapacity in social and work contexts. Hence, an ENT surgeon should be able to evaluate the degree of incapacity associated with the voice disorder in addition to the knowledge of various disorders causing voice change and their treatment.^{1,6-8} Smith *et al.*⁸ in their study of 40 vocal nodule patients versus 200 normal participants with occasional voice symptoms found that vocal nodule patients gave a negative impact on their professional work due to the lesions 49%; 4% negative impact among the normal group. The capacity for work was found to be limited in 39% of the vocal nodule group when compared to 2% in the normal participants. The former group was concerned about their career in 78% versus 24% in the latter group. A similar study by Murry and Rosen³ observed that subjective evaluation by the patients before and after treatment are useful for gathering patients' opinions about the severity of their vocal dysfunction and the need for recovery of function and that the use of such measures allows more specific decision-making about treatment. Rosen and Murray⁹ in their study used VHI for evaluating the relative severity of vocal dysfunctions in 3 groups of patients (functional dysphonia, benign lesions of the vocal folds, and unilateral paralysis of the vocal folds) before and after treatment. They reported that patients with paralysis of the vocal folds gave highest self-evaluated handicap score (i.e. >VHI score), both before and after treatment. This was followed by patients with functional dysphonia, and finally patients with benign lesions of the vocal folds, whose VHI scores were close to those seen in the general population. These authors concluded that the VHI is an

effective measure of vocal handicap. In a different case-control study by Rosen and Murray,⁹ in which the VHI was used to compare the self-assessed voice incapacity in 2 groups; Group A 106 singers (problem with singing without problem with spoken voice) and Group B 369 non-singers with voice problem. Mean VHI score differed significantly between the two groups. VHI also differed among the Group A subclasses of professional and amateur singers. Singers with vocal nodules showed lower mean VHI scores than singers with vocal cysts or polyps. He concluded that singers' perceptions of incapacity could not be adequately measured by visual or objective measures, whereas the VHI effectively identifies the singer's degree of incapacity and specific needs, which may be significant even though the objective deficit in vocal quality is only very slight. Hsiung¹⁰ measured the VHI in 79 dysphonic patients with different of vocal disorders and found that the organic subscale was the most severely affected. He concluded that the VHI is a useful tool for obtaining the patient's assessment of his/her voice deficit in terms of functional, organic, and emotional impacts. Thus, it helps the phoniatrist to design treatment programs that respond to each patient's specific needs. In a different study by the same author, Hsiung¹¹ reported that each subscale of the VHI has high reliability ($P < 0.01$), but that there was a major discrepancy between the VHI results and the results of objective laboratory measures of voice quality. He concluded that due to the large discrepancy between the results of VHI and objective laboratory measures, no objective parameter can be definitely regarded as a prognostic factor in the evaluation of dysphonic patients.

CONCLUSIONS

Organic and functional dysphonia often causes significant incapacity in professional voice users affecting their work performance and social functioning. This would result in significant emotional impact. VHI and QoLI are useful tools in the accurate assessment of voice quality before and after treatment of voice disorders.

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