Original Article

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Etiological Factors of Hoarseness in Patients Attending Basrah General Hospital

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ABSTRACT

Background: Hoarseness is a common symptom in otolaryngology practice, and it's the earliest manifestation of a large variety of conditions directly or indirectly affecting the larynx, ranging from benign to most malignant. **Aim**: This study was undertaken to find out clinical profile, incidence of common predisposing and etiological factors of hoarseness. **Methods:** Two hundred cases of hoarseness for 18 months were studied. All cases were analyzed for detailed history and examination with visualization of the larynx through rigid video laryngoscopy or flexible nasopharyngolaryngoscopy and in some cases, direct laryngoscopy and biopsy were taken for histopathological study. The final results were analyzed by simple manual analysis with frequency and percentage using Microsoft Excel Software 2007. **Results:** A total of 200 patients were included in the study. Among them, patients in the age groups of 31–40 years and 41–50 years were the main sufferers of hoarseness. Similarly, among 200 patients 124 (62%) were males whereas 76 (38%) were females, with the male to female ratio 1.6:1. Vocal cord nodules were the most commonly encountered etiology with a frequency of 17.5 % whereas tuberculous laryngitis was the least commonly encountered etiology with a frequency of 0.5%. **Conclusions:** There was an etiological variation in hoarseness ranging from simple laryngitis to the most life-threatening malignancies. It is important not to ignore the hoarseness and precise history, examination and investigations should be done to diagnose the early underlying pathological changes for prevention and accurate management.

Keywords: Hoarseness, etiology, rigid video-laryngoscopy, flexible nasopharyngolaryngoscopy, Iraq

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INTRODUCTION

Nearly one-third of the population has impaired voice production at some point in their lives.[1,2] Hoarseness is more prevalent in certain groups, such as teachers and older adults, but all age groups and gender can be affected. [1–6]

In addition to the impact on health and quality of life (QOL), [7, 8] hoarseness leads to frequent health care visits and several billion dollars in lost productivity annually from work absenteeism.[9]

Hoarseness is often caused by benign or self-limited conditions, but may also be the presenting symptom of a more serious or progressive condition requiring prompt diagnosis and management. Dysphonia may be broadly defined as an alteration in the production of voice that impairs social and professional communication.[9]

In contrast, hoarseness is a coarse or rough quality to the voice. Although the two terms are not synonymous, in our study, we decided to use the term hoarseness

because it is more recognized and understood by patients, clinicians, and the lay press.

Anatomy and Physiology

Three systems constitute the vocal apparatus: the respiratory system, the larynx, and the supraglottic vocal tract. Normally, these complex systems are integrated to produce high vocal quality. During vocalization, the compressed air generates a pressure differential through a narrowed glottis by means of the Bernoulli effect.[10]

Larynx consists of fold-shaped muscles and is covered by mucous membranes. The space between the vocal folds is called the glottis. The vocal folds originate on the posterior surface of the thyroid cartilage near the thyroid angle (Adam's apple), run posteriorly, and attach to the vocal process of the arytenoid cartilages. Each vocal fold consists of a membranous (anterior) component and cartilaginous (posterior) component. Sensory innervations of the larynx above the glottic level occur through a branch of the superior laryngeal nerve. Below the level of the glottis, sensory innervations are provided by the recurrent laryngeal nerve.[10] Any pathology along the course of the vagus/recurrent laryngeal nerve can affect the vocal fold motion on the ipsilateral side and cause hoarseness.

Etiology and Pathophysiology

Causative factors of hoarseness are numerous. Abrupt onset of complete voice loss, termed aphonia, is more likely traced to a neurologic or psychogenic origin than to an organic lesion. Lesions of the vocal folds more often produce vocal symptoms of gradual onset, frequently beginning intermittently and then becoming constant and occasionally worse with time.[11]

Iatrogenic hypernasality may occur following a surgical procedure that creates an opening between the oral and nasal cavities or interferes with neurologic innervations.[11]

The pattern of symptom progression may indicate a static neurologic event such as multiple sclerosis or myasthenia gravis. Patients with hypothyroidism may present with abnormally low-pitched voices. Female patients may experience temporary vocal difficulties around menstruation.[12]

Chronic medical conditions may also affect the voice. Patients who are deconditioned because of cardiac or other major illnesses may not have sufficient pulmonary support to sustain and project their voice. [13,14]

Psychological disturbances are frequently reflected in the voice and may be the primary cause of the presenting vocal disturbance.[15] For example, the voice of depressed patients is typically reduced in loudness and prosody. Additionally, stress may also play a significant role.[16]

Diagnosis

The evaluation of hoarseness involves assessment of the anatomic, physiologic, and behavioral factors that influence overall vocal production. Assessment begins with a description of the voice, symptomatology, and a medical and social history. Laryngeal visualization is necessary to determine the status of the vocal folds. In selected cases, more sophisticated diagnostic procedures may be indicated. [16]

A detailed voice history is helpful to delineate the specific characteristics of voice and the social and medical contributing factors. Almost any bodily system may be responsible for a voice complaint; therefore, the history must probe all areas.[17]

Laryngeal visualization allows the assessment of the vocal folds for the presence of any lesions or abnormal movement that may suggest an underlying systemic problem.[17] An indirect laryngoscopy is performed using at least a head mirror and light as in. To analyze in more detail, a fiberoptic laryngeal telescope or flexible nasopharyngoscope is used.

Stroboscopic examination may be indicated in selected cases where a lesion is not clearly visualized or where there is a need to assess the possibility of epithelial invasion in early glottic carcinoma.[18]

When vocal fold immobility is detected, the differential diagnosis includes a possible denervation injury versus cricoarytenoid fixation. When performed within 6 months of the injury, electromyography (EMG) may elucidate the etiology in 1852.

MATERIALS AND METHODS

This prospective study was carried out in Department of Otolaryngology and Head and Neck Surgery, Basrah General Hospital, Basrah, Iraq between November 2012 to April 2014.

Two hundreds patients with hoarseness, who were referred to the hospital either from private clinics or from outpatient department for further assessment and evaluation of their complaints, were studied. All patients who presented with hoarseness were included in the

study, apart from patients with nasal and nasopharyngeal pathology, oral and oropharyngeal pathology and speech defects due to CNS lesions.

Both genders were included in this study, with a wide age group ranging from 11 years to 86 years (who were designated as 60+).

Detailed history (including medical, past surgical, especially neck and laryngeal surgery, social history concerning voice abuse and smoking), general and head and neck clinical examination, radiological investigations as well as some specific investigations were also conducted. Each patient was examined by either rigid video laryngoscopy, flexible nasopharyngolaryngoscopy or direct laryngoscopy. Some patients required histopathological examination for further confirmation of their diagnosis. Postoperative follow up was scheduled for the patients. The final results were analyzed by simple manual analysis with frequency and percentage using Microsoft excel software 2007.

RESULTS

The patients were categorized, and the tables were prepared according to sex, age, duration of presentation, voice abuse and professions, smoking habits, and according to the pathology discovered whether by primary examination or by histopathological studies.

Age and sex distributions

The highest incidence was in the fourth followed by fifth decade of life (23.5% and 20.5% respectively), while the lowest incidence was in the third decade (9.5%).

The incidence was higher in male patients (124 patients ,62%) compared to the female patients(76 female patients, 38%). Male to female ratio was 1.63:1, as shown in (Fig.1).

Voice abuse and smoking

The incidence of hoarseness was higher in patients who were used to abusing their voices, and this includes housewives, hawkers and those who work in a noisy background. There were 108 such patients (54%), compared to others who used their voice normally (92 patients, 46%) (Table 1).

In the voice abuser group, there were 28 patients who represented 26% of this group, who were the voice professional group. This included teachers, lawyers, preachers, wailers and those memorizing the Holy Qur'an, as shown in (Fig.2).

In regard to smoking habits, we found that 88 patients were smokers (44%), 80 were nonsmokers (40%), and 32 patients were ex-smokers (16%) (Fig. 3).

Duration of presentation

Durations of hoarseness (Fig. 4) revealed that most of the patients – 54 patients (27%) –presented within a duration of six to twelve months, 45 patients (22.5%) presented within one to three months, and 36 patients (18%) presented within less than a month.

Distribution of patients according to etiology

Table 2 shows the distribution of hoarseness as per etiology of the 200 patients included in this study. The most commonly encountered factor was vocal cord nodules with a frequency of 17.5% (35 patients), vocal cord polyp (the second most common etiology) with a frequency of 14.5% (29 patients), followed by neoplasm, which accounts for 13% (26 patients), and chronic nonspecific laryngitis, which accounts for 11.5% (23 patients).

The least common cause of hoarseness was Mediastinal Lymphoma, as they accounted for only 0.5% (1 patient only) (Table 3).

From those patients with hoarseness due neoplastic etiology, laryngeal carcinoma represents the highest frequency (19 out of 26 patients, 73%).

Vocal cord palsy represents the fourth common causative factor found in this study and accounts for 12.5% (25 out of 200 patients).

Traumatic and endocrine causes both account for 3.5% each (7 out of 200) patients in the study. In regard to traumatic factors, intubation granulomas found to account for 43% (3 out of 7 patients), 1.5% of total patients.

Hoarseness due to endocrine etiology was found to account for 3.5% (7 patients) and for 4 patients (2%), it was due to hypothyroidism.

Squamous cell carcinoma contributed to the highest frequency among this group (19 out of 55 patients ,34.5%) followed by benign inflammatory polyp and vocal nodules in 21.8% and 18.18%, respectively (Table 3).

Tuberculous laryngitis represented the least frequent laryngeal lesions causing hoarseness (1.81%).

Table 1: Jobs and Professions of patient

Job / Profession	Female patients	Male patients	Total	Percentage
Teacher	6	7	13	6.5%
Preacher	3	5	8	4%
Lawyer	1	2	3	1.5%
House wife	46	-	46	23%
student	11	9	20	10%
Policeman / Army	-	12	12	6%
Laborer / Farmer	-	29	29	14.5%
Retired	3	11	14	7%
Taxi driver	-	9	9	4.5%
Singer	-	1	1	0.5%
Factory Worker	-	20	20	10%
Politician	1	1	2	1%
Hawker / wailer	-	3	3	1.5%
others	5	15	20	10%
Total	76	124	200	100%

Table 2: Distribution of Patients According to Etiology.

Etiology	Patients No.	Percentage
Vocal Cord Nodule	35	17.5%
Vocal Cord Polyp	29	14.5%
Neoplasm	26	13%
Laryngeal Carcinoma	19	9.5%
Post Cricoid Carcinoma	3	1.5%
Leukoplakia	2	1%
Papillomas	2	1%
Vocal Cord Palsy	25	12.5%
Idiopathic	10	5%
Post Thyroidectomy	8	4%
Bronchial Tumors	3	1.5%
Thyroid Carcinoma	2	1%
Mediastinal Lymphoma	1	0.5%
Post Thoracotomy	1	0.5%
Chronic Non Specific Laryngitis	23	11.5%
Functional / Psychogenic	14	7%
Acute Laryngitis	13	6.5%
Reinke's Oedema	9	4.5%
Reflux Laryngitis	8	4%
Injury and Trauma	7	3.5%
Intubation Granuloma	3	1.5%
Scarring of Cords	2	1%
Arytenoid Dislocation	1	0.5%
Burns	1	0.5%
Endocrine	7	3.5%
Hypothyroidism	4	2%
Pregnancy	2	1%
Hormonal Therapy	1	0.5%
Vocal Cord Cyst	3	1.5%
Tuberculous Laryngitis	1	0.5%
Total	200	100%

Table 3 : Histopathological study (55 patients)

Histopathology	Number of patients	Percentage
Squamous cell carcinoma	19	9.5% (35%)
Inflammatory Polyp	12	6% (22.25%)
Vocal Nodule	10	5% (18.5%)
Hemorrhagic Nodule	4	2% (7.5%)
Hemorrhagic Polyp	3	1.5% (5.5%)
Leukoplakia	2	1% (3.75%)
Papilloma	2	1% (3.75%)
Vocal Cyst	2	1% (3.75%)
Total	54	27.5% (100%)

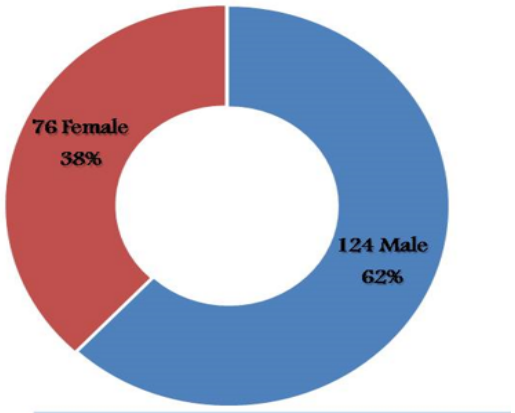

Figure 1: Sex distribution of patients

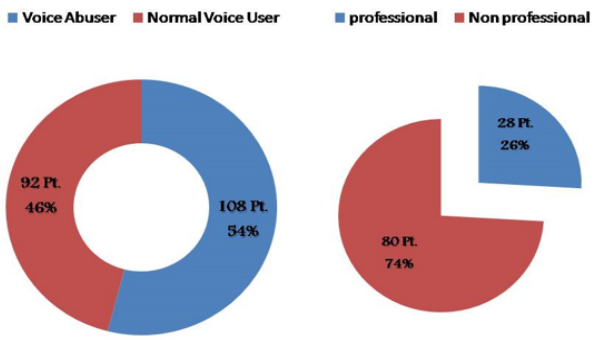

Figure 2: Voice abusing and professions

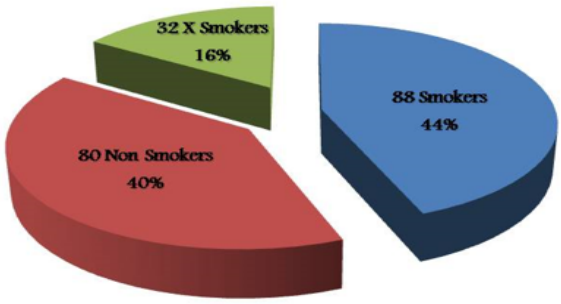

Figure 3: Smoking habits

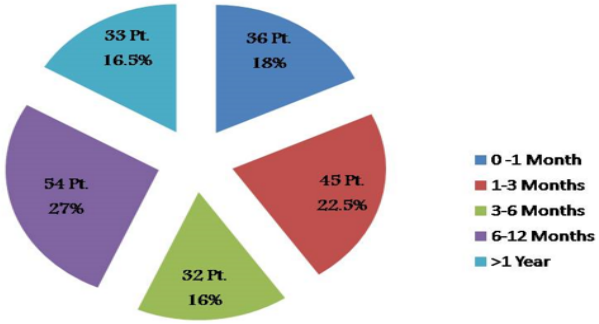

Figure 4: Duration of symptoms

DISCUSSION

Vocal abuse is a common etiological factor in laryngeal dysfunction resulting in hoarseness. Rosen et al. (1988)[19] state that vocal abuse is one of the most common causes of hoarseness, which lead to other vocal pathologies.

Vocal abuse was found to be a major contributory factor for hoarseness in this study as well. This concord with Kaluskar (1971)[20], Parikh (1991)[21], Mehta (1985)[22] and Chaturvedi (1999).[23]

Vocal cord nodule is the most common finding in this study (17.5%). Mehta (1985), Parikh (1991), Chaturvedi (1999) and Banjara (2011)[24] found this to be 12.5%, 24%, 12.72%, and 11.95%, respectively (Table 4).

Male predominance was observed in our study, similar to Banjara (2011) and Farooq (2006)[25], whereas studies like Mehta (1985), Parikh (1991), and Chaturvedi (1999) didn't find gender to be an influencing factor for hoarseness.

Majority of patients were found to be in the 31–40 years age group in this study. This is similar to the findings by Farooq (2006), Baitha et al. (2002)[26], and Batra et al. (2004)[27], whereas Mehta (1985), Parikh (1991), and Chaturvedi (1999) didn't find age to be an influencing factor.

Klauskar (1971), Mehta (1985), Parikh (1991), Broek (1997)[28], and Banjara (2011) state that inhaling irritants, especially cigarette smoke, is the most important predisposing factor for hoarseness.

Likewise, Norris & Peal (1963)[29] reported 94% incidence of smoking in patients with chronic laryngitis; however, we found vocal abuse to have a bigger effect than smoking, as well as the presence of multiple factors (Table 4)

Laryngeal carcinoma and vocal cord palsy were found to be important contributing factors for hoarseness in the present study. This is similar to the findings by Banjara (2011), while lower incidence of cord palsy was found by Parikh (1991) and Chaturvedi (1999). However, they had higher figures for laryngeal carcinoma.

In this study, among those with vocal cord palsy, 4% were presented following thyroid surgery. However, Farooq (2006) reported the same to be 12.5%. We also found bronchial tumors and post thoracotomy cord palsy to be 1.5% and 0.5%, compared to 3% and 2.5% respectively by the same workers above (Table 4).

The least etiological factor for hoarseness in this study was chronic specific laryngitis, which is similar to the findings by Banjara (2011). However, this is very different from Mehta (1985) and Parikh (1991), who found that about quarter of the patients had TB laryngitis.

Table 4 : Etiology of hoarseness: Comparative Studies.

FACTORS	Mehta (1985) N = 120	Parikh (1991) N = 100	Chaturvedi (1999) N = 110	Farooq (2006) N = 200	Banjara (2011) N = 251	Present Study N = 200
Age of Incidence	--	--	--	4th & 5th Decade	4th & 6th Decade	4th & 5th Decade
Male / Female ratio	--	--	--	3 : 1	1.9 : 1	1.63 : 1
Voice Abuse	49%	56%	40.9%	12.5%	31%	54%
Smoking	28%	20%	13.63%	--	43%	44%
Vocal Cord Nodule	12.5%	24%	12.72%	--	11.95%	17.5%
Vocal Cord Polyp	11.66%	15%	4.54%	--	3.59%	14.5%
Laryngeal Carcinoma	7.5%	12%	14.54%	11%	9.56%	9.5%
Leukoplakia	--	--	--	--	1.2%	1%
Papillomas	3.33%	3%	--	--	1.59%	1%
Vocal Cord Palsy	9.16%	3%	9.09%	--	13.55%	12.5%
Chronic Non Specific	15.38%	7%	9.09%	20%	9.56%	10.5%
Functional / Psycho.	2.5%	2%	--	--	16.33%	7%
Acute Laryngitis	10.83%	9%	23.63%	--	4.38%	5.5%
Reinke's Oedema	--	--	--	--	0.4%	4.5%
Reflux Laryngitis	--	--	1.81%	--	0.8%	3.5%
Int. Granuloma	--	--	--	--	0.4%	1.5%
Scarring of Cords					1.2%	1%
Hypothyroidism	--	--	--	1.5%		2%
Vocal Cord Cyst	--	--	--	--	5.58%	1.5%
T B Laryngitis	22.5%	23%	5.45%	--	0.8%	0.5%

CONCLUSIONS

Although hoarseness has an ICD-10 code, it's a symptom of disease with a very diverse etiology. The etiological data varies in different geographical locations and from center to center. With its male predominance, there was variation in etiologies in hoarseness ranging from simple laryngitis to malignancies. Vocal abuse and smoking are major predisposing factors for the hoarseness of voice.

RECOMMENDATIONS

• It is important not to ignore hoarseness, and precise history, examination, and investigations should be done to know the early diagnosis of underlying pathology for prevention and early management.

• Any patient with hoarseness lasting more than three weeks and not responding to conservative measures should be referred to an otolaryngologist for visualization of larynx as early presentation is important to discover non obvious malignancies and other pathologies.

• Vocal hygiene and giving up smoking are important factors in prevention and management of laryngeal diseases.

• More studies are recommended to include all hospitals in Basrah to rule out incidence and etiology of hoarseness and long term follow up of patients is recommended.

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