

Evaluation of Hoarseness of Voice by Indirect and Flexible Direct Laryngoscopy

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Abstract

Background: Hoarseness is not a disease. It is a symptom of variety of conditions like acute laryngitis to severe life-threatening malignancies

Objectives: The aim was to determine the clinical profile, aetiology and prevalence of hoarseness of voice and to compare the diagnostic accuracy of hoarseness of voice by indirect laryngoscopy with flexible direct laryngoscopy

Methods: A total of 90 cases of hoarseness of voice were studied during the study period of two years using indirect laryngoscopy and flexible direct laryngoscopy. The age of the patients in our study ranged from 12 years to 82 years

Results: The incidence of hoarseness among total OPD patients was 0.08%. More than half (57.8%) of the patients were males with a M:F of 1.4:1. The most common pre-disposing factor in our study was vocal abuse (42.22%), followed by Smoking (41.11%). Vocal cord Nodule was the most common aetiology (IDL=20% and FDL=24.44%). Carcinoma of larynx (FDL and IDL =16.66%) and Chronic hyperemic Laryngitis (FDL = 16.66%, IDL = 17.77%) were the second common aetiology in our study

Conclusions: Our study findings that Flexible Direct Laryngoscopy has been found to be a reliable diagnostic procedure that is very sensitive and specific compare to indirect laryngoscopy.

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I. Introduction

Hoarseness is a term used to describe change in normal voice quality. It is a generic term used to describe a wide range of vocal abnormalities. The voice may sound breathy, raspy, strained, fatigued or show changes in volume or pitch.¹

It is invariably the earliest manifestation of a large variety of conditions directly or indirectly affecting the voice apparatus. Jackson and Jackson (1930) feel that hoarseness is the most important symptom of laryngeal disease and it is only absent when the cords and the motor mechanism are entirely free from disease.² True hoarseness from a laryngeal origin usually results in rough raspy voice.³

The etiology of hoarseness is very diverse and the etiological data varies greatly. Half of all patients presenting with a voice complaint have a benign lesion of the vocal fold.⁴The major three being nodules, polyps and cysts.⁵

Hoarseness (or dysphonia) is a symptom not a diagnosis and effective treatment recommendation cannot be made without determining underlying cause. The disease ranges from totally benign to the malignant.⁶ In India and other developing countries, due to the prevailing lower economic status, poor nutrition, poor general health of population, different food habits, smoking and drinking habits, unhealthy and different social customs influence the incidence of hoarseness.⁷

The most common causes of hoarseness are acute laryngitis, chronic laryngitis, polyps, cysts and nodules, laryngeal carcinoma, paralysis of the vocal cords, functional causes, various medications, such as diuretics, anticholinergics and antihistamines, hormonal disorders, such as thyroid and growth hormone problems, or the use of anabolic steroids, intubation (during anaesthesia) and ageing.⁸

Hoarseness is a common complaint in today's fast faced high stressed life. Laryngeal visualization is necessary to determine the status of the vocal folds. It can be done either with indirect, direct (both flexible and rigid) laryngoscopy or with stroboscopy. As hoarseness is a common presentation in ENT OPD, its evaluation using appropriate tools is important. Hence, we are conducting this study to determine the prevalence of

hoarseness among patients and also evaluate the pros and cons of indirect laryngoscopy and fibreoptic flexible laryngoscopy in OPD setting in our institute.

The current study is to determine the clinical profile, etiology and prevalence of hoarseness of voice and to compare the diagnostic accuracy of hoarseness of voice by indirect laryngoscopy with flexible direct laryngoscopy.

II. Materials And Methods

It was a cross sectional study where 90 adult patients of more than 18 years of age regardless of sex with a complaint of hoarseness attending outpatient department (OPD) under Department of Otorhinolaryngology, Regional Institute of Medical Sciences, Imphal, Manipur from September 2016 to August 2018. Patients unwilling to give informed written consent; voice change due to i) congenital ii) nasal and nasopharyngeal pathology iii) oral and oropharyngeal pathology iv) speech defects produced due to CNS lesion v) corrosive poison were excluded. Informed written consent was obtained from all participants.

Study variables such as age, sex, religion, occupation, educational qualification, personal history and family history, exposure variable, duration of disease are used. Outcome variables are measured using prevalence, co-morbidity, symptomatology (disorder of voice like hoarseness, respiratory obstruction, cough and expectoration, pain in throat, dysphagia, mass in neck).

A case of hoarseness is taken as any adult patient with history of change in voice quality for more than two weeks. A clinical history was taken followed by indirect laryngoscopy using laryngeal mirror (Mehta surgical emporium, Mumbai, India) for all patients coming with complaint of hoarseness of voice for more than 2 weeks, after which, the patient was sent for all routine investigations.

For cases with normal investigation reports, direct laryngoscopy was done using direct flexible laryngoscope (Olympus flexible laryngoscope, Olympus electronics, Shinjuku, Tokyo, Japan). Cases with abnormal investigation profile were managed accordingly on case to case basis provided there are no contraindications for direct laryngoscopy.

PROCEDURES:

Indirect laryngoscopy-

Patient was seated opposite to the examiner, erect with the head and chest leaning slightly towards the examiner. He was asked to protrude his tongue which was wrapped by gauze and held by the examiner between the thumb and middle finger. Index finger was used to keep the upper lip or moustache out of the way. Gauze piece was used to get a firm grip of the tongue and to protect it against injury by lower incisors.

Laryngeal mirror size 4 to 6 were warmed and tested on the back of hand and was introduced into the mouth firmly against the uvula and soft palate. Light was focussed on the laryngeal mirror and patient was asked to breathe quietly. To see movements of the cords, patient was asked to take deep inspiration (abduction of cord), say "Aa" (adduction) and "Ee" (for adduction and tension). Movements of both the cords were compared.

Flexible direct laryngoscopy-

In difficult cases, where laryngeal examination cannot be performed with a mirror due to anatomical abnormalities or intolerance of mirror by the patient, a flexible rhinolaryngoscope was used. It is passed through the nose under local anaesthesia and gives a good view of larynx, laryngopharynx, subglottis and even upto trachea. It was an outdoor procedure.

STATISTICAL ANALYSIS:

Data collected and entered in IBM SPSS Statistics 21 for Windows (IBM Corp. 1995, 2012). Descriptive statistics like mean and standard deviation was used for age, sex, etc. and percentages was used for religion, education etc. Chi square test will be used for comparing two proportions and independent t test will be used for comparing two means. A p value of <0.05 will be considered as significant. Further an ethical approval was obtained from the Institutional Research Review Board of RIMS.

III. Results And Observations

A total of 1,02,698 patients attended Otolaryngology department, RIMS during the study period of which 90 patients presented with hoarseness of voice and were evaluated. Thus, the prevalence rate of hoarseness for this study was 0.08%.

Out of 90 patients, the median age of the patients was 42.5 (IQR: 31.5-54.0) years with a minimum of 18 years and maximum of 82 years. Majority of the patients were in the age group of 21-40 years (figure 1).

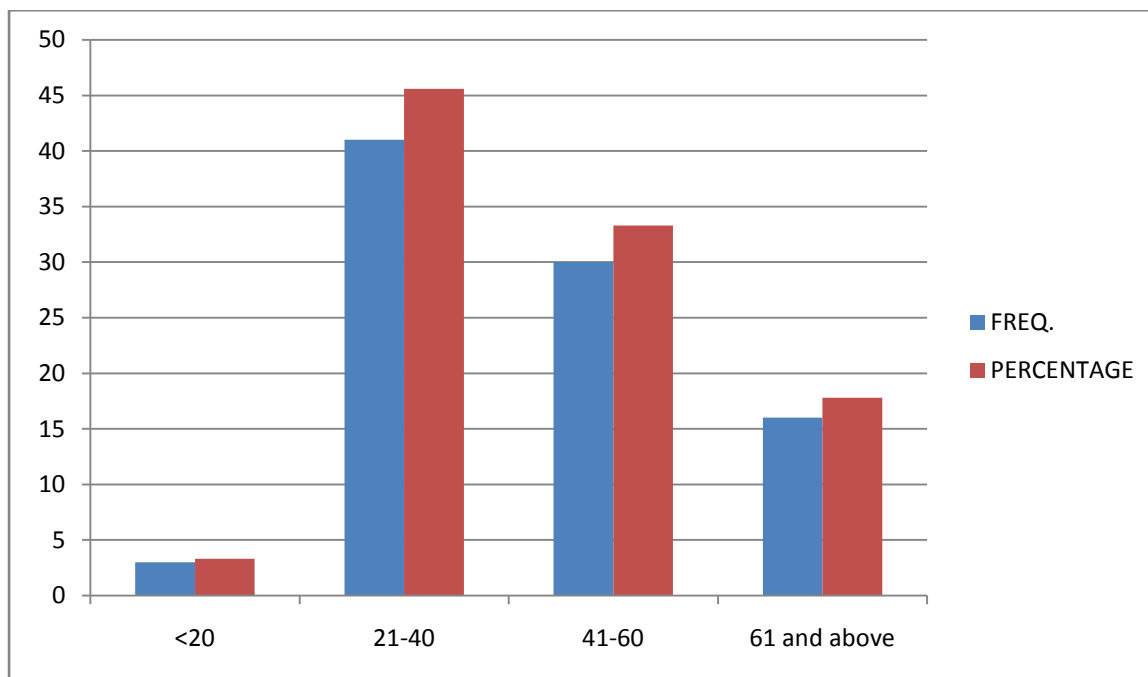


Fig.1: Age distribution of the patients.

The sex distribution shows male preponderance with a male and female ratio of 1.4 : 1 (figure 2).

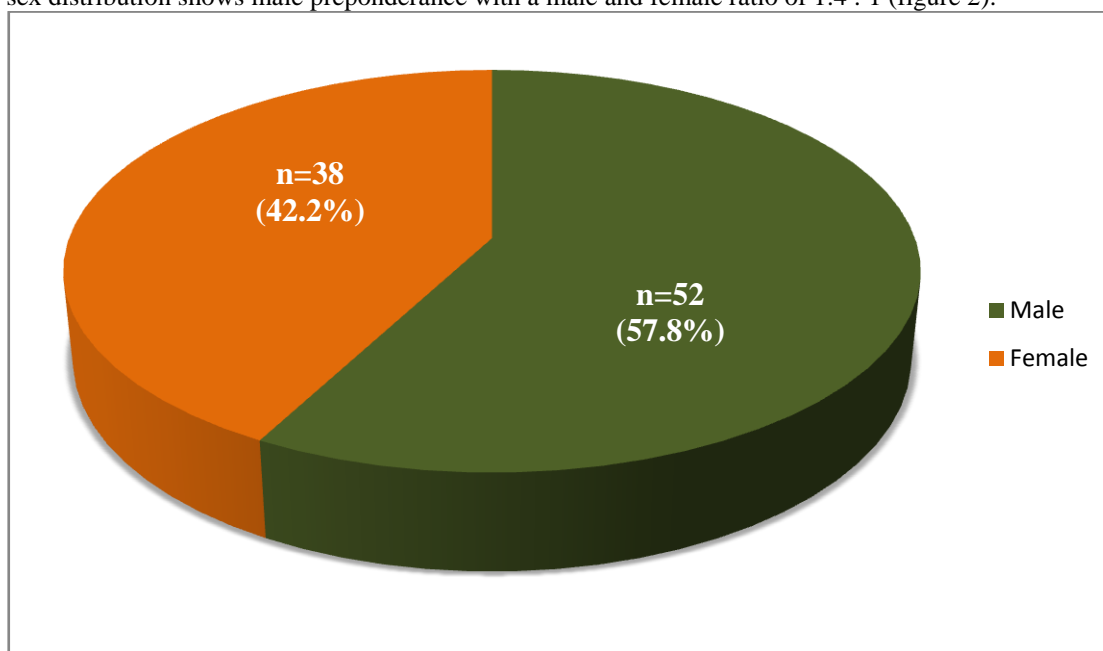


Figure 2. Sex distribution of patients.

More than half (53.4%) of the patients were from rural setting while remaining 46.60% belongs to urban area (Figure 3).

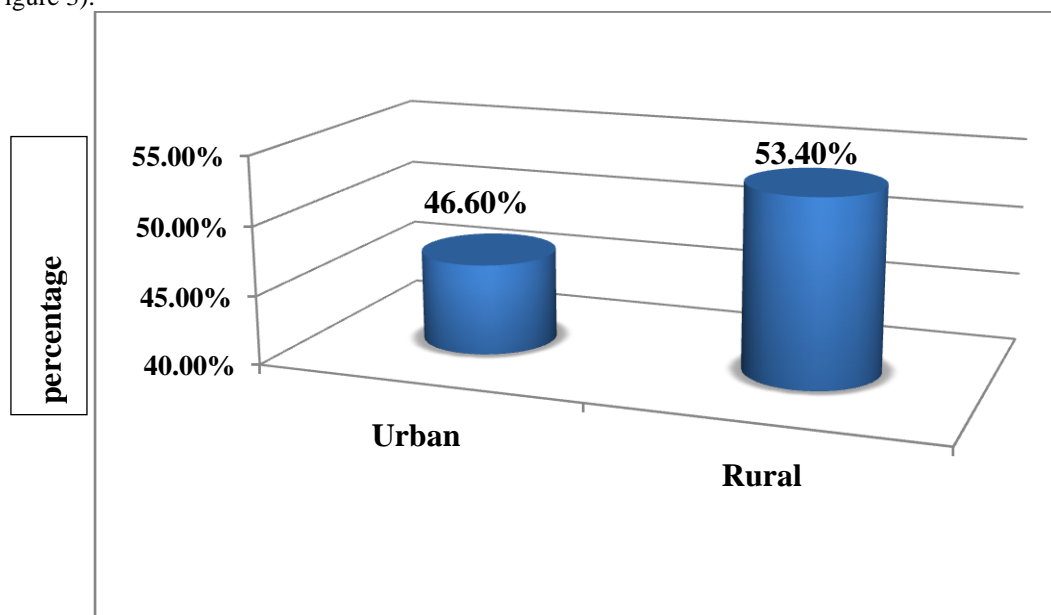


Figure 3: Area of residence

One third (33.3%) of the patients were unemployed followed by homemaker which constituted 18.9% of the patients. Majority of the patients (34.4%) had completed matriculation. More than half (56.7%) were Hindu by religion followed by Christian and muslim.

Table 1. Socio-demographic characteristics of the patients in study group with hoarseness of voice (N=90)

Characteristics	Frequency (n)	Percentage
Occupation		
Unemployed	30	33.3
Homemaker	17	18.9
Government employee	15	16.6
Student	11	12.3
Driver	8	9.0
Teacher	4	4.4
Others	5	5.5
Education		
No formal education	27	30.0
Under matriculation	24	26.7
Matriculation	31	34.4
Higher secondary and above	8	8.9
Religion		
Hindu	51	56.7
Christian	22	24.4
Muslim	17	18.9

Table 2. Diagnostic accuracy of hoarseness of voice by indirect laryngoscopy and flexible direct laryngoscopy (N=90)

Diagnosis	IDL	FDL	NPV (%)	Sensitivity (%)	PPV (%)	Specificity (%)	p-value
Carcinoma Larynx	14	15	97.4	86.7	92.9	98.7	<0.01
RT Induced	4	4	100	100	100	100	<0.01
Acute	10	11	98.8	90.9	100	100	<0.01

Laryngitis							
LPR	10	10	98.8	90	90.00	98.8	<0.01
VC Nodule	18	22	94.4	81.8	100	100	<0.01
VC Palsy	5	5	100	100	100	100	<0.01
Chronic Hyperemic Laryngitis	16	15	98.7	93.3	98.7	98.7	<0.01
VC Polyp	6	8	97.6	75	100	100	<0.01

*NPV = Negative predictive value, PPV = Positive predictive value

14 cases were diagnosed positive for Ca Larynx by IDL with a Sensitivity of 86.7% and Specificity of 98.7%.

15 patients were diagnosed by FDL as Ca Larynx with a Positive Predictive Value (PPV) of 92.9% and Negative Predictive Value (NPV) of 97.4% .

10 cases of Acute Laryngitis were diagnosed by IDL with a Sensitivity of 90.9% and Specificity of 100%.

11 patients diagnosed by FDL as Acute Laryngitis with a Positive Predictive Value (PPV) of 100% and Negative Predictive Value (NPV) of 98.8%.

10 cases of LPR were diagnosed by IDL with a Sensitivity of 90.0% and Specificity of 98.8%.

10 patients were diagnosed by FDL as LPR with a Positive Predictive Value (PPV) of 9.00% and Negative Predictive Value (NPV) of 98.8%.

5 cases were diagnosed positive for Vocal Cord palsy by IDL and FD with a Sensitivity, Specificity, PPV and NPV of 100%.

15 cases were diagnosed positive for chronic hyperemic laryngitis by IDL with a Sensitivity of 93.3% and Specificity of 98.7%.

15 patients were diagnosed by FDL as Chronic hyperemic laryngitis with a Positive Predictive Value (PPV) of 93.3% and Negative Predictive Value (NPV) of 98.7%.

6 cases were diagnosed positive for Vocal cord polyp by IDL with a Sensitivity of 75.0% and Specificity of 100%.

8 patients were diagnosed by FDL as Vocal cord polyp with a Positive Predictive Value (PPV) of 100% and Negative Predictive Value (NPV) of 97.6%.

IV. Discussion

Hoarseness is not a disease, but only the manifestation of a disease.¹¹ It is one of the commonest symptoms of a variety of self-limiting conditions like acute laryngitis to severe life-threatening malignancies.

In a study conducted by BaithaS et al¹⁰ and BabuS et al² reported incidence of hoarseness as 0.32% and 0.45% among total OPD patients and incidence among new cases as 0.66% and 0.64%. In present study, a total of 90 cases of hoarseness of voice were studied during the study period. The incidence of hoarseness among total OPD patients was found to be 0.08% which is much lesser than other study.

The age of the patients in our study ranged from 18 years to 82 years with median of 42.5 (IQR: 31.5-54.0) years. Majority of the patients were in the age group of 21 to 40 years (45.6%) according to study conducted by Baitha et al¹⁰ correlates with the finding of other authors.

. In a study conducted by James S et al⁸ and BaithaS et al¹⁰ majority of the patients were unemployed followed by housewife which could be due to the fact that most of the patients were from rural background and low educational qualification. This findings corresponds to studies done by GhoshS et al¹² where majority of the patients were housewife by occupation.

In our study majority of patients (53.40%) were from rural area and 46.6% were from urban area. Also in study by Baitha et al¹⁰ patients were predominantly from rural areas comprising of 75.5%.

Ghosh et al,¹² found vocal abuse in 72% of cases. Khammas AH et al³⁰ reported 53.68% of patients having history of smoking and BabuS et al² reported Smoking was commonest predisposing factor (44.22%) followed by vocal abuse (30.28%). The most common pre-disposing factor in present study was vocal abuse (42.22%), followed by Smoking (41.11%).

In our study we conducted both Indirect laryngoscopy and Flexible direct laryngoscopy. In both cases, Vocal cord Nodule was the most common aetiology (IDL=20% and FDL=24.44%). Vocal nodules were the commonest aetiology in study by Ghosh et al¹² with incidence of 30%. Carcinoma of larynx (FDL=16.66% and

IDL=15.55%) and Chronic hyperemic Laryngitis (FDL = 16.66%, IDL = 17.77%) were the second common aetiology in our study.

Of the 14 cases that were diagnosed positive for Ca Larynx by IDL, 13 cases have been found to be positive by FDL, while 1 was negative. Of the 76 patients who were diagnosed negative by IDL, 74 were diagnosed as negative by FDL, while 2 were positive by FDL. This translates into a Sensitivity of 86.7% and Specificity of 98.7%.

Of those 15 patients who were diagnosed by FDL as Ca Larynx, 13 were positive by IDL while 2 were negative. Of the 75 who were diagnosed negative, 74 were negative according to IDL; this translates into a Positive Predictive Value (PPV) of 92.9% and Negative Predictive Value (NPV) of 97.4%.

Of 10 cases who were diagnosed positive for Acute Laryngitis by IDL, all cases have been found to be positive by FDL. Of the 80 patients who were diagnosed negative by IDL, 79 were diagnosed as negative by FDL, while 1 was positive by FDL. This translates into a Sensitivity of 90.9% and Specificity of 100%.

Of those 11 patients who were diagnosed by FDL as Acute Laryngitis, 10 were positive by IDL while 1 was negative. Of the 79 who were diagnosed negative, all were negative according to IDL. This translates into a Positive Predictive Value (PPV) of 100% and Negative Predictive Value (NPV) of 98.8%.

Of 10 cases who diagnosed positive for LPR by IDL, 9 cases have been found to be positive by FDL, while 1 was negative. Of the 80 patients who were diagnosed negative by IDL, 79 were diagnosed as negative by FDL, while 1 was positive by FDL. This translates into a Sensitivity of 90.0% and Specificity of 98.8%.

Of those 10 patients who were diagnosed by FDL as LPR, 9 were positive by IDL, while 1 was negative. Of the 80 who were diagnosed negative, 79 were negative according to IDL, while 1 was positive. This translates into a Positive Predictive Value (PPV) of 90.0% and Negative Predictive Value (NPV) of 98.8%.

Of 5 cases who were diagnosed positive for Vocal Cord palsy by IDL, all cases have been found to be positive by FDL. Of the 85 patients who were diagnosed negative by IDL, all were diagnosed as negative by FDL. This translates into a Sensitivity, Specificity, PPV and NPV of 100%.

Of 15 cases who diagnosed positive for chronic hyperemic laryngitis by IDL, 14 cases have been found to be positive by FDL, while 1 was negative. Of the 75 patients who were diagnosed negative by IDL, 74 were diagnosed as negative by FDL, while 1 was positive by FDL. This translates into a Sensitivity of 93.3% and Specificity of 98.7%.

Of those 15 patients who were diagnosed by FDL as Chronic hyperemic laryngitis, 14 were positive by IDL while 1 was negative. Of the 75 who were diagnosed negative, 74 were negative, while 1 was positive according to IDL. This translates into a Positive Predictive Value (PPV) of 93.3% and Negative Predictive Value (NPV) of 98.7%.

Of 6 cases who diagnosed positive for Vocal cord polyp by IDL, all cases have been found to be positive by FDL. Of the 84 patients who were diagnosed negative by IDL, 82 were diagnosed as negative by FDL, while 2 were positive by FDL. This translates into a Sensitivity of 75.0% and Specificity of 100%.

Of those 8 patients who were diagnosed by FDL as Vocal cord polyp, 6 were positive by IDL while 2 was negative. Of the 82 who were diagnosed negative by FDL, all were negative by IDL. This translates into a Positive Predictive Value (PPV) of 100% and Negative Predictive Value (NPV) of 97.6%.

Thus, according to our study findings Flexible Direct Laryngoscopy has been found to be a reliable diagnostic procedure that is very sensitive and specific.

V. Conclusion

A total of 90 cases of hoarseness of voice were studied during the study period. The incidence of hoarseness among total OPD patients was 0.08%. The age of the patients in our study ranged from 12 years to 82 years. More than half (57.8%) of the patients were males with an M: F of 1.4:1. Majority of the patients were unemployed and more than half of them were from rural areas. The most common pre-disposing factor in our study was vocal abuse (42.22%), followed by Smoking (41.11%). In our study we conducted both Indirect laryngoscopy and Flexible direct laryngoscopy. In both cases, Vocal cord Nodule was the most common aetiology (IDL=20% and FDL=24.44%). Carcinoma of larynx (FDL =16.66% and IDL =) and Chronic hyperemic Laryngitis (FDL = 16.66%, IDL = 17.77%) were the second common aetiology in our study. The sensitivity, specificity, positive predictive value and negative predictive value of different aetiology by FDL were all high (majority above 90%). Thus, according to our study findings Flexible Direct Laryngoscopy has been found to be a reliable diagnostic procedure that is very sensitive and specific.

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