



Clinical Profile of Laryngeal Lesions in Tertiary Care Hospital: Stroboscopy

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Abstract

Introduction: The purpose is to study various laryngeal lesions through stroboscopic examination in patient visiting otorhinolaryngology outpatient department in a tertiary care hospital and to evaluate the various risk factors associated with laryngeal lesions.

Methods: It was a 2 years cross sectional study done from October 2020 to October 2022 in a tertiary care hospital. The relevant clinical details pertaining to age, sex, chief complaints and addiction history were taken from medical records. A total number of 175 cases were studied who were attending hospital with different laryngeal symptoms through stroboscopy.

Results: Out of the total 175 patients, 65 females and 115 males were evaluated with mean for age is 54.69, standard deviation for age is 15.56, median for age is 57. Benign laryngeal pathologies constituted 85(48.57percent) of total laryngeal pathology and the malignant group constituted 51.43 (90) percent of total population. 45.14 percentage of total population presented with no addiction history while the remaining 54.86% gave history of substance abuse.

Conclusion: Supraglottic carcinoma formed the major proportion of laryngeal pathology in our study on patient presented with laryngeal pathology. Tobacco and alcohol intake and smoking has shown to be a potential risk factor for laryngeal malignancy.

Keywords: Functional Dysphonia; Carcinoma *In Situ*; Laryngopharyngeal Reflux; Videolaryngoendoscopy; Videolaryngostroboscopy

Introduction

Voice disorders are common [1]. This epidemiologic study provides valuable information regarding the prevalence of laryngeal disorders, factors that contribute to laryngeal disorder vulnerability, and the functional impact of laryngeal problems on day to day life of an individual. But true prevalence of laryngeal disorders in the general population remains undetermined. In the absence of acceptable

epidemiologic data, it is difficult to precisely identify specific populations at risk, to delineate the causes and effects of laryngeal disorders, to develop early screening procedures to identify those at risk, to estimate societal costs related to laryngeal disorders, and to plan health care services designed to prevent or treat such problems. Most benign and precancerous lesions of the larynx are located on the vocal folds, and almost half of the malignant laryngeal tumors involve the glottis.

Symptoms reported by patients and risk factors are very similar for benign, precancerous and malignant lesions, which makes clinical differentiation impossible. Progression of benign to precancerous and malignant lesions is often observed. Diagnosis and distinguishing between benign, precancerous and malignant lesions at an early stage would make it possible to plan radical treatment during the first laryngeal microsurgery. Currently, indirect laryngoscopy is routinely performed in patients with laryngeal pathology. Due to the anatomy of the vocal folds and a unique mechanism of phonatory vibrations, it is feasible to assess the vibration on stroboscopy in the case of pathology involving glottis. The first stroboscopic examination was conducted in 1878 by Oertel. The image obtained during stroboscopy was however, a virtual image of the vocal cord vibration adjusted to the image registration rate of the human retina (5 movements per second) [2].

With the introduction of stroboscopy began the new era of laryngeal studies as it provides a documented record of laryngeal pathology. So, we can say that stroboscopy is a revolution in the study of laryngeal pathology. Stroboscopy also detects various movements of vocal cords with voice production so that diseases such as functional dysphonia can be detected very easily. Early detection is possible in laryngeal malignancy. Stroboscopy can be performed using either a rigid (oral) endoscope or a flexible endoscope. Stroboscopy is a highly subjective diagnostic technique and involves full cooperation of the subject and yet it is one of the best diagnostic methods for laryngeal pathology like inflammatory etiology (acute laryngitis, chronic suppurative laryngitis chronic non-suppurative laryngitis, vocal nodules vocal Polyp), neoplastic etiology (carcinoma larynx, benign tumor), vocal cord paralysis, foreign body and functional dysphonia. Diagnosis is the basis of treatment decisions [3]. Stroboscopy is an invaluable instrument in the armamentarium of the laryngeal surgeon. Laryngeal stroboscopy is arguably the most important clinical tool for the evaluation and treatment of patients with voice disorders. Unfortunately, at present, laryngeal stroboscopy is strictly a clinical tool and has no definitive use in the area of voice research. The limitation of laryngeal stroboscopy is the subjective nature of the interpretation of the video examination. A video stroboscopy research tool was developed using 10 stroboscopic parameters selected from the literature and clinical practice.

Purpose of this study was to evaluate the diagnostic value of stroboscopy for voice disorders related to laryngeal pathology and also the risk factors associated with laryngeal pathologies and apply results in evidence-based health care. Patients with various complaints like difficulty in swallowing, difficulty in breathing, voice change, throat pain were examined stroboscopically and studied prospectively.

Materials & Methods



Figure 1: Stroboscopy Unit.

This is an observational cross-sectional study in a tertiary care hospital from October 2020 to 2022 visited in otorhinolaryngology department. The study was done after institutional ethical committee clearance.

Data Collection

Data related to stroboscopy findings of laryngeal pathology were collected based on symptoms presented by the patient during Out-patient department visit. A detailed history of every patient was taken including patient age, sex, demographic, occupational, social status, chief complaints, associated complaints, symptoms duration, symptoms onset, symptom aggravating and relieving factors, diurnal variation if any, addiction history, medical history, tuberculosis history, any vocal abuse history, prolonged hospital admission history, intubation history.

Inclusion criteria:

We included all patients with five main clinical symptoms during Outpatient department visit in whom we have done stroboscopy. These are:

- Voice change,
- Difficulty in swallowing,
- Difficulty in breathing,
- Neck swelling,
- Throat pain

Exclusion criteria:

- Patient with age below 5 years,
- Patient with psychiatric illness,
- Uncooperative patients
- Patient not giving consent for stroboscopy,
- Severe trismus with mouth opening less than 2 fingers,
- Patient with maxillofacial trauma,
- Patient with head injury.

Study Design

This is an observational cross-sectional study.

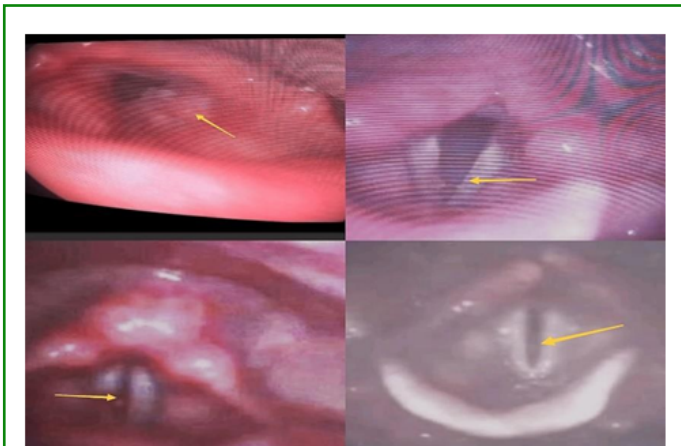


Figure 2: Stroboscopic Pictures with Growth over Vocal Cord, Vocal Nodules, Vocal Polyp, Vocal Paresis with Phonatory Gap.

Sample Size

Assuming annual out-patient department of otorhinolaryngology of 10000 with 5% case of disease of interest at 95% confidence interval with 80% power of test and absolute allowable error that is sample size to be 175.

Statistical Analysis

The data collected were entered in Microsoft Excel. The data was initially analysed using frequencies, mean, median and standard deviation. The statistical test used is chi square test.

Results

Detailed history of patient was taken including name, age, sex, habits, clinical symptoms and after all, stroboscopic examination was done for patient that are suspected to

have laryngeal pathologies. Total cases included were 175 amongst which 65 were female (37.14%) and 115 male (62.86%) with Mean age of 54.7.

Age	Numbers
Up to 20	3
21-30	15
31-40	21
41-50	27
51-60	38
61-70	48
71-80	18
81-90	5

Table 1: Age Distribution.

Benign laryngeal pathologies included laryngitis (24), Vocal polyp (7), Vocal palsy (9), and vocal nodules (5) Constituted 86 (49.14 percent) of total laryngeal pathology and the malignant group that included glottic cancer (16), hypopharyngeal cancer (9), oropharyngeal cancer (1), supraglottic cancer (45), Oesophageal cancer (14), postop CT RT Oral cancer (4) constituted 50.85 (89) percent of total population. Patient with laryngeal symptoms like difficulty in swallowing, change in voice with complaining of reflux were included under normal findings (41). In oesophageal carcinoma there is pooling of saliva seen during stroboscopic examination. In post op CT RT Oral cancer there is diffuse oedema present along with mucositis changes. In hypopharyngeal and oropharyngeal cancer there is additional involvement of larynx with laryngeal complaints.

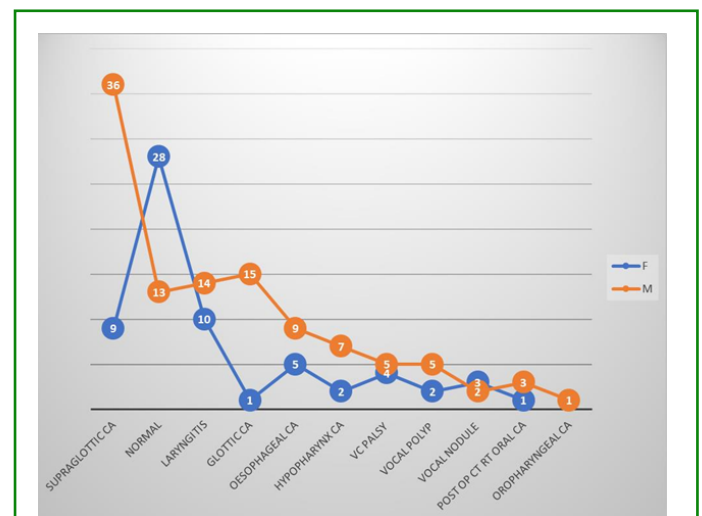


Figure 3: Comparison of laryngeal pathology in male and female.

This study shows the distribution of patients with laryngeal pathologies associated with history of addiction, among which patient with no addiction constituted major proportion that was 45.14 % of total population while the remaining 54.86% gave history of substance addiction among which tobacco chewing habit present in 52 studied patients and smoking (27) being the second prevalent habit. Diagnostic along with clinical analysis was carried out and it was found that the 48 percent that is 84 patients out of 175 total studied patient presents with voice change. 127 patients presented with complaints of difficulty in deglutition for solid, liquid or semisolid. 17 out of 175 observed patients visiting our tertiary care centre presented with complaints of difficulty in breathing. Significant neck node was the presenting clinical finding in 28 patients (16%).

Graph demonstrates comparison of laryngeal pathologies in males and females in which 36 male patients presented with supraglottic cancer in comparison to only 9 female patients. This study demonstrates a strong association between supraglottic malignancy and smoking. Out of 45, 20 patients of supraglottic malignancy in our study gave history of smoking.

These values had been compared using chi square test. While

Addiction				Chi square value	P value	Odds ratio	Confidence interval	
Cancer	0	1	Total				Lower limits	Upper limits
0	63	22	85	58.4	<0.001*	14.3	6.85	29.9
1	15	75	90					
Total	78	97	175					

Table 2: Association between habits or addiction and cancer.

Discussion

Triaridis S [4] concluded that for one third of the study's population stroboscopy established the diagnosis (43 patients, 28.8%) by identifying the etiology of dysphonia or changing the initial diagnosis [4]. Rosen CA [5] represents the first dedicated research regarding the development of a stroboscopy research instrument utilizing video perceptual analysis [5]. Elias ME, et al. [6] compared Stroboscopy with laryngoscopy in 732 patients and found stroboscopy, "to be useful or essential in 68% of the cases" Stroboscopy modified the initial diagnosis, determined through use of laryngoscopy, in approximately 17-23% of his cases [6]. Sercarz JA, et al. [7] stated that stroboscopy modified the diagnoses of 47% of the patients reviewing an initial examination using laryngoscopy [7]. In 1987, Sataloff RT [8] estimated in a series of 486 examinations that stroboscopy was useful in diagnosing voice disorders in one third of the professional voice users [8]. In a study by Rasheed AM [9] 97 cases of benign vocal

reporting the data in the given below table the chi square statistic value was found to be 58.4 with degree of freedom to be 1 (p value <0.001). We are also reporting the odds ratio for the same with the confidence intervals as stated above. People who had addictions had 14.3 times higher chances of developing cancer than those who do not have addictions.

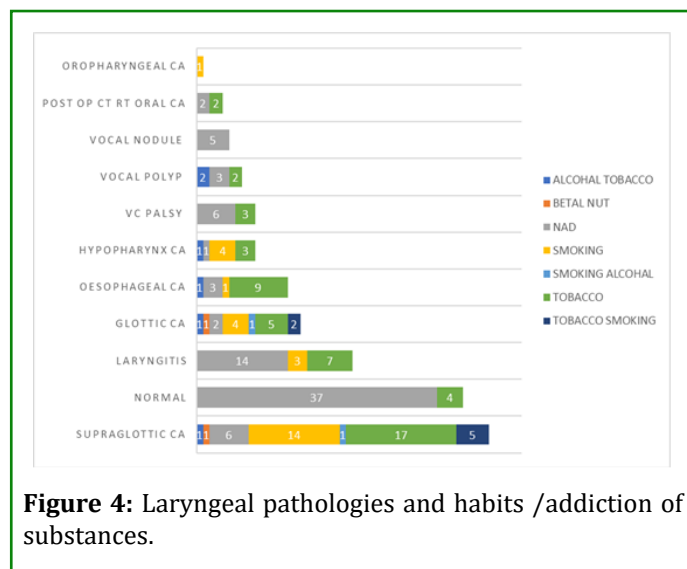


Figure 4: Laryngeal pathologies and habits /addiction of substances.

cord lesions were seen, of which vocal cord nodule (22.3%) is most common.

In a study by Kelley RT, et al. [10] vocal cord oedema is most common diagnosis followed by vocal cord polyp. (25% oedema, 21.8% polyps, 7.6% nodules, 8.2% mucosal cysts, 7.1% intracordal cysts, 12.5% sulcus, 1.6% mucosal bridges, 6% contact lesions, 2.2% vascular lesions, 5.4% keratosis and 1.1% fibrosis). In study conducted by Uloza V, et al. [11] the most common diagnosis is vocal cord nodule (25 cases), followed by laryngeal cancer (12cases). In study conducted by Sulica L [12] of total 105 patients laryngeal nodule seen in 12 (17.9%) and laryngeal cancer seen in 10 (14.9%). In 9 (13.4%) cases normal finding is noted. There were no significant findings in 3 cases. VC nodule was observed as the most common pathology followed by vocal polyp, carcinoma and chronic laryngitis. It was also observed that there was statistically significant difference (p<0.001) in pre and post treatment findings of different parameters of voice evaluated

using stroboscopy. In the study it was observed that the most common risk factors for vocal abnormalities was voice abuse (62%) followed by smoking (44%), LPRD (30%) and alcohol (22%) [13]. Videolaryngoendoscopy, complemented by videolaryngostroboscopy, which has previously been used mainly for the functional assessment of the vocal folds, is now becoming an indispensable tool in everyday clinical practice for a head and neck oncologist [14].

There are several types of treatments for voice disorders; broad categories of treatments are pharmaceutical, surgical and behavioural. Treatment outcome measures are used to evaluate the efficacy of these treatments in research studies and clinical practice. There are several different types of outcome measures available to evaluate the effectiveness of a treatment for voice disorders including: patient report, perceptual assessment, acoustic analysis, aerodynamic measures, and laryngeal imaging. However, this study is also not without limitations, interpretation and value of stroboscopic findings are directly linked to training and skills of the operator. Stroboscopy has an outstanding ability to observe the anatomy and function of the glottis during phonation. It provides the opportunity to evaluate the larynx while engaging in a variety of phonatory activities like habitual misuse of voice. Stroboscopy may also be repeated, recorded, and is reasonably priced. It has a better grasp of the diagnostic values on stroboscopy for patients with benign laryngeal illnesses. Patients with mild vocal fold edge lesions, persistent dysphonia and people who regularly use their voice professionally, are whose particular nature could not be determined by indirect laryngoscopy. The results of such large epidemiologic study provide valuable information regarding the prevalence of different laryngeal pathology by stroboscopy. Using these data, education and preventative programs can create for specific demographics. Furthermore, once a laryngeal disease is identified, planning and assigning healthcare resources to treat it can be done.

Conclusion

The present study is cross sectional observational study of 2 years done from October 2020 to October 2022 in a tertiary care hospital. A detailed history with presenting complaints, age, sex, habits was taken, a complete laryngeal examination was done by stroboscopy and risk factor associated with laryngeal pathologies were evaluated.

A total of 175 cases which came under my inclusion criteria during the study period. Most predominant clinical presentation of patients in our study is dysphagia. Neoplastic lesions constituted 89 out of 175, majority of them were seen are of supraglottic cancer. Out of total malignant lesions, majority of cases are of supraglottic cancer. Out of malignant cases, patients with habit of tobacco consumption

constituted major group. Mean for age is 54.69, standard deviation for age is 15.56, median for age is 57, IQR for age is 22. In our study, chi square statistic value was found to be significant (p value <0.001). People who had addictions had 14.3 times higher chances of developing cancer than those who do not have any addictions.

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