

ORIGINAL ARTICLE

Utility of Flexible Fiberoptic Nasolaryngoscopy in Assessment of Laryngeal Lesions Among Suspected Patients Living in Karachi, Pakistan

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ABSTRACT

Objective: To assess the utility of flexible fiberoptic nasolaryngoscopy in diagnosing laryngeal lesions and identifying factors contributing to the development of serious laryngeal pathologies among suspicious patients.

Methods: A cross-sectional study was conducted from August 2017 to August 2018 at Dow University Hospital. Patients who came to an ENT outpatient clinic with a complaint of hoarseness, dysphagia, and sortness of breath (SOB) were asked to undergo Fiber optic direct laryngoscopy (FODL) examination. Laryngeal pathologies were noted on FODL along with demographic characteristics, presenting complaints, and aggravating factors.

Results: Findings of the FODL showed that amongst 86 patients with regular complains of upper respiratory disease, lesions were found to be higher in vocal cords (n=34, 39.5%), followed by posterior pharyngeal walls (n=19, 22.1%), and pyriform fossa (n=13, 15.1%). A significant association of pyriform was observed with history of radiation (p-value 0.023). Similarly, posterior commissure was also found significantly associated with history of radiation (p-value 0.041). Moreover, exposure to air pollution was also found significantly associated with ary epiglottic folds (p-value 0.036), ventricular bands (p-value 0.004), vocal cords (p-value 0.004), anterior commissure (p-value 0.017), sub-glottis (p-value 0.016), and posterior pharyngeal walls (p-value 0.046).

Conclusion: Efficacy of fiberoptic nasolaryngoscopy in diagnosing laryngeal lesions among patients with regular complains of upper respiratory tract was found significant especially in thick populated industrial city. We recommend flexible nasolaryngoscopy examination in routine checkups at primary and secondary health units as it is low-cost and free of anesthesia risk and therefore can reduce burden of advanced disease from society.

Keywords: Fiberoptic Laryngoscopy, laryngeal diseases, hoarseness, throat symptoms

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INTRODUCTION

Laryngopharyngeal diseases are very common throughout the world.¹ Numerous factors contribute to the development of laryngeal disorders. Various studies have reported environmental pollution and smoking dietary practices as a major contributing factors for

larynx and hypopharynx diseases in a metropolitan town like Karachi.²⁻⁵

Incidence of malignancy of the head and neck has increased over the past decade.^{5,6} Current data from the Karachi Cancer Registry suggest that oral cavity cancer has the highest incidence among all male cancers and the second highest among all female cancers.⁷ The most commonly

affected site in head and neck is buccal mucosa followed by lateral tongue border and then laryngopharyngeal area.⁸ Oral cavity and oropharynx tumors are given early attention by the patient and primary physician due to easily visible sites. On the other hand, larynx tumors are not directly visible to the patient or primary physicians. Other throat diseases, with the exception of vocal fold diseases, are either symptomless at an early stage or start with vague symptoms. Even if symptoms appear, the orolaryngeal region is considered a difficult area for a primary physician to examine.

Mirror examination is used as a basic tool to examine laryngopharynx, but its use is limited due to reduced mouth opening or excessive gag reflex. Flexible nasolaryngoscopy is a significant diagnostic tool in investigating patients with laryngeal/ voice disorder.⁹ So, patients with these disorders do not consult otolaryngologist till the advanced stage of the disease which greatly affects disease outcome resulting in increased morbidity and even mortality.

Fiberoptic direct laryngoscopy (FODL) has greatly helped otolaryngologist in early detection of larynx and hypopharynx anomalies.¹⁰⁻¹³ It is used as an office based procedure under local-anaesthesia via 4% topical xylocaine spray over nose and throat.

FODL allows otolaryngologist to directly examine detailed anatomy of nose, nasopharynx, larynx and hypopharynx. It also allows assessing laryngopharyngeal movements during deglutition and vocal cords movements during phonation. So, it is the best tool to assess laryngopharyngeal functions during swallowing and phonation, in centers, where facility of very expensive stroboscopy is not available.⁴

In this study, we used FODL as a tool in finding out etiopathogenesis of various laryngopharyngeal disorders and studied its use in individuals at risk of developing laryngeal anomalies.

METHODS

A cross sectional study was conducted in Dow University Hospital from August 2017 to August 2018. All patients above 18 years of age who came to outpatient clinic of ENT with complain of

hoarseness or change of voice, dysphagia and difficulty in breathing were asked for fiber optic laryngoscopy examination. Patients having anxiety or suffering with acute asthma were excluded.

A solution of 0.25% or 0.5% Xylometazoline sprayed in nose and another spray of 4% Xylocain was also applied in both nostrils to locally anesthetise nose and pharynx of the patient. A flexible fiberoptic direct laryngoscope of 0.5 mm diameter was introduced into either of nostril and negotiated through posterior chonae and nasopharynx to visualize laryngoharynx. The findings of FODL were also noted on a predesigned proforma that also includes information regarding the age, sex, occupation, exposure to pollution, associated habits such as smoking.

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008.

For the purpose of statistical analysis, SPSS version 23 was used. Mean \pm SD was calculated for quantitative variable like age of the patients. Frequency and percentages were calculated for qualitative variables like gender, presenting complaints, aggravating factors and lesion screened on flexible endoscopy. Comparison was also done to see the association of lesion screened on flexible endoscopy with baseline characteristics. Fisher-Exact test was applied. p-value <0.05 was taken as significant.

RESULTS

Out of total 86 patients, the mean age was 47.21 \pm 15.51 years. Majority (n=55, 64%) were males. Hoarseness was the most common complaint reported by 37 (43%) of the patients followed by dysphagia (n=17, 19.8%) and shortness of breath (n=10, 11.6%). The most common aggravating factor was substance abuse (n=28, 32.6%). (Table 1)

The findings of flexible endoscopy screening showed that the highest number of lesion was found on vocal cords (n=34, 39.5%), followed by posterior pharyngeal wall (n=19, 22.1%),

Table 1: General characteristics of the patients (n=86)

	n	%
Age, years	47.21 ±15.51*	
Gender		
Male	55	64
Female	31	36
Presenting complaint		
Hoarseness	54	62.8
Dysphagia	21	24.4
SOB	12	14
Common aggravating factors		
Substance abuse	28	32.6
Exposure to air pollution	8	9.3
Voice Abuse	7	8.1
Neck trauma	2	2.3
History of radiation	5	5.8

*mean ±SD, n: number, SOB: Shortness of breath

pyriform fossa (n=13, 15.1%), posterior commissure (n=10, 11.6%), anterior commissure (n=10, 11.6%), ventricular bands (n=8, 9.3%), sub-glottis (n=7, 8.1%), epiglottis (n=6, 7%), ary epiglottis (n=6, 7%), base of tongue (n=4, 4.7%) while valleculae in 3 (3.5%) patients. (Figure 1)

A non-significant association of lesion screened on FODL was observed with demographic variables and presenting complaint (p-value >0.05). Whereas comparison of aggravating factors showed that pyriform fossa was significantly associated with radiation history (p-value 0.023) followed by posterior commissure (p-value 0.041). (Figure 2) Furthermore, a significant association of exposure to air pollution was also observed with ary epiglottic folds (p-value 0.036), ventricular bands (p-value 0.004), vocal cords (p-value 0.004), anterior commissure (p-value 0.017), sub-glottis (p-value 0.016), and posterior pharyngeal wall (p-value 0.046). (Table 2)

DISCUSSION

Fiber-optic laryngoscopy in clinical setting carries greater chance in making early diagnosis of laryngeal as well as hypopharyngeal diseases including benign, pre-malignant and malignant lesions especially in those who cannot tolerate indirect mirror laryngoscopy.¹⁴

Although it is recommended to utilize FODL examination as screening tool for early detection of laryngeal and hypopharyngeal lesions. However in a survey it was found that 56% otolaryngologists do not perform FODL, mostly either due to non-availability of fiberoptic flexible laryngoscopes or because of lack of expertise in performing procedure.¹⁵ Zhaoyong et al¹⁶ reported presence of heavy metals loaded industrial dust in environment. Therefore presence of metalloids particles in free air have become one major reason for development of premalignant and malignant lesions of aerodigestive tract. Since Karachi is a major industrial city, the majority of its inhabitants face problems of air pollution and air borne allergies. People are at risk because of thick congested population causing pollution which is typical of industrial cities, hence habitant of industrial cities have higher chances of developing laryngeal abnormalities.

Most of the general physicians are not skilled in doing mirror laryngoscopy or FODL. The lack in performing these basic clinical examination in routine practice has led to failure in early detection of even minor pathologies that might ultimately progress into advanced stage and hence increase burden of diseases upon tertiary healthcare centers. These diseases if identified at their early hospital visits, would definitely result

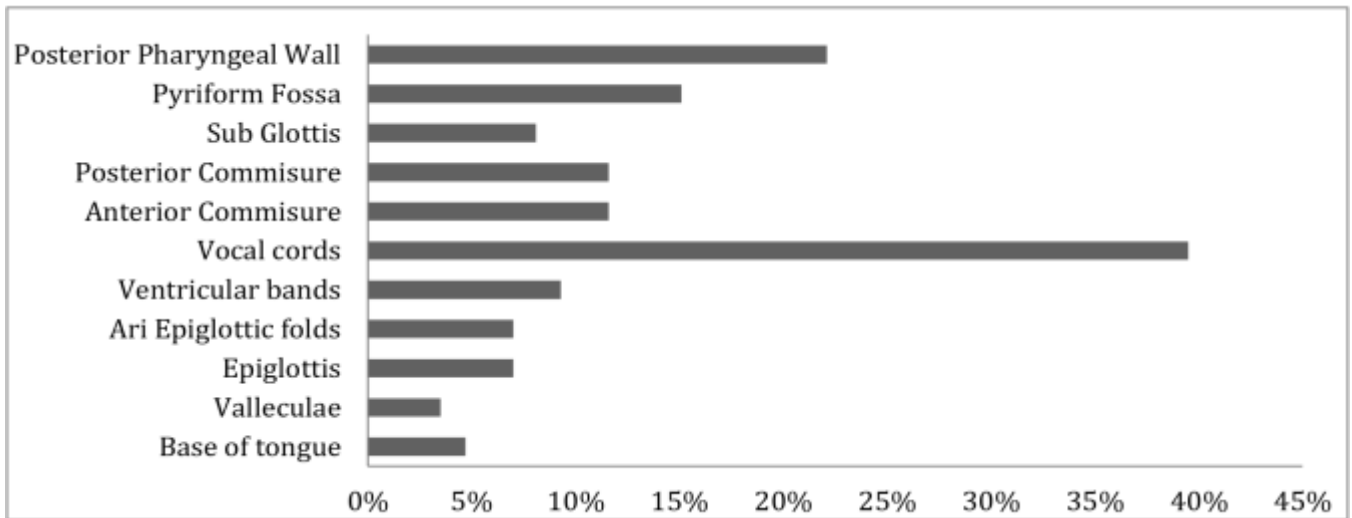


Figure 1: Frequency of lesion screened on flexible endoscopy (n=86)

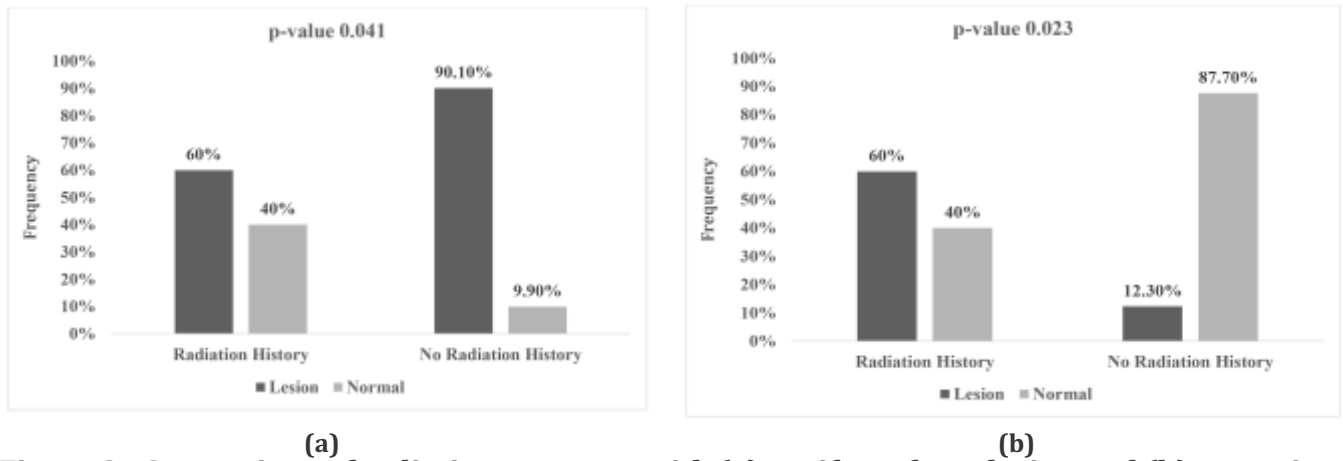


Figure 2 : Comparison of radiation exposure with (a) pyriform fossa lesion and (b) posterior commissure lesion

in better outcome. As in our study, 4.7% subjects had minor ulcers on their base of tongue and 3.5% had small masses at valleculae, raised the strong suspicion of being malignant were later diagnosed as so on biopsy, making their definitive treatment possible at an initial stage with successful outcome.

Symptoms of supra-glottic and glottic anomalies often mimic with common upper respiratory tract diseases e.g. sore throat, post-nasal drip, laryngopharyngeal reflux (LPR), allergic pharyngitis, laryngitis and need to be appropriately differentiated by taking history and doing proper clinical laryngoscopic examination of patients along with FODL. The diagnostic accuracy remain only around 5% in patients presenting with change in voice, sore throat and dysphagia if fiberoptic direct laryngoscopy is not performed, while accuracy

increases upto 68.3% with endoscopic assessment.¹⁷ This finding was also reflected in our study where 34% patients referred from other centres with failed diagnosis for any laryngeal problems were found to have masses at ari epiglottic folds, pyriform fossae, and vocal cords on FODL.

In the current study, hoarseness was the most common complaint reported followed by dysphagia and shortness of breath. The most common causative factor was identified as tobacco substance abuse.

American Broncho-esophageal Association reported that initial endoscopic laryngeal examination was found very helpful.¹⁸ Efficacy of video laryngoscopy has been emphasized since long time.¹⁹ Our study also reveals that in some of the patients, initially taken history was indicative of chronic laryngitis or gastroesophageal reflux

Table 2: Comparison of lesion with and without exposure to air pollution as screened on flexible laryngoscopy (n=86)

	Exposure to Air Pollution			p-value*
	Total	Yes	No	
Base of tongue				
Lesion	4	0 (0)	4 (100)	0.512
Normal	82	8 (9.8)	74 (90.2)	
Valleculae				
Lesion	3	0 (0)	3 (100)	0.572
Normal	83	8 (9.6)	75 (90.4)	
Epiglottis				
Lesion	6	1 (16.7)	5 (83.3)	0.520
Normal	80	7 (8.8)	73 (91.3)	
Ary Epiglottic folds				
Lesion	6	2 (33.3)	4 (66.7)	0.036
Normal	80	6 (7.5)	74 (92.5)	
Ventricular Bands				
Lesion	8	3 (37.5)	5 (62.5)	0.004
Normal	78	5 (6.4)	73 (93.6)	
Vocal Cords				
Lesion	34	7 (20.6)	27 (79.4)	0.004
Normal	52	1 (1.9)	51 (98.1)	
Anterior Commissure				
Lesion	10	3 (30)	7 (70)	0.017
Normal	76	5 (6.6)	71 (93.4)	
Posterior Commissure				
Lesion	10	2 (20)	8 (80)	0.215
Normal	76	6 (7.9)	70 (92.1)	
Sub Glottis				
Lesion	7	3 (42.9)	4 (57.1)	0.016
Normal	79	5 (6.3)	74 (93.7)	
Pyriform Fossa				
Lesion	13	3 (23.1)	10 (76.9)	0.063
Normal	73	5 (6.8)	68 (93.2)	
Posterior Pharyngeal Wall				
Lesion	19	4 (21.1)	15 (78.9)	0.046
Normal	67	4 (6)	63 (94)	

*Fisher-exact test applied, p-value <0.05 taken as significant

by virtue of FODL examination they were diagnosed to have laryngeal edema or vocal nodules. In Karachi, many ENT clinics and even primary and secondary care hospitals are not equipped with this essential diagnostic tool. We receive many referrals from nearby and remote areas without proper examination findings and diagnosis.

Endoscopies are usually helpful however disparity among different examiners especially in discrimination of vocal edema, mucosal thickening, small nodules versus normal structure could arise.²⁰ In those cases where findings were ambiguous, we offered medical treatment if it results in significant symptomatic and physical improvement then no need for further intervention. However in cases where findings remain unchanged, we advise patients for direct laryngoscopy with biopsy where necessary. Findings of our flexible endoscopy screening showed that highest number of lesion were found at vocal cords followed by posterior pharyngeal wall, and pyriform fossa.

The limited number of sample size was a major limitation of this study. As diseases of laryngopharyngeal region is of big magnitude in Karachi, for finding the prevalence of disease it is needed that larger numbers of patients from other tertiary centers must be screened.

CONCLUSION

Efficacy of fiberoptic nasolaryngoscopy in diagnosing laryngeal lesions among patients with regular complains of upper respiratory tract was found significant especially in thick populated industrial city. We recommend flexible nasolaryngoscopy examination in routine checkups at primary and secondary health units as it is low-cost and free of anesthesia risk and therefore can reduce burden of advanced disease from society..

AUTHORS' CONTRIBUTION: SUN, SZ substantially contributed to the conception and design of the study SUN and SZ also worked in the acquisition, analysis, and interpretation of data. SUN, MAA, AHS drafted the manuscript, SUN, SZ, MAA, MSF revised it critically for important intellectual content. MSF, MAA, AHS gave the final approval of the manuscript.

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