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Otolaryngology

Evaluation of the Diagnostic Efficacy of Fibreoptic Nasopharyngolaryngoscopy in a Tertiary Care Hospital

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Abstract **Original Research Article**

Introduction: Fiber optic nasopahryngolaryngoscopy is a visual examination of the larynx and surrounding organs. It is an excellent method for determining the reasons for laryngeal problems, voice change, throat discomfort, and swallowing difficulties, and therefore, this should be utilized consistently in all ENT clinics. This study aimed to evaluate the diagnostic effectiveness of flexible fibreoptic nasopharyngolaryngoscopy as a diagnosis tool for ENT diseases. ***Methods:*** This was a retrospective study conducted in the Department of Otolaryngology (ENT), Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh, from January 2024 to June 2024. We included 100 patients irrespective of gender who underwent Fibreoptic Nasopharyngolaryngoscopy at our institution. ***Result:*** The mean age of our patients was 37.39±18.92 years. Most of our study patients (58%) were male and 42% were female. The most common presenting symptom was a change in voice (86%), followed by a burning sensation in the throat (6%), hoarseness of voice (4%), FB sensation (2%), and thyroid swelling (2%). The vocal cord nodules were the most common condition, affecting 50% of patients followed by the left vocal cord polyps (10%), and laryngitis (12%). Most of the patients (48%) were advised for conservative treatment & speech therapy. ***Conclusion:*** In our study, we found that fibreoptic nasopharyngolaryngoscopy is a beneficial diagnostic procedure for individuals experiencing symptoms related to the larynx. This process allows for a wide range of applications and may be carried out under local anesthesia in an outpatient department (OPD) setting.

Keywords: Evaluation, Diagnosis, Fibreoptic Nasopharyngolaryngoscopy, Laryngopharyngeal.

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INTRODUCTION

Laryngeal and pharyngeal diseases can cause symptoms such as hemoptysis, stridor, dysphagia, aspiration of meals, Globus sensation, throat soreness, cervical lymphadenopathy, and voice distortion. These people should be evaluated to create a treatment plan, receive a diagnosis, and determine the prognosis. Pharyngeal and laryngeal disorders can be congenital or acquired. Acquired ailments include neoplastic lesions, traumatic injuries, and infectious/inflammatory diseases. Neoplastic lesions can include both benign and malignant malignancies. The larynx and pharynx must be examined as part of the evaluation. It is possible to utilize rigid and flexible endoscopy, indirect laryngoscopy, or direct laryngoscopy for this purpose [1]. Indirect laryngoscopy is very quick and requires a mirror and standard lighting to visualize the larynx and pharynx [2]. Traditionally, this visualization has been achieved through the use of mirrors and other light sources. To make a diagnosis and sometimes to perform limited therapies, a practicing otorhinolaryngologist may observe the regions of interest using the mirror-viewing approach [3]. Recent advancements in lighting, video, and optics have enhanced our capacity to do such

visualizations with better picture quality and the capacity to store these images in formats that can be retrieved [3].

Flexible nasopharyngoscopy, sometimes called fiberoptic nasendoscopy, flexible nasolaryngoscopy, or flexible fiberoptic nasopharyngolaryngoscopy, is an essential skill for any otorhinolaryngologist or ENT surgeon. Examining the nose, throat, and airway is the aim of this diagnostic procedure. The inventions of Hopkins and Stortz in the 1950s helped to popularize fiberoptic imaging. The first functioning fiberoptic scope for medical use was developed by Hirschowitz in 1963 [4]. A flexible fiberoptic nasopharyngolaryngoscope of practical use in-office procedures was first introduced in 1975 [5]. Since its introduction, the flexible fiberoptic nasopharyngolaryngoscope (FN) has become an indispensable tool for otolaryngologists [6].

The flexible nasopharyngoscope allows for the simultaneous performance of a biopsy from any questionable region or growth in addition to allowing evaluation of the upper airway, hypopharynx, and larynx [7]. Fiber-optic nasopharyngoscopy can visualize the upper airway from the nose to the level of vocal cords including the nasal cavity, septum, turbinates, posterior choanae, adenoids, nasopharynx, pharyngeal and lingual tonsils, vallecula, epiglottis/supraglottis, and glottis with mobility or immobility of the vocal folds [7]. It is an office-based procedure and can be done under local anesthesia [8, 9]. ENT surgeons do these procedures daily in acute settings for airway concerns or neck abscesses.

Therefore, in this study, we aimed to evaluate the diagnostic effectiveness of flexible fibreoptic nasopharyngolaryngoscopy as a diagnosis tool for ENT diseases.

METHODOLOGY & MATERIALS

This was a retrospective study conducted in the Department of Otolaryngology (ENT), Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh, from January 2024 to June 2024. We included 100 patients irrespective of gender who underwent Fibreoptic Nasopharyngolaryngoscopy at our institution.

These are the following criteria to be eligible for enrollment as our study participants: a) Patients aged more than 5 years old; b)Patients with an indication of voice change, burning sensation in the voice, and swelling throat; c) Patients who were willing to participate were included in the study And a) Patients with previous ENT surgery; b) Patients with known allergies; c) Patients with any history of acute illness (e.g., renal or pancreatic diseases, ischemic heart disease, asthma, etc.) were excluded from our study.

Data Collection: Informed consent was then taken for the procedure. The equipment used was an Xion Flexible Fiberoptic Nasopharyngolaryngoscope with video monitoring. As preparation, the nose was sprayed with a solution of topical decongestant agent and local anesthetic (4% xylocaine solution and xylometazoline) ten minutes before the procedure. The nose was not packed with this solution. The throat was further sprayed with the local anesthetic. Under sterile conditions, the flexible nasopharyngolaryngoscope was passed transnasaly and the required area was visualized and examined. Biopsies were taken where deemed necessary.

Statistical Analysis: All data were recorded systematically in the preformed data collection sheet. Quantitative data was expressed as mean and standard deviation and qualitative data was expressed as frequency distribution and percentage. Statistical analysis was performed by using SPSS 23 (Statistical Package for Social Sciences) for Windows version 10.

RESULTS

Table 1: Age distribution of our study patients

Age	N	P(%)	P-value
≤10 years	6	6.0	
11-20 years	10	10.0	
21-30 years	26	26.0	
31-40 years	18	18.0	
41-50 years	19	19.0	
>50 years	21	21.0	
Mean±SD (years)	37.39±18.92		0.01

Table 1 shows that the majority (26%) of our patients were in the age group of 21-30 years, followed by 21% of them were aged more than 50 years, 19% & 18% of patients were in the 41-50 & 31- 40 years age group respectively. Only 6% of patients were aged ≤10 years old. The mean age of our patients was 37.39±18.92 years, with a p-value of 0.01 which is significant.

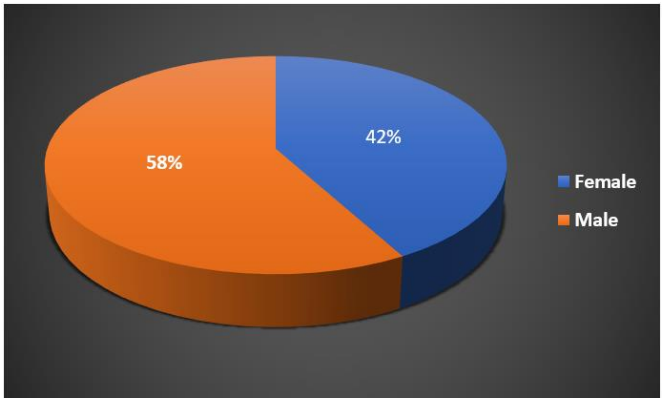

Figure 1: Gender distribution of our study patients

The pie chart shows that most of our study patients (58%) were male and 42% were female. The male and female ratio was 1.38:1 in our study.

Table 2: Distribution of our study patients by indications & nasopharyngoscopic findings

Indication	**N**	**P(%)**
Voice change	86	86.0
Burning sensation in the throat	6	6.0
FB sensation in the throat	2	2.0
Hoarseness of voice	4	4.0
Thyroid swelling	2	2.0
Total	100	100.0
Nasopharynx		
NAD	76	76.0
Enlarged adenoid	12	12.0
Post nasal drip	4	4.0
Growth in the nasopharynx	8	8.0
Total	100	100.0
Oropharynx		
NAD	92	92.0
Growth involving vallecula and left tonsil	8	8.0
Total	100	100.0
Airway		
Adequate	90	90.0
Inadequate	6	6.0
Tracheostomy tube in situ	4	4.0
Total	100	100.0
Movement		
Normal	79	79.0
Left vocal cord palsy	7	7.0
Right vocal cord Palsy	6	6.0
Bil Abductor palsy	4	4.0
Vocal cords not seen	4	4.0
Total	100	100.0

Table 2 shows the 100 patients with nasopharyngoscopic findings. The most common presenting symptom was a change in voice, reported by 86% of patients, followed by a burning sensation in the throat (6%), hoarseness of voice (4%), FB sensation (2%), and thyroid swelling (2%). The nasopharynx, 76% had no issues in the nasopharynx. However, enlarged adenoids (12%), post-nasal drip (4%), and growth in the nasopharynx (8%) were observed. In the oropharynx, 92% had no abnormalities, but 8% showed growth involving the vallecula and left tonsil. Hypopharynx findings were normal in all patients. Airway showed that 90% of patients had adequate, while 6% had inadequate airways and 4% required a tracheostomy tube. The movement was normal in 79% of cases, left vocal cord palsy (7%), right vocal cord palsy (6%), bilateral abductor palsy (4%), and cases where vocal cords were not seen (4%).

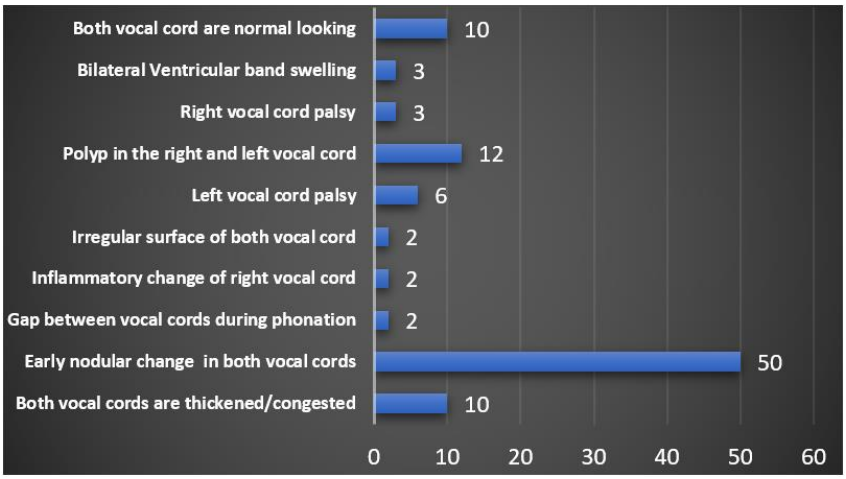

Figure 2: Distribution of study patients by Larynx findings

Figure 2 shows that the majority (50%) of patients had early nodular changes in both vocal cords, followed by 12% had polyps in the left & right vocal cords, and both vocal cords were congested/thickened in 10% of patients. Out of all patients, only 10% had normal-looking vocal cords.

Table 3: Final diagnosis of our study patients

Diagnosis	N	P(%)
Vocal cords nodule	50	50
Phonatory gap	4	4
Right vocal cord polyp	4	4
Left vocal cord polyp	10	10
Bil. Ventricular band swelling	2	2
Growth involving vallecula and left tonsil	2	2
Laryngitis	12	12
Right vocal cord palsy	4	4
Left vocal cord palsy	6	6
Other	6	6

Table 3 shows the final diagnosis of our study patients. The vocal cord nodules were the most common condition, affecting 50% of patients followed by the left vocal cord polyps (10%), laryngitis (12%), and bilateral ventricular band swelling (2%). Both right and left vocal cord palsy were observed in 4% and 6% of patients, respectively, while growths involving the vallecula and left tonsil accounted for 2%. Phonatory gap and other conditions were observed in 4% and 6% of cases, respectively.

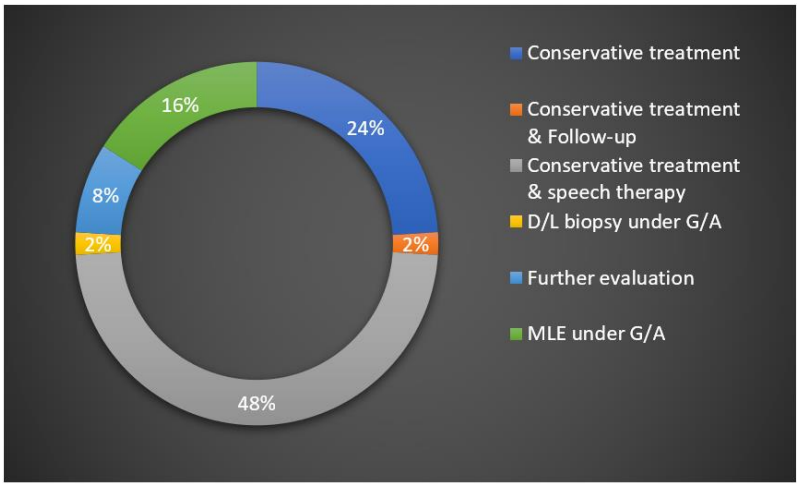

Figure 3: Advice given to our patients

Figure 3 shows the distribution of our study patients by advice given by their physicians. Most of the patients (48%) were advised for conservative treatment & speech therapy, followed by 24% who were advised

only for conservative treatment, and 16% were advised for MLE under G/A. Only 8% were advised for further evaluation.

DISCUSSION

This study included 100 patients who presented with laryngopharyngeal symptoms. Our study revealed that the laryngopharyngeal symptoms were seen predominantly (26%) in the age group of 21-30 years, followed by 21% of them aged more than 50 years, 19% & 18% of patients in the 41-50 & 31- 40 years age group respectively. The mean age of the patients was 37.36±18.11 years. According to the study conducted by Mahabub *et al.,* the age of presentation was between 18-72 years and the mean age was 54 years with a standard deviation of 11.79 [10]. This is in contrast to a study conducted by Vibhuti *et al.,* Most of the patients in their study were in the age group of 35-44 years with a mean age of 42.8 years [11]. According to our study, male patients (58%) presented more with laryngopharyngeal symptoms than female patients (42%). Vibhuti *et al.,* showed the male and female ratio was 2.85:1 in their study [11]. Another study by Yaseen also showed a male-to-female ratio of 1.68:1 who presented with laryngeal symptoms [12]. In the current study, the mean body mass index is 23.9±4.19 kg/sq.m. A study conducted by Tasli *et al.,* found that obesity does not affect the laryngeal view on trans-nasal flexible laryngoscopy [13].

This study showed that most of the patients presented with voice change, followed by burning sensation in the throat and hoarseness in voice. Vibhuti *et al.,* found that the most common presenting symptom was a change in voice (61%), foreign body sensation in the throat (28%), and difficulty in swallowing (16%) [11]. Wilkins *et al.,* discovered that persistent cough (17.1%), Globus feeling (32%), and hoarseness of voice (51.3%) were the criteria for nasolaryngoscopy [14]. According to Aremu *et al.,* the most common indication was goiter/thyroid cyst (45.0%), which was followed by hoarseness (26.0%), epistaxis (6.0%), and foreign body (5.0%) [7].

In our study, with the help of flexible laryngoscopy, all structures were visualized for all patients. Posterior one-third tongue, vallecula, median glossoepiglottic fold, the lingual surface of the epiglottis, and the laryngeal surface of the epiglottis, arytenoids, aryepiglottic folds, and vocal cords were seen in our patients. The study conducted by Kishore *et al.,* found that the anterior commissure, ventricle, and subglottis were not visualized at all with the indirect laryngoscopy [15]. A study by Vibhuti *et al.,* showed that indirect laryngoscopy could detect 11% of oropharyngeal lesions compared to 13% by fiberoptic laryngoscopy [11].

The findings showed that the majority (50%) of patients had early nodular changes in both vocal cords, followed by 12% had polyps in the left & right vocal cords, and both vocal cords were congested/thickened in 10% of patients. Out of all patients, only 10% had normal-looking vocal cords. Feshan M *et al.,* found that 58.42% of the patients had normal findings during endoscopic examination, followed by laryngopharyngeal reflux which is identified in 19.8%, carcinoma in 11.88%, vocal cord palsy in 2.97%, and vocal cord nodule in 1.98% [1]. A study by Mahbub *et al.,* showed that vocal cord growth accounted for 21%, vocal cord polyps for 30%, vocal cord nodules for 14%, vocal cord palsy for 8%, ulcerated lesions for 5%, and normal for 2% [10]. Iqbal *et al.,* found that nasal pathologies were the next common findings (18.6%), followed by carcinomas of larynx/nasopharynx/hypopharynx (14.8%) and vocal cord paralysis (13%) [16].

The final diagnosis by FOL showed that the vocal cord nodules were the most common condition, affecting 50% of patients followed by the left vocal cord polyps (10%), laryngitis (12%), and bilateral ventricular band swelling (2%). Both right and left vocal cord palsy were observed in 4% and 6% of patients, respectively, while growths involving the vallecula and left tonsil accounted for 2%. According to Feshan *et al.,* the majority of research participants had normal results (58.42%), with laryngopharyngeal reflux (19.80%) and cancer (11.88%) following closely behind [1].

The introduction of flexible endoscopes has broadened the diagnostic and therapeutic indications in clinical practice due to their ease of use and requirement for just local anesthesia [17, 18]. Flexible nasoendoscopes are being used by nurse practitioners in otolaryngology specialty practice, along with other medical specialists such as gastroenterologists and anesthesiologists, to facilitate intubation in challenging airways [19-22].

Sterility has been a significant issue with the growing use of flexible fiberoptic endoscopes, even though high-level disinfection is a typically effective operation. To ensure sterility, single-use sterile sheaths have been used [23–25]. We followed the standard sterilization technique when performing the surgery, and no post-procedure infections were noted. Flexible fiberoptic nasolaryngoscopy helps to quickly view patients with compromised airways and is well tolerated [26, 27].

This study supports the claim that flexible nasopharyngolaryngoscopy is a very helpful diagnostic method for those with laryngeal problems. This is not appropriate for use with those who have laryngeal or hypopharyngeal tumors since they require rigid direct laryngoscopy under general anesthesia.

Limitations of the study

Our study was a single-center study. We took a small sample size due to our short study period. After evaluating those patients, we did not follow up with them

for the long term and did not know other possible interference that may happen in the long term with these patients.

CONCLUSION AND RECOMMENDATIONS

The findings of our study show that Fibreoptic nasopharyngolaryngoscopy is a beneficial diagnostic procedure for individuals experiencing symptoms related to the larynx. This process allows for a wide range of applications and may be carried out under local anesthesia in an outpatient department (OPD) setting. Flexible fiberoptic laryngoscopy can visualize all structures and detect pathologies early in their stage so that the patient gets treatment early which can alter the prognosis. Hence, flexible fiberoptic nasopharyngolaryngoscopy should be done in all patients with laryngopharyngeal symptoms.

So further study with a prospective and longitudinal study design including a larger sample size needs to be done to validate the findings of our study.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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