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Original Research Article

Role of flexible fiberoptic nasopharyngolaryngoscopy and indirect laryngoscopy in the diagnosis of laryngopharyngeal pathologies

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ABSTRACT

Background: Visualization of the larynx and pharynx is essential to diagnose and treat pathologies, and to prognosticate. This can be done by using indirect laryngoscopy, rigid and flexible endoscopy, and direct laryngoscopy. The main purpose of the article was to assess the profile of laryngopharyngeal pathologies diagnosed by flexible fiberoptic nasopharyngolaryngoscopy and indirect laryngoscopy in patients with laryngopharyngeal symptoms and to estimate the level of agreement between flexible fiberoptic nasopharyngolaryngoscopy and indirect laryngoscopy for selected laryngopharyngeal conditions like vocal nodule, vocal cord polyp, Reinke's edema, hypopharyngeal growth, vocal cord palsy, vocal cord growth. An Independent t-test and chi-square test were used to analyze the results. Statistical package for the social sciences (SPSS) version 20 was used for statistical analysis.
Methods: In this descriptive cross-sectional study, 101 patients with laryngopharyngeal symptoms were subjected to both indirect laryngoscopy and flexible fiberoptic nasopharyngolaryngoscopy. The structures visualized, pathologies detected, time taken and discomfort levels were statistically analyzed.
Results: In our study, we found that laryngopharyngeal symptoms were more common among the 61 to 70 years age group. The majority of them were males. The majority of them were retired employees. The most common presenting complaint was difficulty in swallowing, followed by globus sensation and voice change. All structures were visualized by flexible fiberoptic nasopharyngolaryngoscopy. Whereas, in indirect laryngoscopy, some structures were visualized and some were not. Pyriform fossa apex and post-cricoid region were not visualized for all patients with indirect laryngoscopy. Laryngopharyngeal reflux was the most common pathology detected. There is no significant difference between IDL and FOL in site, subsite, and clinical appearance of the pathology detected. There is a significant difference between IDL and FOL in time taken (FOL has a higher mean) and discomfort levels (IDL has a higher mean).
Conclusions: Though indirect laryngoscopy is cost-effective in terms of investment, the time taken for the procedure is also less, flexible fiberoptic laryngoscopy is considered superior because it can visualize all structures and can detect pathologies early in their stage so that the patient gets treatment early which can alter the prognosis.

Keywords: Indirect laryngoscopy, Flexible naso-pharyngo-laryngoscopy, Laryngopharyngeal, Visual analog scale, Laryngo-pharyngeal reflux, Dysphagia, Globus, Hoarseness of voice

INTRODUCTION

Laryngeal and pharyngeal pathologies may present with voice change, stridor, dysphagia, aspiration of feeds, globus sensation, throat pain, cervical lymphadenopathy, and hemoptysis. These patients should be evaluated to obtain a diagnosis, plan treatment, and to determine the prognosis.

The laryngeal and pharyngeal pathologies can be congenital or acquired. The acquired conditions can be infective/inflammatory, traumatic, and neoplastic lesions.

Neoplastic lesions can either be benign or malignant tumors.

Visualization of the larynx and pharynx is mandatory as a part of the evaluation. It can be done by using indirect laryngoscopy, rigid and flexible endoscopy, or direct laryngoscopy. Indirect laryngoscopy is very quick and requires a mirror and standard lighting to visualize the larynx and pharynx.[1] It is recognized as an integral part of the examination but may be associated with failure to visualize the lesion in a few patients.[2] The invention of the Hopkins rod telescope and flexible endoscope reserves direct laryngoscopy for therapeutic purposes.[3]

Flexible fiberoptic nasopharyngolaryngoscopy can visualize the upper airway from the nose to the level of vocal cords. It is an office based procedure and can be done under local anesthesia.[3,4] Therapeutic procedures can also be done. In head and neck cancer clinics, nearly all patients will have a flexible nasopharyngoscopy to look at cancer surveillance, treatment response, or disease recurrence. It is also used in acute settings for airway concerns or neck abscesses. Learning the skill to perform a flexible fiberoptic laryngoscopy therefore became essential. ENT surgeons do these procedures daily and hence the learning curve is much faster.

METHODS

A descriptive cross-sectional study was done in the department of ENT at the Southern Railway Headquarters Hospital, Ayanavaram, Chennai for a period of one year (June 2022 to June 2023).

Ethical committee approval was obtained. The detection rate of hypopharyngeal lesions by FOL was considered the primary outcome of interest. Descriptive analysis was carried out by mean and standard deviation for quantitative variables, frequency, and proportion for categorical variables. Data was represented using appropriate diagrams like bar diagrams, pie diagrams, and box plots. Mean and standard deviation were calculated for continuous variables, and the percentage was assessed for categorical variables. An independent t-test was used to find the difference in continuous variables among IDL and FOL. The chi-square test was used to find differences in categorical variables among IDL and FOL. Statistical package for the social sciences (SPSS) version 20 was used and p value <0.05 was considered significant.

Inclusion criteria

Patients above 18 years of both sexes; patients presenting with laryngopharyngeal symptoms like voice change, throat pain, difficulty in swallowing, neck mass, globus sensation, blood in sputum, cough while swallowing of any duration; patients with laryngeal or pharyngeal malignancy; and follow-up of malignant cases were included.

Exclusion criteria

Patients presenting with stridor, who had a history of allergy to lignocaine, uncooperative patients, uncontrolled bleeding disorder, acute epiglottitis, and recent facial trauma were excluded.

The patients coming to the ENT department satisfying the above-mentioned inclusion criteria were selected. Detailed clinical history was obtained regarding their symptoms and the duration. All the participants were subjected to both indirect laryngoscopy and flexible fiberoptic nasopharyngolaryngoscopy. Both procedures were done under local anesthesia using 10% lignocaine spray and were office-based.

Indirect laryngoscopy was performed using a mirror with the patient sitting upright with the tongue protruding, which was held using gauze. The mirror was passed into the oral cavity facing downwards to rest against the uvula and the laryngeal and pharyngeal structures were visualized.

Flexible fiberoptic nasopharyngolaryngoscopy was done with the patient in the supine position. Participants were kept nil per mouth from the previous night. The participant's nasal cavity was decongested with 0.1% xylometazoline nasal drops. The flexible scope was lubricated with the lignocaine jelly and passed through the nasal cavity. The scope was advanced further till the laryngeal structure was visualized. The pharyngeal pathologies were also detected.

The time taken for both procedures was recorded. The discomfort levels while undergoing both procedures were assessed using a visual analog scale.

After the procedure, the participants were instructed not to take anything orally until the local anesthetic effect had worn off, usually less than an hour.

RESULTS

A total of 101 subjects were included in the final analysis.

Characteristics of patients

The majority (33.66%) were in the 61 to 70 years age group followed by the 51 to 60 years and 71 to 80 years age group as shown in Table 1. In our study, the majority of the patients 56.44% were males and 43.56% were females as in Figure 1. The majority of the participants were retired employees 40.59%. The mean body mass index (BMI) is 23.9. The majority of the participants (54.46%) had class 3 Mallampati score. The majority of patients had difficulty swallowing, followed by globus sensation and voice change as depicted in Figure 2. The mean duration of symptoms is 110.20 days.

Table 1: Descriptive analysis of age distribution in the study population (n=101).

Age distribution	Number	Percentage
21 to 30	8	7.92
31 to 40	9	8.91
41 to 50	10	9.90
51 to 60	21	20.79
61 to 70	34	33.66
71 to 80	16	15.84
81 to 90	2	1.98
91 to 100	1	0.99

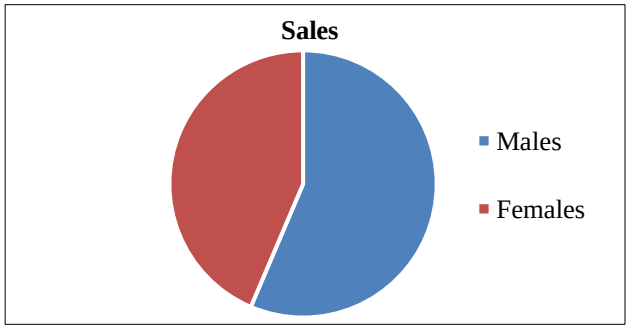

Figure 1: Sex distribution in the study population.

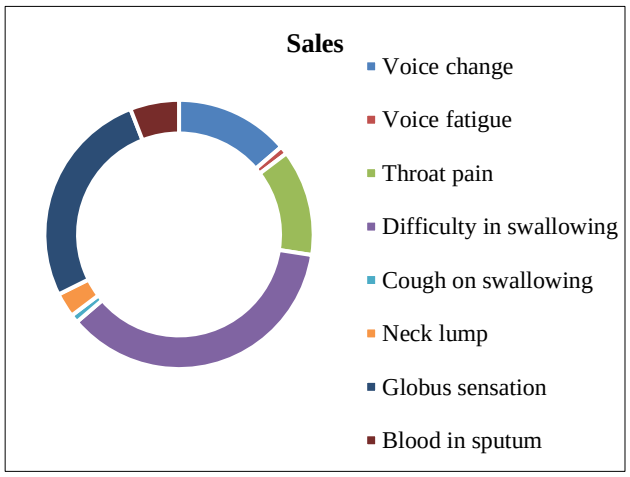

Figure 2: Complaints in the study population.

Characteristics of FOL and IDL

In our study, all laryngopharyngeal structures were visualized with the help of FOL. Whereas, in IDL, some structures were visualized and some were not. The pyriform fossa apex and post-cricoid region were not visualized in any of the patients as shown in Figure 3. FOL detected pathologies in 43 patients, whereas IDL detected pathologies only in 33 patients which is shown in Table 2. With the help of FOL, arytenoids were the most common subsite involved in the supraglottis in 19 patients. In the glottis, vocal cords were involved in 12 patients. Whereas in IDL, arytenoid involvement was seen in 15 patients. Vocal cords were involved in 9 patients as depicted in Table 3. With the help of FOL, congestion over the laryngopharyngeal structures was seen in 21 patients, and ulceroproliferative growth was seen in 11 patients. This is in contrast when compared with IDL which is shown in Table 4.

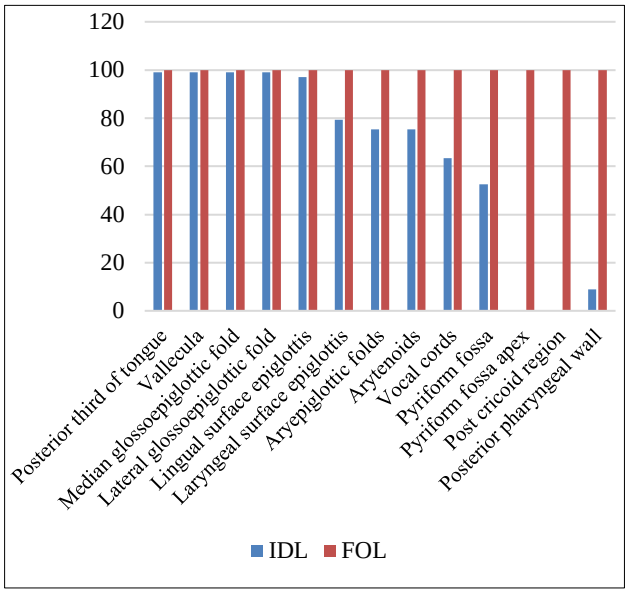

Figure 3: Structures visualized in the study population.

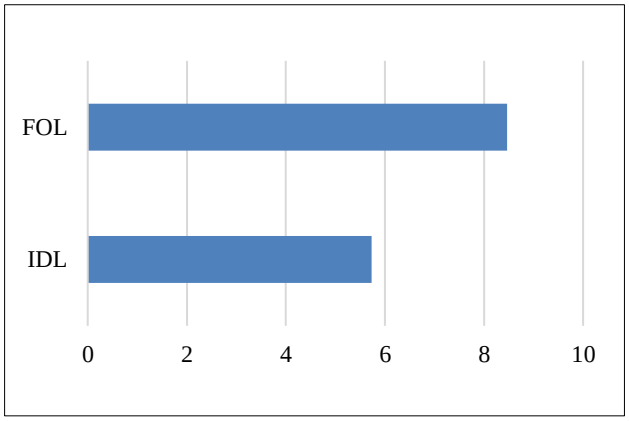

Figure 4: Bar diagram showing the average time taken for IDL and FOL

Table 2: Cross tabulation for the sites of pathology involved in both FOL and IDL in the study population.

Site	FOL	IDL
Normal	58	68
Oropharynx	3	3
Hypopharynx	5	3
Supraglottis	23	18
Glottis	12	9
Total	101	101

Most of the study population had normal findings (58.42%). The majority had laryngopharyngeal reflux (19.80%) followed by carcinoma (11.88%) as shown in Table 5. The average time taken for IDL was 5.73 mins and for FOL, it was 8.47 mins which is depicted in Figure 4. In our study, the discomfort levels were higher for IDL when compared to FOL which is shown in Figure 5.

Table 3: Cross tabulation for the subsites of pathology involved in both FOL and IDL in the study population.

Subsites	FOL	IDL
Normal	58	68
Arytenoids	19	15
Vocal cords	12	9
Pyriform sinus	2	3
Vallecula	2	2
Epiglottis	2	2
Post-cricoid area	3	0
Soft palate	1	1
Aryepiglottic folds	1	1
False vocal cords	1	0
Total	101	101

Table 4: Cross tabulation for the clinical appearance seen in both FOL and IDL in the study population.

Clinical appearance	FOL	IDL
Normal	58	68
Congestion	21	17
Ulceroproliferative	11	8
Vocal cord palsy	3	3
Nodule	2	1
Patch	2	1
Polyp	1	2
Cyst	1	1
Edema	1	0
Hematoma	1	0
Total	101	101

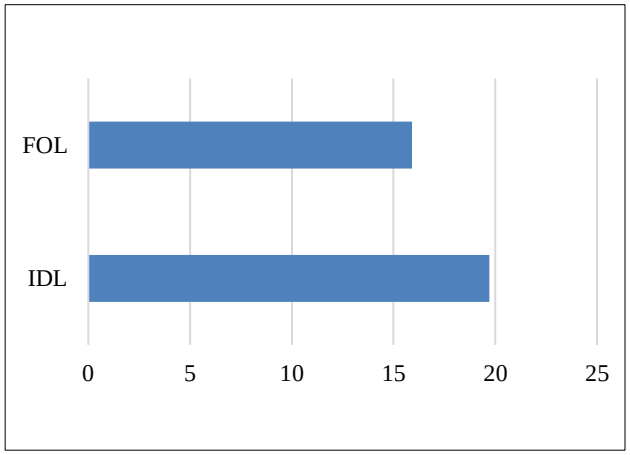

Figure 5: Average discomfort levels for IDL and FOL.

Table 5: Descriptive analysis of the final diagnosis in the study population (n=101).

Final diagnosis	Number	Percentage
Normal	59	58.42
Laryngopharyngeal reflux	20	19.80
Carcinoma	12	11.88
Vocal cord palsy	3	2.97
Vocal cord nodule	2	1.98
Vocal cord polyp	1	0.99
Post instrumentation injury	1	0.99
Premalignant lesions	1	0.99
Candidiasis	1	0.99
Cyst	1	0.99
Reinke's edema	0	0.00
Sulcus vocalis	0	0.00
Abscess	0	0.00
Foreign body	0	0.00

DISCUSSION

This study included 101 patients who presented with laryngopharyngeal symptoms. Our study revealed that the laryngopharyngeal symptoms were seen predominantly (33.66%) in the 61 to 70 years age group. This is followed by the age groups 51 to 60 years and 71 to 80 years thereafter. The age of patients ranged from 25 to 91 years. The mean age of the cases is 57.91 years with a standard deviation of 15.194. This shows that patients in the seventh decade of life with laryngopharyngeal symptoms seek medical attention. 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.[5] 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.[2] According to our study, male patients presented more with laryngopharyngeal symptoms than female patients. 56.44% were males and 43.56% were females. A study by Vibhuti et al showed a male-to-female ratio of 2.85:1.[2] Another study by Yaseen also showed a male-to-female ratio of 1.68:1 who presented with laryngeal symptoms.[6]

In our study, the majority (40.59%) of the patients were retired employees who were 60 years of age and above. 19.8% of the patients were employed who were less than 60 years of age. Hence, laryngopharyngeal symptoms are more common in older age groups. In our study, the mean body mass index is 23.9 kg/sq.m with a standard deviation of 4.19. According to our study, the majority (54.46%) of the patients had a class 3 Mallampati score. Tasli et al conducted a study to determine the effect of obesity on trans-nasal flexible laryngoscopy. They found that obesity does not affect the laryngeal view on trans-nasal flexible laryngoscopy.[7]

Our study showed that the majority of the patients presented with difficulty in swallowing. This is followed by globus sensation and voice change thereafter. 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%).[2] Wilkins et al found that the indications for nasolaryngoscopy were hoarseness of voice (51.3%), globus sensation (32%), and chronic cough (17.1%).[8] The mean duration of symptoms was 110.20 days with a standard deviation of 217.535. The range varies from a minimum duration of 1 day to a maximum duration of 1825 days.

In our study, with the help of flexible laryngoscopy, all structures were visualized for all patients. This is in contrast to indirect laryngoscopy where certain structures were not visualized. Posterior one-third tongue, vallecula, median glossoepiglottic fold, and lateral glossoepiglottic folds were visualized in 99.01% of patients. The lingual surface of the epiglottis was visualized in 97.03% of patients, and the laryngeal surface of the epiglottis in 79.21% of patients. Arytenoids and aryepiglottic folds were seen in 75.25% of patients. Next in line is the vocal cords which were seen in 63.37% followed by the pyriform fossa in 52.48% of patients. The posterior pharyngeal wall was seen only in 8.91% of patients. Pyriform fossa apex and post-cricoid region were not visualized at all by indirect laryngoscopy. According to the study conducted by Kishore et al, they found that the anterior commissure, ventricle, and subglottis were not visualized at all with the indirect laryngoscopy.[9]

In our study, oropharyngeal lesions were seen in 3 patients by both IDL and FOL. Indirect laryngoscopy could detect glottic lesions in 9 patients, whereas FOL could detect glottic lesions in 12 patients. Hypopharyngeal lesions were seen in 3 patients by IDL in contrast to 5 patients by FOL. Supraglottic lesions were seen in 18 patients with the help of IDL compared to 23 patients by FOL. A study by Vibhuti et al showed that indirect laryngoscopy could detect 11% of oropharyngeal lesions compared to 13% by fiberoptic laryngoscopy. The detection rate was 26% in supraglottis with the help of IDL which is in contrast to 43% detected by FOL. IDL could detect 42% of glottic lesions, whereas FOL could detect 55%. 1% subglottic lesions were seen with the help of IDL compared to 5% by FOL. IDL could detect 2% of hypopharyngeal lesions. This is in contrast to FOL which detected 10% of the hypopharyngeal lesions.[2]

In our study, with the help of indirect laryngoscopy, it was found that 9 patients had lesions in the vocal cord, 3 patients in the pyriform sinus, 15 patients in arytenoids, 2 each in vallecula and epiglottis, 1 each in aryepiglottic fold and soft palate. Whereas, with the help of flexible nasopharyngolaryngoscopy, the findings showed that 12 patients had lesions in the vocal cord, 3 patients had lesions in the post-cricoid area, 2 patients in the pyriform sinus, 19 patients in arytenoids, 2 each in vallecula and epiglottis, 1 each in the aryepiglottic fold, soft palate and false vocal cords.

We observed that the ulceroproliferative growth was visualized in 11 patients with the help of a flexible endoscope, where it was seen only in 8 patients with indirect laryngoscopy. Congestion over the laryngopharyngeal structures was seen in 21 patients with flexible scope, but only in 17 patients with indirect laryngoscope. Polyp over the vocal cord was seen in 2 patients with an indirect laryngoscope. With the help of a flexible endoscope, only one patient had a polyp. The lesion which was seen as a polyp in indirect laryngoscopy was an ulceroproliferative growth when examined with the flexible nasopharyngolaryngoscope.

In our study, 58.42% of the patients had normal findings during endoscopic examination. This is 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%. Finally, vocal cord polyps, premalignant lesions, post-instrumentation injury, candidiasis, and cysts contribute to 0.99% each. Mahbub et al showed that indirect laryngoscopy could detect 30% vocal cord polyps, 17% vocal cord growth, 11% vocal cord nodules, 6% vocal cord palsy, 4% ulcerated lesions, and 5% normal study. On FOL examination, 30% were vocal cord polyps, 21% were vocal cord growth, 14% were vocal cord nodules, 8% were vocal cord palsy, 5% were ulcerated lesions, and 2% were normal.[5]

This study showed that the average time taken for the indirect laryngoscopy procedure was 5.73 minutes. Whereas for flexible fiberoptic nasopharyngo-laryngoscopy, it was 8.47 mins.

This study showed a score of 19.7 on the visual analog scale for indirect laryngoscopy. Flexible fiberoptic nasopharyngolaryngoscopy showed only a 15.9 score on the visual analog scale for pain. Pyarali et al showed that flexible fiberoptic rhinolaryngoscopy is not painful. But it can be uncomfortable. The visual distraction significantly reduces the procedure-specific mean discomfort scores. Hence they concluded that visual distraction is a simple and cost-effective technique to reduce discomfort while performing flexible fiberoptic rhinolaryngoscopy.[10]

Flexible fiberoptic laryngoscopy can visualize all structures of the larynx and pharynx. This is in contrast to indirect laryngoscopy where there are certain limitations when viewing the structures. The time taken for flexible endoscopy is more but it is less uncomfortable when compared to indirect laryngoscopy. Even though there are no significant differences in identifying the pathology, flexible fiberoptic laryngoscopy is considered superior to indirect laryngoscopy because it can visualize all structures and can detect any early pathologies so that the patient gets treatment early. This is particularly important in cases of malignancy where early diagnosis and treatment will improve the prognosis of the patient.

CONCLUSION

Though indirect laryngoscopy is cost-effective in terms of investment, the time taken for the procedure is also less, flexible fiberoptic laryngoscopy is considered superior because it can visualize all structures and can 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 who present with laryngopharyngeal symptoms even when the indirect laryngoscopy is normal.

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

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