

ORIGINAL RESEARCH

Microlaryngoscopy: A Guide to the Management of Laryngeal PathologiesPradip Kumar Tiwari¹, Debajit Das²**ABSTRACT**

Intoduction: Dysphonia is the main symptom of lesions that affect the larynx. Many of those require surgical treatment. Vocal cord lesions are the most common and the most prevalent indication for laryngeal microsurgery.

Aim: To conduct a study of laryngeal lesions and their management by microlaryngoscopy.

Materials and methods: The main objective being to highlight the importance of microlaryngoscopy in the management of laryngeal pathologies. A total of 147 patients were studied and out of which 20 cases were operated under general anaesthesia during the study period (Jul 14 – Jun 15). History recording and full clinical examination of the patients, examination of blood, sputum for AFB, plain X-rays, CT scan, MRI, ECG were done. The largest possible laryngoscopy was used. The working distance was 20 cm.

Results: Patients undergoing microlaryngoscopy were diagnosed with vocal cord polyps, nodules, Reinke's oedema, keratosis, papilloma, fibroangioma, endocrine small cell carcinoma of vocal cord etc. Most of these patients were female as contrary to various studies where males were common. Microlaryngoscopic excision was both diagnostic and therapeutic and proved to be an important guide to the management of laryngeal pathologies.

Conclusion: Vocal cord polyps were more frequently encountered. In addition, correlations between polyp type and sex, polyp size, position, type of carcinoma, its response to radiotherapy and speech therapy were observed. Different surgical techniques were used. The long term voice results following indirect microlaryngoscopic surgery demonstrated a statistically significant improvement for the maximum dynamic intensity range at habitual speaking pitch.

Keywords: Microlaryngoscopy, laryngeal pathologies and management

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INTRODUCTION

Access to the airways in the living patient was tried already by Hippocrates (460-370 B.C.).¹ Routine visual inspection of the larynx became possible over 150 years ago with the discovery of the simple method of mirror laryngoscopy that is still practiced today. Credit for this major contribution to laryngology is given to Manuel Garcia (1805-1906), a Spanish vocal pedagogist. Direct examination of the larynx with the rigid laryngoscope, first performed by Kirsten in 1895, and standardized by Killian, the Santa Claus, early in the last century. Chance favours the mind prepared. Professor Seiffert accidentally found that the gallows of the Killian's apparatus supported the laryngoscope even after collapsing onto the chest. This discovery led to the birth of suspension microlaryngoscopy.² In 1953, the Zeiss operating microscope was introduced, Kleinssasser (1961) revolutionized the diagnosis and treatment of a laryngeal lesion using microlaryngoscopy. He adopted the binocular Zeiss microscope to direct laryngoscopy, using a 400mm objective lens. In the early 1970s Jako Strong, Vaughan described coupling of CO₂ laser to surgical microscope and this provided greater precision and facility for endolaryngeal surgery.³ Dysphonia is the main symptom of lesions that affect the vocal tract. More than 50% of individuals with voice disorders have benign alterations of the vocal fold mucosa. The study is important for the laryngologist not only for the symptoms they produce but also because of the necessity of distinguishing them from malignant lesions. Some of these tumors may even undergo malignant changes like papilloma (4%), granular cell tumor (2%), keratosis, nodule, polyp, chronic hyperplastic laryngitis. Non-neoplastic le-

sions seem to be caused primarily by vibratory trauma (excessive voice abuse). Cigarette smoking, infection, allergy and gastric reflux are cofactors. Microalaryngoscopy along with different approaches like Optical Coherence Tomography-Enhanced Microalaryngoscopy, Confocal endomicroalaryngoscopy, Injection Microalaryngoscopy, Microalaryngostroboscopy, Microdebrider assisted Microalaryngoscopy, Laser Assisted Microalaryngoscopy has changed the whole perspective of laryngeal surgery.

MATERIALS AND METHODS

This prospective clinical study continued for 1 year i.e. from Jul 14 – Jun15. The main objective being to highlight the importance of microalaryngoscopy in the management of laryngeal pathologies. A total of 147 patients were studied and out of which 20 cases were operated under general anaesthesia during the study period (Jul 14 – Jun15). History recording and full clinical examination of the patients, examination of blood, sputum for AFB, plain X-rays, CT scan, MRI, ECG were done. The largest possible laryngoscope was used. The working distance was 20 cm.

Inclusion criteria: All patients presenting with a mass originating in the larynx and on whom conservative therapy (speech therapy or medical management) had failed.

Exclusion criteria: Patients where conservative therapy was successful, patients with speech disorder due to neurological lesions and patients needing external/ other approaches were excluded from the study.

Sample size consisted of all the cases of laryngeal diseases presenting within the study period. Sample collection was done by pretested and predesigned proforma.

PATIENT SELECTION

All patients with definite laryngeal disease attending the outpatient department of ENT, ASSAM MEDICAL COLLEGE AND HOSPITAL and admitted in the ward were considered for the study. All patients were subjected to detailed history, general examination and ENT examination. All patients in this study underwent the detailed laryngeal assesment by 70 degree telescope with camera attachment and fiberoptic nasopharyngolaryngoscope. Microalaryngoscopy was always done under general anaesthesia. Follow up was done at 24 hours after surgical procedure, at 1 week, at one month and at 3 month.

STATISTICAL ANALYSIS

It was done and by t-test between age and vhi. P-value was found to be 0.0001. The study was found to be extremely statistically significant.

RESULTS

Table 1 shows the age and sex distribution and the most common age group was found to be 51-60 years which was mainly the working group. Table 2 shows that most common chief complain was disorder of voice followed by respiratory obstruction Table 3 shows that most common occupation

Age group in years	Male cases	Female cases	Percentage
21-30	6	3	6.13
31-40	1	7	5.44
41-50	6	17	15.64
51-60	36	26	42.18
61-70	39	6	30.61
Total	88	59	100.00

Table-1: Age and sex distribution

Presenting symptoms	No of patients	Percentage
Disorder of voice	147	100
Respiratory obstruction	121	82.31
Cough and expectoration	11	7.48
Repeated clearing of throat	86	58.50
Pain in throat	87	59.18
Dysphagia	69	46.93
Mass in the neck	79	53.74

Table-2: Chief complaints of patient

Occupation	No of patients	Percentage
Housewife	50	34.01
Businissman	58	39.46
Student	2	1.36
Office worker	13	8.84
Teacher	6	4.08
Singer	3	2.04
Stage actor	2	1.36
Others	13	8.84
Total	147	100.00

Table-3: Occupational incidence

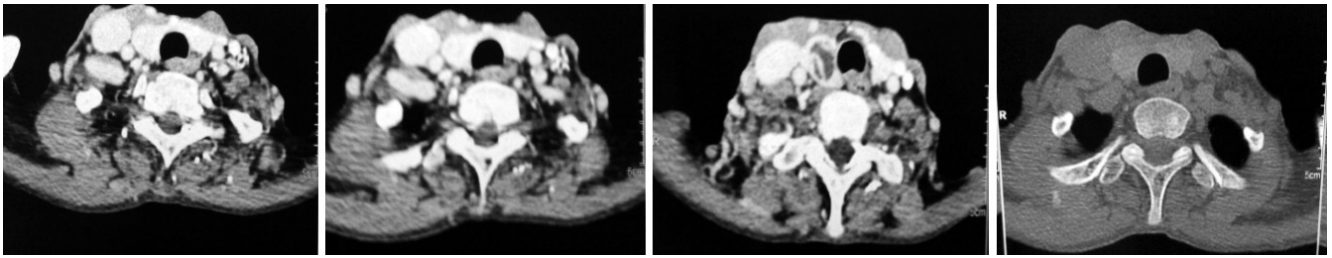


Figure-1,4: CT scan of head and neck

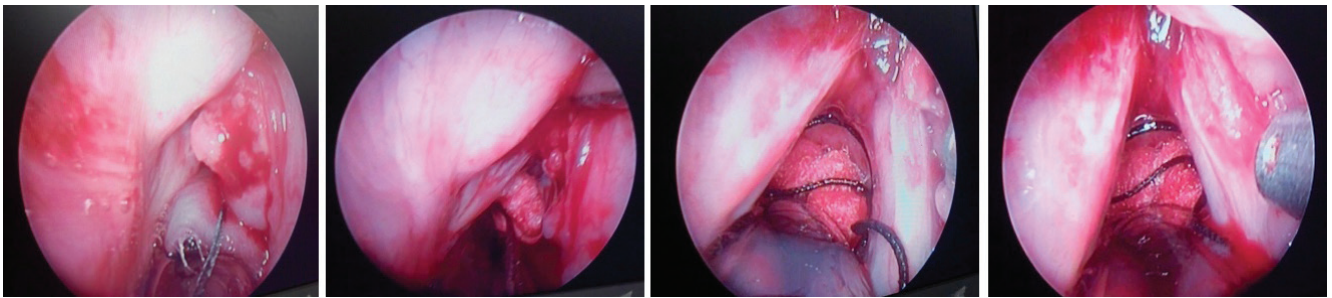


Figure-5,8: MLS picture pre and post-operation

Disease	IL findings	70° endoscopy	Flexible endoscopy
Vocal nodule	1	1	1
Vocal polyp	5	5	5
Reinke'soedema	4	4	4
Keratosi	4	4	4
TB Larynx	1	1	1
Epiglottic growth	2	2	2
Aryepiglottic growth	69	69	69
Supraglottic growth other	56	56	56
Subglottic growth	3	3	3
NEC	2	2	2

Table-4: Laryngoscopic findings

Disease	Patients undergoing MLS
Vocal nodule	1
Vocal polyp	5
Reinke'soedema	4
Keratosi	4
Laryngeal Tuberculosis	1
Epiglottic growth	2
Aryepiglottic growth	69
Supraglottic growth other	56
Subglottic growth	3
NEC	2

Table-5: Table on surgical procedure

was businessman Almost all the investigational findings were same as seen in table 4. Table 5 shows that almost all the patients went for MLS either for biopsy or

for therapeutic purpose. FIG: 1-4 CT scan of the head and neck region showed minimal to mild thickening of the right vocal cord with mild enhancement of the right vocal cord, mild fat stranding in the right paraglottic region. Few bilateral level II and level III neck lymph nodes were positive FIG: 5-8 The patient was operated by microlaryngoscopy. We can see here that a polypoidal growth is over the right false vocal cord extending to the anterior commissure, left false vocal cord, right pyriform sinus, pre-epiglottic space and right true vocal cord associated with pyriform sinus asymmetry. In most of the cases of laryngeal carcinomas, Immunohistochemistry was positive for chromogranin, synaptophysin and neuron-specific enolase. In one of the case of neuroendocrine carcinoma of larynx CEMR imaging of the neck showed bulkiness with T2FS hyperintense signals noted in the right false vocal cord extending to the anterior commissure, left false vocal cord,

right pyriform sinus, pre-epiglottic space and right true vocal cord associated with pyriform sinus asymmetry. The lesion showed moderate heterogeneous enhancement. Few bilateral level II and level III neck lymph nodes were positive.

DISCUSSION

In 1953, the Zeiss operating microscope was introduced, Kleinsasser (1961) revolutionized the diagnosis and treatment of a laryngeal lesion using microlaryngoscopy. He adopted the binocular Zeiss microscope to direct laryngoscope, using a 400mm objective lens.⁴ In the early 1970s Jako Strong, Vaughan described coupling of CO₂ laser to surgical microscope and this provided greater precision and facility for endolaryngeal surgery.³ Dysphonia is the main symptom of lesions that affect the vocal tract.⁵ More than 50% of individuals with voice disorders have benign alterations of the vocal fold mucosa. The study is important for the laryngologist not only for the symptoms they produce but also because of the necessity of distinguishing them from malignant lesions. Some of these tumors may even undergo malignant changes like papilloma (4%), granular cell tumor (2%), keratosis, nodule, polyp, chronic hyperplastic laryngitis. Non-neoplastic lesions seem to be caused primarily by vibratory trauma (excessive voice abuse). Cigarette smoking, infection, allergy and gastric reflux are cofactors.^{6,7} Microlaryngoscopy along with different approaches like Optical Coherence Tomography-Enhanced Microlaryngoscopy, Confocal endomicroscopy, Injection Microlaryngoscopy, Microlaryngostroboscopy, Microdebrider assisted Microlaryngoscopy, Laser Assisted Microlaryngoscopy has changed the whole perspective of laryngeal surgeries.

Doloi et al (2011) in a study observed that early diagnosis by microlaryngoscopy leads to identification of malignancy in early stages and better prognosis. Standard treatment of choice should be microlaryngeal surgery with or without laser, voice rest and speech rehabilitation.⁸ David et al (2008) in a study observed that optical coherence tomography is able to produce high-resolution images of vocal fold mucosa to a maximum depth of 1.6 mm which may be used in the diagnosis of vocal fold lesions, particularly early squamous cell carcinoma and further help in the OCT-guided microsurgery of larynx.⁹ T. Just et al (2012) in a study observed that Confocal endomicroscopy can detect dysplastic cells close to the basal cell layer and within the subepithelial space in lesions with small leukopla-

kia. These findings will help to improve the precision for biopsy and microlaryngoscopic laser surgery of larynx to identify the margins of the premalignant lesion.¹⁰

Steven M. Zeitels et al (2009) in a study observed that injection of photoangiolytic and antiangiogenesis agent coupled microlaryngoscopy will enhance phonatory function in laryngeal diseases like glottal papillomatosis.¹¹ Dikkers FG et al in a study observed that microlaryngostroboscopic surgery offers a very good functional result in cases of dysphonia due to a benign lesion of the vocal fold.¹² El-Bitar et al (2002) in a study observed that Microdebrider assisted Microlaryngoscopy can be an optional cytoreductive treatment and will enhance phonatory function in laryngeal diseases like angiomatous and gelatinous polypoidal lesions and papillomatosis of larynx.¹³ Reza Rahbar et al (2006) in a study observed that Microlaryngoscopy can be an optional treatment and will enhance phonatory function in patients with laryngeal cleft and early diagnosis and proper repair of the condition are essential to prevent pulmonary damage and associated morbidity.¹⁴

In one of the study it was seen that microlaryngoscopy revealed abnormal adduction of the vocal folds during inspiration in a case of stridor with cerebral palsy and subsequent injection of periodic type A botulinum toxin to the vocal folds helped in sparing a tracheostomy.¹⁵ Andrew D. Whymark et al (2006) in a study observed that Laser Assisted Microlaryngoscopy for epiglottomy in cases of laryngomalacia surgery had comparable success to other surgical techniques without having the risks of permanent scarring to the supraglottis.¹⁶ Filho et al (2013) in a study observed that Microlaryngoscopic surgery helped to differentiate the characteristic changes in both angiomatous and gelatinous vocal fold polyps. They found that angiomatous polyps were common in men, medium sized, positioned in middle third of vocal fold and more frequently associated with minimal structural alterations where as gelatinous polyps were common in women, small sized, positioned in posterior third of vocal fold and not associated with minimal structural alterations.¹⁷ Thus the role of hormones and therapeutic treatment with microlaryngoscopy can be done.

CONCLUSION

In our study microlaryngoscopy proved to be a better guide to the management of laryngeal pathologies and a good tool for further research for the benefit of mankind.

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