

Microlaryngoscopic Procedure of Laryngeal lesions- A Clinical study of 100 cases

*M A Matin , **M Rowshan Ali, ***M Nurul Islam,

ABSTRACT: **OBJECTIVE:** To evaluate the role of microlaryngoscopy in the management of benign laryngeal lesions and T₁ glottic carcinoma. To analyze the age and sex distribution, symptomatology, site of involvement, occupational factors and prognosis of various benign laryngeal lesions and T₁ glottic carcinoma. **STUDY DESIGN:** A 10 year prospective study was conducted from July 1999 to June 2010. **SETTING:** The study was conducted at Maleka Nursing Home, Bogra, Dhaka Medical College Hospital and Rajshahi Medical College Hospital. **SUBJECTS AND METHOD:** A total of 100 patients (78 males & 22 females) with benign laryngeal lesions and T₁ glottic carcinoma were included based on symptomatology of persistent hoarseness or hoarseness and stridor and positive finding of indirect laryngoscopy or flexible nasolaryngoscopy/Telelaryngoscopy. The patients with T₂-T₄ glottic carcinoma with or without neck nodes were excluded from this study. Microlaryngoscopy was performed in all cases using operative microscope (Atmos, Germany) with 400 mm lens, laryngeal suspension, rigid black anterior commissure laryngoscope and curved towards left, towards right microlaryngeal forceps and scissors except one case of laryngeal web where Diode laser was used. Documentation was done in every case either using camera attachment and TV monitor or taking photograph of pre and post operative microlaryngoscopic view of laryngeal pathology with digital camera. Histopathology was done in all cases of laryngeal pathology excluding laryngeal web and partial cordectomy patient. **RESULTS:** A male preponderance with a male:female ratio of 3.5:1 was observed. Patients age ranged from 5-75 years (mean age 43.5). Majority of patients were in the age group of 41-50 years. All (100%) presented with persistent hoarseness of voice and stridor was the presenting complaint in 8(8%) cases. Vocal cord polyps (38%) were observed to be the commonest type of benign lesions while invasive squamous cell carcinoma (24%) was the most common neoplastic lesion. Glottal lesions were observed in 90 cases (90%) of which 72 cases involved in right vocal cord. Teacher was found to be the commonest occupation in 30 patients (30%). All T₁ glottic carcinoma got post operative radiotherapy. There was no recurrence in cases of polyps, nodules and haemangiomas with 2 recurrences in T₁ glottic carcinoma and multiple papilloma. Significant improvement of voice was noticed in 94 patients (94%). **CONCLUSION:** Microlaryngeal surgery and voice rest offer a cost effective, useful and safe method for the management of benign laryngeal lesions with significant voice improvement and minimal recurrence. **Key Words:** Benign laryngeal tumours, vocal cord polyps, T₁ glottic carcinoma, Microlaryngoscopy surgery.

INTRODUCTION: Microlaryngoscopy is the most modern technique of examination of the larynx both for diagnostic and therapeutic purposes. With the help of operating microscope with 400 mm lens and laryngeal suspension, the surgeon gets better magnified view of the larynx with two hands free to operate on larynx. Advances in all aspects of otorhinolaryngology since the early 1960's until now a days that it has been difficult for the participating physician to keep himself informed. Microsurgical techniques applied in otology were rapidly adopted to diagnose and treat disease of the larynx with greater excellence and opened a new exciting era in laryngology. Use of operating microscope, advances in anaesthesia, development of precise surgical instruments, application of carbon dioxide laser together with the initiative and ingenuity of laryngeal surgeons have all led to many new techniques in micro laryngeal surgery, laser treatment and more recently phonosurgery¹. Most recently Robot assisted microlaryngeal surgery has been introduced with great success². Although CO₂ laser has great advantage in vascular laryngeal lesions and multiple papilloma larynx controversy exists regarding voice recovery after the use of laser versus microforceps

techniques in the removal of benign vocal fold lesions³. The use of Microdebrider for the resection of subglottic cyst also showed some benefits over CO₂ laser⁴. Instead of using conventional vertically opening microinstruments, microsurgical pressing excision technique (MPET) utilized two pairs of custom made horizontally left opening or right opening, curved microscissors/curved cupped microforceps to remove right or left vocal fold lesions accordingly using one instrument at a time, the lesion can be successfully removed with the microscissors and micro forceps in a press-evert cut manner⁵. We use this technique of microlaryngeal surgery in our study. Laryngeal pathologies may present as hoarseness, dyspnoea, stridor, hemoptysis, referred pain and dysphagia¹. The aim of this study was to evaluate the role of microlaryngoscopy in the management of various laryngeal pathologies and to enlist the various laryngeal lesions causing hoarseness and other presentation. **SUBJECTS AND METHODS:** This study was conducted at Maleka Nursing Home, Bogra, Dhaka Medical College Hospital and Rajshahi Medical College Hospital from July 1999 to June 2010. The study was

*Department of ENT and HNS, Rajshahi Medical College & Hospital, **Bogra Diabetic Hospital, ***Shahid Ziaur Rahman Medical College, Bogra, Bangladesh.

carried out in 100 patients, 92 patients from Maleka Nursing Home, 7 patients from 1st National Phonosurgery workshop at Dhaka Medical College Hospital and one patient from Rajshahi Medical College Hospital who presented with complaints related to laryngeal frame work such as persistent hoarseness, dyspnoea, chronic dry cough and choking. A detailed history was taken and thorough clinical examination was performed with special emphasis on indirect laryngoscopy, Flexible nasolaryngoscopy/teledaryngoscopy and neck examination. Necessary laboratory and radiological investigations were performed. After provisional diagnosis, all patients underwent microlaryngoscopy under general anaesthesia using microlaryngeal instruments in 99 patients and Diode laser in one patient and the tissues removed were sent for histopathology. The findings were recorded on preformed Proforma's.

RESULTS: Majority of the patients were male (78 as compared to 22 females) with male; female ratio 3.5:1 (Table 1). The age ranged from 5 years to 75 years. (Table 2). The mean age was 43. 5 years and most common age group was between 41-50 years(38%). All patients presented with persistent hoarseness for more than 6 weeks(100%) while 8 patients(8%) presented with stridor. (Table 3). Table 4 shows site of lesion of which 90% of patients presented with glottic lesion followed by supraglottic lesion in 8% of cases. Table 5 shows patients occupation where 30% of patients were from teacher group. The patients habit was studied in Table-6 which showed those who are habituated with betel leaf and betel nut ranking the highest(40%). The indirect laryngoscopic examination/FOL/teledaryngoscopic findings of different patients is shown in Table-7. and Histopathological reports in Table-8. Indirect laryngoscopic findings of 3 vocal cord polyps showed ulcerated vocal cord polyps under operating microscopic view seems to be carcinoma and histology confirmed squamous cell carcinoma. Vocal cord polyps were observed to be the commonest type of benign lesions in 38 patients(38%) while invasive squamous cell carcinoma(24%) was the most common neoplastic lesion. Laryngeal Tuberculosis was found in 1 patients(1%) A rare case of haemangiopericytoma was found in a 45 year old male patient presented with huge subglottic laryngeal polypoid lesion who needed tracheostomy. Microlaryngoscopies were performed in all cases under general anesthesia. Vocal cords nodules, polyps, papillomas, haemangiomas were removed with microsurgical instruments with microlaryngoscopy followed by speech therapy. Partial cordectomy and arytenoidectomy was done in one patient of bilateral vocal cord paralysis following thyroid surgery. (Table-9) Diode Laser was used in 1 patient with laryngeal web. Microlaryngoscopy helped in precise excision avoiding damage to the underlying and surrounding structures.

Similarly T1 glottic tumor were fully visualized and specimen was easily taken from the lesion for histopathological diagnosis. 2 patients with fusiform congested vocal cords on microlaryngoscopy were labeled Reinke's edema and treated endoscopically followed by speech therapy. Out of 4 patients of multiple papilloma larynx one patient presented with stridor needed

Sex of Patient	No of Patient	Percentage (%)	
Male	78	78	M:F=3.5:1
Female	22	22	

Table 1: Sex distribution of patients n=100.

Age group	No of Patient	Percentage (%)
5-10	4	4
11-20	10	10
21-30	5	5
31-40	18	18
41-50	38	38
51-60	13	13
61-75	12	12

Table 2: Age distribution of patients n=100

Symptoms	No of Patient	Percentage (%)
Hoarseness of voice	100	100
Pain in throat	12	12
Cough	9	9
Stridor	8	8

Table 3: Presenting Complaints/symptoms n=100

Site	No of Patient	Percentage (%)
Glottis	90	90
Supraglottis	8	8
Subglottis	2	2

Table 4: Site of Lesion n=100

Occupation	No of Patient	Percentage (%)
Teacher	30	30
Shop keeper	19	19
House wife	14	14
Student	8	8
Politician	7	7
Others	22	22

Table 5: Patient's occupation n=100

Habit	No of Patients	Percentage (%)
Betel leaf & betel nut	40	40
Smoker	22	22
Cigarette, betel leaf & nut	9	9
None	25	25

Table 6: Patient's habit n=100

Finding	No of Patients	Percentage (%)
Polypoid lesion/polyps	41	41
Ulcerated VC lesion	25	25
Nodular lesion/nodule		
Bilateral	7	7
Single	5	5
Vascular polyp/haemangioma	7	7
Pedunculated lesion/cyst	4	4
Multiple papilloma larynx	4	4
Reinke's oedema	3	3
Leukoplakia	2	2
Laryngeal web	1	1
Bilateral VC palsy	1	1

Table 7: IL/FOL/Teledaryngoscopic finding n=100

Report	No of Patient	Percentage (%)
Vocal cord polyp	38	38
Invasive squamous cell carcinoma	24	24
Vocal cord Nodules	16	
Haemangiomas	6	6
Multiple papilloma	4	4
Squamous papilloma	3	3
Dysplasia	2	2
Reinke's oedema	3	3
Laryngeal tuberculosis	1	1
Haemangiopericytoma	1	1

Table 8: Histopathology Report n=100

Procedure	No of patient	(%)
Microlaryngeal excision of lesions by forceps and scissor	98	98
Partial cordectomy and arytenoidectomy By scissor	1	1
Excision of laryngeal web by Diot laser	1	1

Table 9: Types of Microlaryngeal procedure n=100

Complications	No of patients	Percentage (%)
Chipped upper incisor teeth (old pt)	3	3
Severe laryngeal spasm needing tracheostomy	2	2
Vocal cord atrophy	1	1

Table 10: Complications of Procedure n=100

tracheostomy. Recurrence was observed in one patient of multiple papilloma larynx and one case of T₁ glottic carcinoma. Damage to upper incisor teeth occurred during procedure in 3 old patients, 2 patients got severe laryngeal spasm following the procedure who needed tracheostomy (Table 10). Normal voice or significant improvement of voice was observed in 94 patients. (94%)

DISCUSSION: The history of peroral endoscopy extends into 19th century¹. Manuel Gracia, a Spanish singing teacher living in London, was the first to report the visualization of larynx with mirrors and reflected sun light. His discovery, reported in 1855, was followed by the independent development in 1856 of direct laryngoscopy by Truk and Czermak in Vienna. Gustave Killian, in Freiburg, demonstrated the endoscopic feasibility of foreign bodies removed from tracheo-bronchial tree in 1897. Cheivellier Jackson in Philadelphia introduced the distally lighted laryngoscopes, bronchoscopes as well as telescopes with incandescent bulbs at the turn of the century. His contribution to the whole understanding of laryngo-broncho-esophagoscopy was enormous, and he developed the art of foreign body removal from the air and food passages to the extent that there has not been any subsequent fundamental improvement^{6,7}. A thorough and detailed laryngeal examination is the key in evaluation when patients present with voice changes such as hoarseness, vocal fatigue etc. advances in technology and improved understanding of vocal fold physiology and sound production have resulted in a dramatic improvement in the ability to visualize the interior of the larynx^{8,9,10}. There is no single method of laryngeal examination that is optimal for patients with symptoms related to larynx, when it is important to recognize the advantages and limitation of a variety of techniques for laryngeal examination. Indirect laryngoscopy has been used by otolaryngologist for years

because it is an out patient department examination and allows gross examination of the larynx and pharynx. However this method of examination is limited in comparison to newer methods like flexible and rigid endoscopy. A time limitation caused by large base of tongue, soft palate, over hanging epiglottis and exaggerated gag response limits this examination from being performed in 5-10% of patients⁹. Flexible endoscopy has advantages to visualize the nasopharyngeal velum, pharynx and larynx in patients with exaggerated gag reflex and in children. Moreover stroboscopic light source can be attached with it¹⁰. Rigid endoscopy offers an extremely clear view of the larynx and provides magnified view of the vocal folds when used with high quality operating microscope using 400mm focal length lens. Subtle lesions or vocal folds atrophy are identified easily using this method. It facilitates detailed examination for staging of malignant lesions and taking biopsy. Micro laryngoscopy provides surgical approach for the excision of benign lesions such as papillomatosis, polyps, and nodules while early carcinoma (carcinoma in situ and T₁) can also be excised en block^{11,12}. Laser can be used for cordectomy / arytenoidectomy or laryngeal papillomatosis. In our study, the causes of hoarseness in majority of cases were vocal cord polyps (38%) among the benign lesions which is similar to the lowenthal study¹. Vocal cord T₁ carcinoma is the second most cause (24%). In our study most of the lesions were glottal (90%) which is also similar to the study by Shapshay et al who recorded 86% of glottal lesions among 307 cases¹³. Most patients were male and the cause was voice abuse as most of them belonged to teaching profession (30%). Most polyps and T₁ glottic carcinoma were present in the right vocal cord (72%) and nodules were present at the anterior one-third of the vocal cord. One-third were bilateral where as vocal cord polyps were present near the anterior commissure and were difficult to see on indirect laryngoscopy without flexible laryngoscopy. The addition of microscope not only helped in detail delineation of the nodules but also excision without damaging the underlying muscles. Similarly the polyp was grasped with forceps and based excised with micro scissors under magnification. In 94 patients voice returned to normal post-operatively with voice rest/speech therapy without any fibrosis on the vocal cord. Microlaryngoscopy not only helped in the diagnosis but also in surgical management of these patients¹⁴. Diode laser was used with microlaryngoscopy in 1 patient with laryngeal web. The main presentation was hoarseness (100%) and respiratory distress (8%). Similar presentation has been reported by Derky CS et al¹⁵. In our study 25 patients (24 male and 1 female) presented with ulcerated vocal cord lesions seems to be carcinoma (22 T₁ a and 3 T₁ b) of which 24 patients confirmed by histology. Microlaryngoscopy is not only helpful in taking biopsy but also in determining the extent of the lesion properly which is necessary for staging and subsequent treatment of the disease. All 24 patients subsequently got post operative radiotherapy and showed normal voice and no recurrence in subsequent long term follow up except one case who developed severe laryngeal oedema following radiotherapy and eventually needed tracheostomy. Three patients in this study was found to have Reinke's edema. All these patients were

female. Reinke's edema has been found to be more common in females because hormonal receptors have been found to exist in the nucleus and cytoplasm of cells in the vocal folds, as reported by Newman SR et al in his study¹⁶. Microlaryngoscopy and mucosal stripping was done followed by speech therapy. Laryngeal tuberculosis was reported in one patient who got his voice back after anti TB drugs. An extremely rare case of haemangiopericytoma of larynx was reported in a 45 year old male patient at Rajshahi Medical College Hospital presented with subglottic lesion and stridor who needed tracheostomy preoperatively. Microlaryngeal surgery is a common and safe otolaryngological surgery. Its common complications include pain and numbness of the tongue, bruising of the lip, chipped teeth and rarely subcutaneous emphysema of the neck¹⁷. Only 6 patients developed post-operative complications which includes 3 old patient had damage to upper incisor teeth, 2 patients developed severe laryngeal spasm needing tracheostomy and one patient developed vocal cord atrophy with dysphonia. Thus the complications of the procedure were very minimal.

CONCLUSION: Laryngeal lesions have different presentation, affecting all age groups and both sexes. Early diagnosis and, in time management can help us to avoid the late untoward complications. The different methods of laryngeal examination, like laryngoscopy (indirect, flexible and rigid) and microlaryngoscopy have established diagnostic and therapeutic application, especially patients who are difficult to be examined in out patient department. Microlaryngoscopy helped us in the diagnosis of early vocal cord nodules, Reinke's edema and Carcinoma in situ and T₁ glottic carcinoma which can be easily missed on indirect laryngoscopy and direct laryngoscopy. Similarly for therapeutic purposes microlaryngoscopy results are better than direct laryngoscopy due to less damage to the underlying structures and thus less post-operative scarring with excellent functional outcome. So the standard treatment of choice in all types of benign tumours of the larynx should consist of a triad of approach by microlaryngeal surgery (with or without laser), voice rest and vocal rehabilitation.

REFERENCES

1. Pawan S, Amit B, Mahandra C et al. Benign tumours of the larynx: a clinical study of 50 cases. *Ind Otolaryngol Head Neck Surg* 1998; 61: 26-30.
2. Hockstein NG, Nolan JP, O, Malley BW Jr, Woo YJ. Robotic microlaryngeal surgery: a technical feasibility study using the daVinci surgical robot and an airway mannequin. *Chin Med Assoc* 2010; 73: 268-70.
3. Rogerson AR, Clark KF, Bandi SR, Bane B. Voice and healing after vocal fold epithelium removal by CO₂ laser vs. microlaryngeal stripping. *Otolaryngol Head Neck Surg* 1996; 115: 352-9.
4. Lim J, Hellier W, Harcourt J, Leighton AD. Microdebrider resection of bilateral subglottic cysts in a pre term infant: a novel approach. *Int J Pediatr Otolaryngol* 2003; 67: 4651-2.
5. Lee KW, Kuo WR, Chiang FY. Microsurgical pressing excision technique for vocal nodules and simple epithelial hyperplasia of the vocal fold. *Laryngoscope* 2005; 115: 780-5.
6. Kirshtein A. Autopsy of the larynx and trachea: direct examination without mirror. 1897; Philadelphia: F. A Davis Co.
7. Jako GJ. Microscopic laryngoscopy. Presented at the new England Otolaryngological society meeting. 1964.
8. Hsing MW, Pai L, Kang BH, Wang BL. Clinical predictors of difficult laryngeal exposure. *Laryngoscope* 2004; 114: 358-63.
9. Rohek, Lee YW. Prediction of difficult laryngeal exposure in patients undergoing microlaryngosurgery. *Ann Otol Rhinol Laryngol* 2005; 114: 614-20.
10. Kikkawa YS, Tsunoda K, Niimi S. Prediction and surgical management of difficult laryngoscopy. *Laryngoscope* 2004; 114: 776-8.
11. Dikkers FG, Nikkets PGI. Benign lesions of vocal fold; Histopathology and phonotrauma. *Ann Oto Rhinol Laryngol* 1996; 5: 525-31.
12. Derkay CS. Task force on recurrent respiratory papillomatosis of the larynx. *Arch Otolaryngol Head Neck Surg* 1995; 121: 1385-91.
13. Shapshay, SM, Rebeiz EE, Bohigian RK, Hybels RL. Benign lesions of larynx: should laser be used? *The Laryngoscope* 1990; 100: 953-7.
14. Wiatrok BJ. Over review of recurrent respiratory papillomatosis. *Curr Opin Otolaryngol Head Neck Surg* 2003; 11: 433-41.
15. Craigs, Darkay, David HD. Recurrent respiratory papillomatosis of the larynx: current diagnosis and treatment. *Otolaryngol Clin N Am* 2000; 33: 1127-41.
16. Newman SR, Butler J, Hammond EH, Gray SD. Preliminary report on hormone receptors in the human vocal fold. *J Voice* 2000; 14: 72.
17. Chang YN, Lee JC, Chen JJ, Lin YS. A rare complication after microlaryngeal surgery; subcutaneous emphysema and pneumomediastinum. *Chin Med Assoc* 2010; 73(5): 268-70.

ELECTRICAL RESPONSE AUDIOMETRY COURSE

Apr 22-26, 2013

Lanzarote, Canary Islands

Contact: Dr Guy Lightfoot

Ph: +44 (0) 151 706 4202

Email: g.lightfoot@liverpool.ac.uk

Web: www.clineng-liverpool-nhs.com/CPD