

FIBREOPTIC VIDEO LARYNGOSCOPY ANALYSIS OF 60 PATIENTS WITH BENIGN LESIONS OF THE LARYNX

Swathilal S. A¹, Praveen N²

¹Assistant Professor, Department of ENT, Government Medical College, Kozhikode, Kerala.

²Associate Professor, Department of Plastic Surgery, Government Medical College, Thiruvananthapuram, Kerala.

ABSTRACT

BACKGROUND

Most of the benign lesions of the larynx clinically present with similar complaints such as hoarseness of voice or altered quality of voice termed as Dysphonia. The benign conditions of the Larynx are ubiquitous and often associated with significant morbidity. The pitch of the voice is determined by the length and tension of the vocal cords, shape and size of the contact area and the air pressure. Most of the benign lesions are seen on the vocal cord.

Aims of the Study- To evaluate patients presenting with voice disorders due to benign lesions and benign tumours of the larynx with Fibreoptic Video laryngoscopy with special reference to their incidence and aetiological factors.

To analyse the advantages of fibreoptic video laryngoscopy.

MATERIALS AND METHODS

Sixty (60) patients with benign lesions and tumours of the larynx were included presenting as mass lesions of larynx. Detailed history elicited, thorough clinical evaluation including general physical, systemic and ENT examination was conducted. Haematological and Radiological studies were undertaken wherever necessary. All patients were subjected to detailed fibreoptic video laryngoscopy. The data was analysed. Vocal nodules were treated with voice therapy for 6 weeks. All pedunculated polyps were excised through the fibreoptic video endoscope. Vocal granulomas were vapourised using laser. Cysts were ablated using laser. Sessile and larger polyps, Rienke's oedema and Papillomas were treated with microlaryngoscopy surgery. The average followup period was 3-6 months. The predisposing factors were looked into. The sex and age distribution was analysed.

RESULTS

80% of the lesions observed were non-neoplastic lesions. All the neoplastic lesions observed were Papillomas. Vocal cord nodules were the most common lesion observed. They formed 36.66% of the study. Vocal polyps formed 20%. 13.33% of the lesions were papillomatosis. 10% of the lesions observed were retention cysts. Tuberculous laryngitis formed 5%. There were 6.66% cases of sulcus Vocalis. Rienke's oedema was in 5% and vocal granulomas in 3.33%. All lesions presented with some kind of voice disorder. 95% of cases presented with hoarseness. Other vocal symptoms include vocal fatigue (43.33%), breathy voice (10%), voice breaks (11.66%) and reduction in voice range (52.5%).

CONCLUSION

86.66% of the benign lesions observed were non-neoplastic type. 13.33% were true neoplastic lesions. All the neoplastic lesions were Papillomas. Vocal nodules were the commonest benign lesions observed (36.66%). Fibreoptic laryngoscopy was found significantly superior to the conventional methods of diagnosis.

KEYWORDS

Larynx, Laryngoscopy, Tumour, Benign, Vocal Nodule, Vocal Polyp, Papilloma and Fibreoptic.

HOW TO CITE THIS ARTICLE: Swathilal SA, Praveen N. Fibreoptic video laryngoscopy analysis of 60 patients with benign lesions of the larynx. J. Evolution Med. Dent. Sci. 2017;6(26):2122-2129, DOI: 10.14260/Jemds/2017/461

BACKGROUND

Voice in human's life forms the major medium of communication. It is mainly achieved through its verbal use. Voice is used for non-verbal ways of expression also. Tone of the voice helps to express the mood and the attitude. Voice, in the non-verbal form sometimes expresses the emotions with a more powerful impact. The levels of vocal use vary in

different individuals. So the impact of a voice disorder also varies in different individuals. In some professionals like radio announcers and actors, a vocal cord lesion like Rienke's oedema may affect the performer's "voice signature". The laryngologist faces the challenge and responsibility of accurate analysis and selection of the proper management. Fibreoptic video-laryngoscope is an excellent tool for the analysis of lesions of the larynx and the voice disorders. The live, natural colour and the high resolution pictures obtained on the monitor help to detect the lesions better and easily. The present study was conducted to analyse the usage of Fibre-optic video laryngoscopy in the management of different benign lesions of the Larynx. Scalco⁽¹⁾ used Karl Zeiss surgical microscope with suspension blades adapted from Killian and Lynch. Fibreoptic principle was first used for endoscopy in 1958 by Hirschwitz.⁽²⁾ He used it for gastroscopy. Later Ikeda used the same principle for Bronchoscopy.⁽³⁾ First successful photographic documentation of the larynx was

Financial or Other, Competing Interest: None.

Submission 09-03-2017, Peer Review 22-03-2017,

Acceptance 24-03-2017, Published 30-03-2017.

Corresponding Author:

Dr. Swathilal S. A,

Assistant Professor,

Department of ENT,

Government Medical College,

Kozhikode, Kerala.

E-mail: drmtpraveen@gmail.com

DOI: 10.14260/jemds/2017/461



made by Thomas French in 1884 with a laryngeal mirror and a primitive camera.⁽⁴⁾ Hollinger and Brubaker introduced a special endoscopic camera which gave excellent photographs of the larynx.⁽⁵⁾ Kleinsasser used a new instrument combining the use of a wide angle telescope and a telephoto lens with the laryngoscope which gave excellent observation and documentation facilities. Addition of the beam splitter and photo adapter to the Zeiss microscope enabled photography of the interior of the larynx through the operating microscope under magnification.⁽⁶⁾ Ray⁽⁷⁾ first used the colour television for documentation of endoscopic procedures. By attaching a video camera to the fiberoptic laryngoscope excellent pictures can be obtained.⁽⁴⁾ The newer video endoscopes incorporate the miniature high resolution monochrome CCD (Charge-Coupled Device) chip at its distal end which make them very handy. They give superior high resolution life like colour images. The vocal cords will appear greyish in colour. The subepithelial capillaries shining through the healthy vocal cord epithelium are easily recognised. The remaining mucosa appears pinkish. The present study was conducted to use the modern equipment and analyse the advantages and various causes of fiberoptic video laryngoscopy.

Aims and Objectives

To evaluate patients presenting with voice disorders due to benign lesions and benign tumours of the larynx with Fiberoptic Video laryngoscopy with special reference to their incidence and aetiological factors; to analyse the advantages of fiberoptic video laryngoscopy.

MATERIALS AND METHODS

This study was conducted in the Otolaryngology Department of the Southern Railway Head Quarters Hospital, Madras during the period Feb. 1994 to Feb. 1995. The hospital caters to a population of 2 lakhs based in Madras. It also receives referred cases from the peripheral units of Southern Railway. Sixty (60) patients with benign lesions of the larynx were analysed. Benign lesions included neoplastic lesions and non-neoplastic lesions which presented as mass lesions of benign nature. A detailed history was elicited as per the special proforma. Thorough clinical evaluation including general physical, systemic and ENT examination was conducted. Haematological and Radiological studies were undertaken wherever necessary. All patients were analysed in detail with fiberoptic video laryngoscope. Vocal nodules were treated with voice therapy for 6 weeks. Lesions not responding to voice therapy were subjected to surgical excision under video-endoscopic control. All pedunculated polyps were excised through the fiberoptic video endoscope. Vocal granulomas were vapourised using laser. Cysts were ablated using laser. Sessile and larger polyps, Rienke's oedema and papillomas were excised by micro-laryngoscopy surgery. Clinical diagnosis was confirmed by histopathological examination. Post-operative cases were followed up. The average followup period was 3-6 months. The predisposing factors were looked into. The sex and age distribution was analysed. The patients were classified into four groups according to the level of the vocal usage. Kaufman's (1991)⁽⁸⁾ classification was used-

- Level I- Elite professional (Singer, actor).
- Level II- Professional voice user (Lecturer).
- Level III- Non-vocal professional (Teacher, lawyer).

- Level IV- Non-vocal nonprofessional (Labourer, clerk).

The impact of dysphonia on various groups was studied. The rate of recurrence after Fiberoptic video-endoscopic excision was studied. The statistical methods used were by calculating the standard error of difference between proportions and by chi-square test.

Equipment

A Pentax EB/VB 2000 fiberoptic video bronchoscope was used. The instrument consists of fiberoptic video endoscope, light source, video processor, microphone, VCR and TV monitor. The video endoscope has a solid state sensor called CCD (Charge-Coupled Device) in its distal end replacing the image glass fibre bundles of the ordinary fiberscope. The endoscope has a 2 mm channel which provides effective suction and allows the use of biopsy forceps and the fibre of Nd:YAG laser.

Procedure

Fiberoptic video endoscopy is done as a day patient procedure. Nasal cavity is sprayed with 4% lignocaine 10 minutes before the commencement of the procedure. The distal end of the endoscope is lubricated with lignocaine jelly. The scope is passed transnasally while observing the TV monitor avoiding injury to the nasal structures. It is gently advanced to the level of the epiglottis. Larynx is centred on the TV screen. The lesion is examined thoroughly. Examination is done during respiration, phonation, effort on closure and swallowing. In case of singers, vocal cord movements are observed during singing. Simultaneous recording is done in all cases. For further procedures, sedation with intravenous diazepam 5 mg with 0.3 mg atropine is given. The larynx is anaesthetised by instilling 4% lignocaine. Vocal nodules and pedunculated polyps are excised using the biopsy forceps. The remaining tags are also carefully removed to achieve smooth medial margin. Vocal granulomas and cysts are ablated using Nd:YAG laser. Contact method with fibre tact is used. The laser fibre is passed through the biopsy channel. The lesions are vapourised starting from the periphery till normal contour is obtained. Patient was kept under observation for one hour and then discharged. Followup examination is done after 2 weeks and then at regular intervals.

RESULTS

60 patients were included in the present studies who were attending the ENT Department of Southern Railway Head Quarters Hospital, Madras during the period Feb. 1994 to Feb. 1995. Among the 60 patients, 31 were male and 29 were female. The patients belonged to all age groups ranging from 1 to 60 years. More than 60% of the patients belonged to the age group of 11 to 40 years. There were 18/60 patients in the age group of 31 to 40 years (Table 1).

Age in Years	Male	Female
1 - 10	06	03
11 - 20	04	02
21 - 30	06	06
31 - 40	7	07
41 - 50	5	06
51 - 60	01	03
61 - 70	02	02
Total 60 patients	31	29

Table 1. Showing the incidence of Age and Gender distribution of Patients (n = 60)

Among the 60 patients, 26 belonged to low socioeconomic group (43.33%), 20 to middle income group (33.33%) and 14 to High income group (23.33%), (Table 2).

Grade	No. of Patients	Percentage
Low	26	43.33%
Middle	20	33.33%
High	14	23.33%
Total	60	100

Table 2. Showing the Socioeconomic Status in the Study Group (N = 60)

The patients in this study belonged to a varied class of citizens with different professional and work back ground. Housewives constituted to 11 (18.33%), Teachers 12 (20%), Singers 9 (15%), manual labourers 07 (11.66%) and Nurses 6 (10%), (Table 3).

Occupation	No. of Patients	Percentage
Housewives	11	18.33%
Manual Labourers	07	11.66%
Clerks	06	10%
Teachers	12	20%
Students	04	6.66%
Instructors	05	8.33%
Nurses	06	10%
Singers	09	15%
Total	60	100

Table 3. Showing incidences of Occupational Background in the Study Group (n = 60)

According to Kaufmann's Voice use the patients in the study were recognised and found to belong to Level I in 13, (21.66%), level II in 10 (16.66%), Level III in 12 (20%), Level IV in 25 (41.66%), (Table 4).

Level	No. of Patients	Percentage
I	13	21.66%
II	10	16.66%
III	12	20%
IV	25	41.66%
Total	60	100

Table 4. Showing the Kauffmann's Levels of Voice use in the Study (n=60)

Predisposing factors were identified in the study and Vocal abuse was found in 17 (28.33%), Smoking in 16 (26.66%), Alcohol use in 10 (16.66%), URI in 8 (13.33%) and throat clearing in 7 (11.66%), (Table 5).

Predisposing Factors	No. of Patients	Percentage
Vocal Abuse	17	28.33%
Smoking	16	26.66%
Alcohol	10	16.66%
URI	08	13.33%
Throat Clearing	07	11.66%
Intubation	02	3.33%
Total	60	100

Table 5. Showing The Different Predisposing Factors in The Study (N=60)

URI – Upper Respiratory tract Infection.

The voice symptoms were analysed and found that hoarseness of voice was the symptom present in all the lesions studied in this study group with a variable expression. Among the vocal cord nodules, it was present in all the 22 patients. In vocal polyps, hoarseness was present in all the 12 patients. Similarly, Vocal fatigue was found in Vocal nodules, Vocal polyps and Papilloma patients (Table 6).

Symptoms	VC	VP	PAP	RC	TBL	SUL	RO	VG
Hoarseness	22	12	07	04	03	04	03	02
Vocal Fatigue	08	07	05	1	0	3	1	1
Breathy Voice	0	0	0	0	1	1	2	2
Voice Breaks	0	3	0	1	01	0	01	01
Reduction in Voice Range	20	9	01	0	04	0	2	0

Table 6. Showing the Symptoms Vs. Lesions of Larynx (n = 60)

VC: Vocal Nodule VP: Vocal Cord Polyp
 PAP: Papilloma RC: Retention Cyst
 TBL: Tuberculous Laryngitis SUL: Sulcus Vocalis
 RO: Rienke's oedema VG: Vocal Granuloma

Few of the patients in the present study had non-vocal symptoms. They were Cough in 8 (13.33%) and Dysphagia in 5 (8.33%) as an associated symptom (Table 7).

Level	No. of Patients	Percentage
Cough	8	13.33%
Dysphagia	5	8.33%

Table 7. Showing the Non-Vocal Complaints in the Study Group (n = 60)

Indirect Laryngoscopy (IDL) was done in all the patients as a part of ENT clinical examination and the following results were found; diagnosis of vocal nodules made in 14 patients (23.33%), Vocal polyps in 06 (10%), Papilloma in 04 (6.66%) and Retention Cyst in 02 (3.33%) (Table 8).

Lesions	No. of Patients	Percentage
Vocal Nodule	14	23.33%
Vocal Polyp	06	10%
Papilloma	04	6.66%
Retention Cyst	02	3.33%
Tuberculous Laryngitis	02	3.33%
Sulcus Vocalis	01	1.66
Rienke's oedema	01	8.33%
Vocal Granulomas	01	1.66%

Table 8. Showing the Lesions Observed on Indirect Laryngoscopy

All the patients were subjected to Fibreoptic Video laryngoscopy and the clinical examination findings were correlated with the IDL findings. It was found that vocal nodules were observed in 22, Vocal polyps in 12, Papilloma in

08 and Retention Cyst in 06, Tuberculous Laryngitis in 03, Sulcus Vocalis in 04 patients (n = 60), (Table 9).

Lesions	No. of Patients	Percentage
Vocal Nodule	22	36.66%
Vocal Polyp	12	20%
Papilloma	08	13.33%
Retention Cyst	06	10%
Tuberculous Laryngitis	03	05%
Sulcus Vocalis	04	6.66%
Rienke's oedema	03	8.33%
Vocal Granulomas	02	3.33%

Table 9. Showing the Lesions Observed on Fibreoptic Video Laryngoscopy (n = 60)

Age incidence of different lesions of larynx in the study were observed and found that vocal nodules were in 15/22 patients among 21 to 40 years, Vocal polyp in 8/12 patients of 31 to 50 years age, papilloma in 3/6 in 1 to 10 years age and Retention cyst 3/6 and Sulcus Vocalis in 3/4 patients in 31 to 40 years age groups (Table 10).

Age in Years	VN-22	VP-12	PAP-08	RC-06	TBL-03	SUL-04	RO-03	VCG-02
1 - 10	00	00	03	00	00	00	00	00
11 - 20	04	00	02	00	01	00	00	00
21 - 30	07	01	00	00	00	00	01	00
31 - 40	08	03	01	03	00	03	00	01
41 - 50	02	05	01	01	01	00	01	00
51 - 60	00	02	00	01	01	01	01	00
61 - 70	01	01	00	01	00	00	00	01

Table 10. Showing the Incidence of Age in Different Benign Lesions of Larynx (n=60)

Similarly, the sex distribution of different lesions of larynx were observed. It was found that vocal nodules in females were 14/22 (63.63%), Vocal polyp in 6/12 (50%) in males, papilloma in 8/8 in males (100%), Retention cyst 3/3 in males, Sulcus Vocalis 3/4 in females and Tuberculous Laryngitis 3/3 in males (Table 11).

Lesions	Male-31	Female-29
Vocal Nodule- 22	08 (36.36%)	14 (63.63%)
Vocal Cord Polyp- 12	06 (50%)	06 (50%)
Papilloma- 8	08 (100%)	0 (0%)
Retention Cyst- 06	03 (50%)	03 (50%)
Tuberculous Laryngitis- 03	03 (100%)	00 (0%)
Sulcus vocalis- 04	01 (25%)	03 (75%)
Rienke's oedema- 03	01(33.33%)	02 (66.66%)
Vocal Granulomas- 02	01 (50%)	01 (50%)

Table 11. Showing the Gender Incidence of Different Tumours in the Study Group (n = 60)

Vocal Cord Nodules

The most common lesion observed was vocal nodule 22/60 (36.66%). The lesions ranged from 1 – 4 mm in size. Eight of them were less than 2 mm in size. 2 of them were less than 1 mm in size. 9 were bilateral (Figure 1). Excision under video endoscopic control was carried out in 18 patients. There

were 3 cases of recurrence after surgery during a followup period of 3 - 6 months.



Figure 1. Showing the Vocal Nodule A. Unilateral. B. Bilateral

Vocal Cord Polyp

The second most common lesion was Vocal Cord Polyp 12/60 (20%). Seven of them were Pedunculated (58.33%) and five (41.66%) sessile. Six of them were gelatinous type (Figure 2). 3 were of telangiectatic type (Figure 3) and three mixed type (Figure 4). Seven of the polyps were excised on Fibre-optic video-endoscopic procedure and 5 by microlaryngeal surgery. Recurrence was observed after a period of 3 – 6 months followup in 1 patient.



Figure 2. Showing the Vocal Polyp®

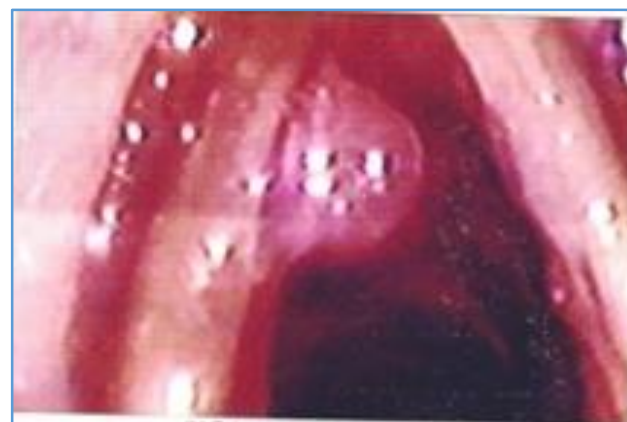


Figure 3. Showing the Telangiectatic Vocal Polyp®



Figure 4. Showing Gelatinous Polyp

Papillomatosis

8 patients with Papillomatosis (Figure 5) observed in this study (13.33%). All were male. It is the only type of true neoplasm observed. 5 were bilateral with involvement of anterior Commissure. 2 were unilateral with the lesion occupying the middle third of right vocal cord. 1 patient was with multiple Papillomatosis. In all cases vapourisation with laser under micro-laryngoscopy was carried out without disturbing the anterior Commissure region. In 3 cases recurrence was observed within a followup period of 3 – 6 months.

Retention Cyst

6 retention cysts were observed. 3 were over the middle third of the vocal cord (Figure 6). 3 were over the vestibular band near the anterior Commissure. Histopathological study showed 2 cysts were lined by squamous epithelium and the other by columnar. Both were ablated using contact laser under video laryngoscopy control. No recurrence was noted over a period of 3 – 6 months followup.



Figure 5. Showing the Retention Cyst

Tuberculous Laryngitis

3 patients were observed (Figure 7) 2 were male and 1 was female. Both were having associated pulmonary cavitory lesions. Anti-Tuberculous treatment was given to all the patients.



Figure 6. Showing the Tuberculous Laryngitis

Sulcus Vocalis

4 patients with this lesion were observed (Fig 8). 1 was unilateral. All cases presented with fatigability of voice. One patient had a breathy voice. Speech therapy was advised in these patients. There was recurrence in 1 patient.



Figure 7. Showing the Sulcus Vocalis

Vocal Granulomas

2 patients were observed with Vocal granulomas. One patient developed it after intubation for surgical excision of vocal cord polyp and 1 with prolonged intubation in an orthopaedic surgery. In both cases laser vapourisation was done under video-endoscopic control. No recurrence was noted over a period of 3 - 6 months followup.

DISCUSSION

The incidence of benign non-neoplastic lesions and benign neoplastic lesions of the Larynx were compared in the present study with some previous studies in Table 12. The difference is statistically insignificant as the p-value is 1.23 with $p < 0.1$ taken as significant.

Study	Non Neoplastic	Neoplastic
Hollinger and Johnston ⁽⁵⁾	990 (82.7%)	207 (17.3%)
Shaw ⁽⁹⁾	1300 (86%)	205 (14%)
Present Study	52 (86.66%)	8 (13.33%)

Table 12. Showing the Comparative Study with the Present Study

In the present study, among the 60 patients presenting with voice disorder indirect laryngoscopy could identify lesions in 35 patients; whereas by fiberoptic video laryngoscopy all the patients could be given a diagnosis. Such instances were compared and details are shown in Table 13. This difference was statistically significant with p-value 0.02 with <0.05 taken as significant.

Lesions	Indirect Laryngoscopy - 35	Video laryngoscopy - 60
Vocal Nodule	14	22
Vocal Cord Polyp	06	12
Papilloma	04	08
Retention Cyst	02	06
Tuberculous Laryngitis	02	03
Sulcus Vocalis	02	04
Rienke's oedema	03	03
Vocal Granulomas	02	02

Table 13. Showing the Missed Diagnoses in the Study (n = 60)

In the Diagnosis of laryngeal lesions, fiberoptic video laryngoscopy is significantly superior to the conventional method of IDL. Its diagnostic accuracy equals that of microlaryngoscopy examination. The advantages over microlaryngoscopy are: It can be done as an office procedure; no general anaesthesia is needed; it is least traumatic; It can be carried out in patients with systemic diseases unfit to undergo rigid endoscopy; the colour monitor will give high resolution magnified images which will help to visualise minute details; The instrument channel will allow forceps and other instruments for biopsy and excision procedures; good documentation facilities; useful for good teaching practice. A comparative study of vocal nodules with studies of other authors was done and shown in the Table 14. The difference of incidence of Vocal nodules in various age groups was found to be statistically significant with p-value 0.043 (p significant at <0.05).

	McFarlane et al (10)	Present Study
Adult Females	30 (68%)	63.63%
Children	11 (25%)	18.11%
Adult Males	3 (7%)	18.11%

Table 14. Showing the Comparative Study of Vocal Nodules

In 1988 Lancer J. et al(11) conducted a study on vocal nodules. In that study, vocal nodules were more commonly found in middle aged women and young boys. The predisposing cause found was vocal abuse. In the present study, vocal abuse was found as a predisposing factor in all the cases. Walter et al(12) had reported recurrence rate of 20% after surgery. In the present study, the recurrence rate was in 8 patients (13.33%). In a comparative study of Vocal polyps of the present study with the study of Jones SR et al,(13) the polyps were observed occurring in the same age group, same gender and with smoking as a risk factor. The Studies had a statistical insignificance with p-value at 0.61 with p taken as 0.05 (Table 15). In the present study, all the lesions were originating from the vocal cords.

	Jones. S.R. et al(13)	Present Study
Age Group	30 - 50 yrs.	21 - 60 yrs.
Males	76%	50%
Smokers	85%	50%

Table 15. Showing the Comparative Study with Jones SR et al

Papillomas were found to be the most common benign neoplasm of the larynx (83%) in the study conducted by Shaw.(9) It constituted 11.29% of all the benign lesions. In the present study, it formed 10% of the entire lesions and it was the only type of true neoplasm observed. In the study by Steven R Jones et al,(13) 84% of the true neoplasms were Papillomas. Equal incidence in both sexes were cited by Bolye et al.(14) In the present study, all the affected patients were male. The lesions in the adults were solitary type. Similar observations were made by Ferguson (1944)(15) and Cuning (1950).(16) A comparative study on Laryngeal Cysts showed that the incidence was 10% in the present study and in PM Robinson(14) study it was 6.08% and in a study by Shaw(9) it was 4.7%, (Table 16). The difference was statistically significant with p-value 0.453 (with P value significant at 0.05).

Study	Percentage
P.M. Robinson(17)	6.08
Shaw(9)	4.7
Present Study	5

Table 16. Showing the Incidence of Retention Cysts of Larynx- A Comparative Study

In the present study, all the lesions were unilateral. Similar observations were made by Monday et al (1983), (Table 17).(18)

Site	Kleinsasser(19)	Present Study
Vocal Cords	55%	50
Vestibular bands	25%	50
Epiglottis	20%	0

Table 17. Showing a Comparative Study of Site of Lesion

In the study by Shaw,(15) Tuberculous laryngitis formed 2.9% of the lesions. In the present study, it was 5% of all the benign lesions. Travis et al(19) described pain, odynophagia and otalgia in 75% of cases and all had pulmonary cavitory lesions. In the present study, pain was present in 50% and all the cases had pulmonary cavitory lesions. Lee STS et al (20) observed 5 cases of sulcus vocalis between the ages of 19-40 years. In the present study, the patients were between 31-40 years of age. Hirano et al (1990)(21) observed unilateral sulcus vocalis in 25% of the cases. In the present study, 50% were unilateral, 66.6% were having bilateral involvement. All the patients presented with vocal fatigability.

The incidence of Rienke's oedema in the present study was 5%; 40% in males and 20% in females when compared to the study of White AD et al(22) (Table 18).

Study	Male	Female
AD White et al(22)	03 (5%)	58 (95%)
Present study	02 (9%)	01(%)

Table 18. Showing Distribution among Males and Females

Vocal Granulomas by Shaw⁽⁹⁾ formed 2.12% of all benign lesions. In the present study, 3.33% were vocal granulomas. The incidence of predisposing factors; Intubation and Vocal abuse were similar in the present study and a study by Shaw⁽⁹⁾ (Table 19).

Predisposing Factor	Shaw ⁽⁹⁾	Present Study
Intubation	56%	50%
Vocal abuse	44%	50%

Table 19. Showing Comparative study of the Incidence of Predisposing Factors of Granulomas

In a study of 27 cases, Feder et al⁽²³⁾ found vocal abuse, intubation and gastro-oesophageal reflux as predisposing factors. In the present study, all granulomas were located over vocal process. Similar observation was made by Kleinsasser.⁽⁶⁾ All the affected were males. In the Kleinsasser⁽⁶⁾ study, all the contact granuloma patients were male.

Summary

Benign lesions of the larynx include neoplastic and non-neoplastic lesions. They are broadly classified together because clinically they behave similarly. Any lesion affecting the larynx will cause some kind of voice disorder. Voice disorders caused by benign lesions are correctable by surgery. In the present study, 60 patients of benign lesions of the larynx were studied. Diagnosis was established by history, clinical examination, routine blood and urine examination, fiberoptic video laryngoscopy and biopsy. The advantages of video endoscopy were analysed. 80% of the lesions observed were non-neoplastic lesions. All the neoplastic lesions observed were Papillomas. Vocal cord nodules were the most common lesion observed. They formed 36.66% of the study. Vocal polyps formed 20%. 13.33% of the lesions were Papillomatosis. 10% of the lesions observed were retention cysts. Tuberculous laryngitis formed 5%. There were 6.66% cases of sulcus vocalis. Rienke's oedema was in 5% and vocal granulomas in 3.33%. All lesions presented with some kind of voice disorder. 95% of cases presented with hoarseness. Other vocal symptoms include vocal fatigue (43.33%), breathy voice (10%), voice breaks (11.66%) and reduction in voice range (52.5%). Patients in the level I voice use presented early and the commonest symptom among them was vocal fatigability (43.33%). Other symptom was voice breaks (60%). In all patients of vocal nodules, vocal abuse was found to be the predisposing factor. 58% of the patients affected with polyps were smokers. Of the two cases of vocal granulomas, previous endotracheal intubation was the predisposing cause.

CONCLUSION

86.66% of the benign lesions observed were non-neoplastic type. 13.33% were true neoplastic lesions. All the neoplastic lesions were Papillomas. Vocal nodules were the commonest benign lesions observed (36.66%). Fiberoptic laryngoscopy was found significantly superior to the conventional methods of diagnosis. The diagnosis efficacy equals microlaryngoscopy. The advantages of the fiberoptic video laryngoscopy are it could be done as an office procedure, no general anaesthesia is needed, it is less traumatic, it can be used in patients with neck stiffness and trismus. The high

resolution magnified images enable to visualise minute details. Instrumentation can be done through separate channel. It permits good documentation and teaching methods.

REFERENCES

- [1] Scalco AN, ShipMan WF, Tabb HG. Microscopic suspension laryngoscopy. *Annals of Otology, Rhinology and Laryngology* 1960;69(4):1134-8.
- [2] Winston P, Epstein SS. Papillomas of the larynx - a clinico pathological study. *Journal of Laryngology and Otology* 1958;72(6):452-64.
- [3] Ikeda S. Flexible broncho fiberscope. *Annals of Otology, Rhinology and Laryngology* 1970;79:916.
- [4] Eijyanagisawa, Yanagisawa R. Laryngeal photography. *The Otolaryngologic Clinics of North America* 1991;24(5).
- [5] Holinger PH, Johnston KC. Benign tumours of the larynx. *Annals of Otology, Rhinology and Laryngology* 1951;60(2):496-509.
- [6] Kleinsasser O. *Microlaryngoscopy and Endolaryngeal micro surgery*. Philadelphia: WB Saunders Co., c1968:48-54.
- [7] Rayl JI, Rourke D. Application of colour television in bronchooesophagology. *Transactions of American Broncho Oesophagological Association* 1974;54:137.
- [8] Kaufman JA, Issacson G. Spectrum of vocal dysfunction. *The Otolaryngologic Clinics of North America* 1991;24(5):985-8.
- [9] Shaw H. Tumours of the larynx. In: Ballantyne J, Groves J. eds. *Scott-Brown's diseases of the Ear, Nose and Throat*. 4th edn. Butterworths, London: 1979:421-36.
- [10] Mcfarlane, Walterson TL. Vocal nodule - endoscopic study and treatment. *Seminars in Speech and Language* 1990;11:47-59.
- [11] Lancer JM, Syder D, Jones AS, et al. A Vocal cord nodules: a review. *Clinical Otolaryngology* 1988;13(1):43-51.
- [12] Walter B, Larsen BI. Hoarseness in children, followup on no therapy, surgical or voice therapy alone or combined. *Acta Otolaryngologica* 1994;(Suppl 412):40-2.
- [13] Jones SR, Myers EN, Barnes L. Benign neoplasms of larynx. *The Otolaryngologic Clinics of North America* 1984;17(1):151-6.
- [14] Boyle WF, McCoy EG. Treatment of papilloma of the larynx in children. *The Laryngoscope* 1970;80(7):1063-77.
- [15] Ferguson CF, Scott HW. Papillomatosis of the larynx in the childhood: a report of 15 cases. *New England Journal of Medicine* 1944;230:477-82.
- [16] Cunning DS. Diagnosis and treatment of laryngeal tumors. *JAMA* 1950;142(2):73-7.
- [17] Robinson PM. Prospective study of complications of endoscopic laryngeal surgery. *Journal of Laryngology and Otology* 1991;105:356-8.
- [18] Monday LA, Cornut G, Bouchayer M, et al. Epidermoid cysts of the vocal cords. *Annals of Otology, Rhinology and Laryngology* 1983;92(2 Pt 1):124-7.
- [19] Travis LW, Hybels RL, Newman MH. Tuberculosis of larynx. *The Laryngoscope* 1976;86(4):549-58.

- [20] Lee STS, Niimi S. Vocal fold sulcus. *Journal of Laryngology and Otology* 1990;104(11):876-8.
- [21] Hirano M, Yoshida T, Tanaka S, et al. Sulcus vocalis: functional aspects. *Annals of Otology, Rhinology and Laryngology* 1990;99(9 Pt 1):679-83.
- [22] White A, Sim DW, Maran AG. Reinke's oedema and thyroid function. *Journal of Laryngology and Otology* 1991;105(4):291-2.
- [23] Feder, Michael. Hyperactive, hyperacidic, intubation granuloma. *Archives of Otolaryngology* 1984;110: 582- 4.