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STUDY OF BENIGN GLOTTIS LESIONS UNDERGOING MICROLARYNGEAL SURGERY

Surgery

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ABSTRACT

Introduction: A total of 50 patients were included in the present study conducted at our institute over a period of 1 year. They all have clinically benign vocal cord lesion.

Materials and method: The patients were selected at random from those attending ENT department. All of them were suffering from vocal cord lesions.Indirect laryngoscopy was the corner stone of slection. After diagnosis most of them were treated with microlaryngeal surgery and post operatively histology was also studied.

Result and Discussion: The incidence of benign non neoplastic tumours (80%) was much greater than neoplastic(20%) cases. Benign lesions have been found among housewives,students,people engaged in services,hawkers,bus conductors,private tutors,singers.The duration of suffering ranged from 10 days to 4 years.Hoarseness was the main symptom in majority of cases(78%).Two patients came with dyspnoea and tracheostomy were needed.10% cases came with chronic cough.It was found that most of the cases of unilateral vocal cord lesions were on right side and single(26 out of 36).Out of 8 cases treated with conservative management results of 6 cases were satisfactory.The success rate was 75%.Rest 42 cases which were undergone microlaryngeal surgery,satisfactory results were obtained in 33 cases(78%).

Conclusion: All of the patients were advised to continue speech therapy post-operatively. The overall success rate was 78%. The overall results of micro laryngeal surgery is satisfactory and earlier is the report, better are the results.

KEYWORDS

INTRODUCTION

Benign lesions are quite common in vocal cords .They can be either true neoplastic or non neoplastic. In our study we found some of the lesions of vocal cord which are mentioned below.

PAPILLOMATOSIS OF THE LARYNX:

Papilloma is a benign epithelial tumour, presenting as a warty epithelial mass on one of the cords. Papillomas usually enter the superficial layer, but may on occasion involve the intermediate and deep layer of the lamina propria of the vocal fold.[1] Papillomas are reportedly most common in children[2] between two and four years old and are comparatively rare in adults. In adults, surgical removal of the tumour is unlikely to be followed by a recurrence. In children, however, these tumours tend to recur and multiple papillomas may occur on both true and false vocal folds, extending onto the epiglottis and sometime occasionally extend to the trachea and bronchi. Surgical treatment needs to ensure the damage to the growing larynx is avoided and that sub epithelial layers are preserved. Voice therapy in children, teaching non traumatic use of the voice, may be important following surgery.

VOCAL NODULES:

Vocal nodules are a frequent disorder in children. Nodules arise (either unilaterally or bilaterally) on the edges of the vocal folds, at the junction of the anterior third and posterior twothirds of the vocal folds and always, when bilaterally occurring, symmetrically on both cords. According to Karkos PD et al (2009)[3],people with vocal nodules often present with restricted pitch range and voice breaks. Vocal nodules originate from a combination of overuse and incorrect use (sometimes termed 'misuse and abuse') of the voice leading to localised vascular congestion of Rienke's space evolving over time to progressive hyalinization,basal cell thickening and parakeratosis.The hour glass shaped glottis chink seen on videostroboscopy causes incomplete glottal closure leading to vocal symptoms. Unless the incorrect vocal habits that led to the nodules are addressed, then there is a high probability that the nodules will recur. Similarly, where treatment includes surgical removal of the nodules alone, without vocal re-education and change of habit, there is little chance of surgery, by itself, eliminating the problem.

VOCAL FOLD CYSTS:

Vocal fold cysts usually develop in Reinke's space below the squamous epithelium.Two vocal fold cysts which are important in voice disorders are mucous retention cysts (intracordal) and epithelial inclusion cysts. Both may result from laryngitis and can interfere with the function of voice to a greater or lesser degree, depending on the site of the cyst. They arise halfway along the membranous part of the vocal fold cover, so vocal symptoms may be considerable as there is a reduction or absence of a mucosal wave over the area of the cyst.According to Matar N et al (2009)[4] cysts are usually surgically removed and afterwards, a period of voice therapy may be necessary to correct any faulty vocal habits which formed while the cyst was present.

GRANULOMA:

Granulomas are rare, benign, inflammatory masses which may be unilateral or bilateral and are found at, or slightly cranio-posterior to, the vocal processes, in the cartilaginous part of the glottis.

Contributing factors to granulomas are:intubation;laryngeal surgery; both on its own and after radiotherapy;vocal abuse; gastroesophageal reflux. The effect on voice is usually that of low pitch, monotony, vocal fry (creak) and hyperfunction. Hoarseness is not a common symptom as the granuloma usually sits on the cartilaginous part of the glottis and seldom affects vibration.

According to Carroll TL, Gartner Schmidt J, Statham MM [5]et al (2010):Vocal process granuloma is related to chronic coughing and throat clearing seen in context of GERD ,psychological stress and conflict among voice overusers(lawyers,executives ,teachers.

Foreign body granuloma was reported a decade ago after vocal fold

medialization for unilateral vocal cord paralysis with Teflon paste.[6,7] Surgical removal of the teflonoma is treatment of choice.

VOCAL FOLD OEDEMA AND POLYPS:

Polyp is a well-differentiated, hyperplastic, benign pathological structure of the mucous membrane.The potential space under the epithelium is called the subepithelial space of Reinke, or Rienke's space. Accumulation of fluid in this space results in vocal fold oedema ('Reinke's oedema') and if the accumulation is concentrated at one end and balloons the epithelium out in front of it, this is known as a vocal fold polyp.

It often occurs after laryngitis, especially when overuse of the voice, and possible excessive coughing, has occurred during the inflammatory phase. In many patients it is associated with heavy smoking.When there is a colloidal mass beneath the epithelium, however, resorption may take a long time and patients may prefer to have the swollen mucosa surgically incised and the excess fluid aspirated. A vocal fold polyp never resolves with therapy alone and should be surgically removed.

REINKE'S EDEMA:

Reinke'sedema is seen in smokers with history of voice abuse.

The characteristic macroscopic features are yellowish myxoid infiltrate of vocal fold submucosal space associated with dilated capillaries and atrophic mucosa.The condition is bilateral and more prominent on superior and free edge of the vocal folds.It results into hoarseness of voice and lowering of pitch.Indirect laryngoscopy often reveals fusiform dilated pale watery vocal folds that display to and fro motion with respiration.

LARYNGEAL WEB:

laryngeal web is a band of connective tissue (which may vary in length) which joins the two vocal folds at the anterior commissure. They may be congenital - due to the vocal membrane failing to separate in embryonic development or acquired - usually this is related to internal or external trauma occurring on the vocal fold edges.A neonate may present with cyanosis, stridor and dysphonia; but this will vary with the extent of laryngeal webbing. They may also have feeding problems and weak phonation. Voice quality in adult patients may be shrill and pitch high as the web tethers the vocal folds and prevents optimal vibration. There may also be varying degrees of breathiness and hoarseness, due to vibratory irregularity and glottal air leak. Primary treatment is surgical, voice therapy postoperatively may then be needed to reestablish good voice.

MATERIALS AND METHODS

A total of 50 cases were selected from ENT department having the following complaints

1. Hoarseness
2. Chronic cough
3. Pain in throat
4. Dyspnoea

Patients having any one or more complaints have been screened and found histologically having benign lesions of vocal cords (Both neoplastic and non neoplastic).To those who were not surgically treated conservative managements were offered.

The following patients were excluded from the study:

1. Patients having malignant growth in vocal cords initially thought to be benign.
2. Keratosis laryngis : 2 patients having evidence of keratosis. They have been excluded due to malignant potential.
3. Acute simple laryngitis and chronic simple laryngitis. These patients had non specific problems without much structural changes to vocal cords.

INSTRUMENTS AND EQUIPMENTS:

1. laryngeal mirror:for preliminary assessment of patients.
2. Microscope:Carl Zeiss operating microscope with 400nm objective lens and photographic attachments.
3. Sony digital camera.
4. Laryngoscope:Different varieties of direct laryngoscopes.
5. Suspension holder.
6. Fibre optic cold light source.
7. Instruments for microlaryngoscopy.

They include: 1)cup forceps 2)straight right and left upbite forceps 3)laryngeal scissors 4)suction cannula 5)laryngeal knife 6)Test tubes with formalin for biopsy specimen.

Patients attending ENT department have been examined on the basis of symptoms stated previously.The age , sex, onset , duration, smoking habits, personal history and family history were taken.Indirect laryngoscopy findings were drawn on OPD tickets to point the site of lesion.

The following points were noted:

1) Movements of vocal cords
2) Situation of the lesions
3) Nature of the lesions(single,multiple,colour,surface)
4) Unilateral or bilateral.

FOLLOW UP OF PATIENTS:

Both groups of patients were carefully followed up weekly for initial one month, then monthly for six months.

Result wise they were divided into:

1. Satisfactory
2. Unsatisfactory (bad or not improved)

When the patients of conservative management group were not improved or became worse, they were recommended for surgery.

RESULTS AND ANALYSIS

		No. Of cases	Percentage	Overall percentage
Type of lesion	Non neoplastic	40	80%	
	Neoplastic	10	20%	
Non neoplastic	vocal nodules	17	42.5%	34%
	degeneration	13	32.5%	26%
	vocal nodules degeneration	2	5.0%	4%
	vocal nodules	3	7.5%	6%
	Retension cyst	3	7.5%	6%
	Web	2	5.0%	4%
Neoplastic	Papilloma	5	50%	10%
	Juvenile papilloma	1	10%	2%
	Fibroangioma	4	40%	8%
Age group	0-11	2	4%	
	11-20	2	4%	
	21-30	10	20%	
	31-40	21	42%	
	41-50	5	10%	
	51-60	7	14%	
	60y and above	3	6%	
Age group(year)	0-10	1	5.9%	
	11-20	2	11.8%	
	21-30	1	5.9%	
	31-40	11	64.6%	
	41-50	1	5.9%	
	51-60	1	5.9%	
Sex	Male	26	52%	
	Female	24	48%	

		No. Of cases	Percentage
Occupation	Housewife	18	36%
	Student	5	10%
	Office worker	10	20%
	Proffessional voice abusers	12	24%
	Proffessional voice users	5	10%
Duration of illness	Very early (A)	5	10%
	Early(B) 1-3 m	7	14%
	Early(C) 3-6m	15	30%
	(D)6m-1y	5	10%
	Late (E)1-2y	8	16%
	(F)2-4y	10	20%
History of voice strain	History of any voice strain	32	64%
	No history of any voice strain	18	36%
Lesion	Vocal nodules	17	
	Vocal polyps	13	

	Cyst	3	
	Polypoidal Degeneration	2	
Habits of alcohol and tobacco	Presence of habits alcohol and tobacco	26	52%
	No of habits of alcohol and tobacco	24	48%
Presenting features	Hoarseness of voice	39	78%
	Chronic cough	5	10%
	Dyspnoea	2	4%
	Pain in throat with discomfort	4	8%
other features	Breathing problems	7	14%
	Hoarseness of voice	7	14%
	Pain in throat	17	34%
other features	Chronic cough	9	18%
	No other symptoms	10	20%
Residential area	Urban	37	74%
	Rural	13	26%
Name of surgery	Tracheostomy	2	4%
	Laryngofissure	1	2%
Management offered	Conservative	8	16%
	Microsurgical	42	84%
Results of conservative management	Tubercular	2	2%
	Granuloma Early vocal nodules	6	4%

			Percentage	
		No. Of cases	Rt%	Lt%
Side distribution of vocal cord lesions	vocal nodules	10	6%	1%
	Vocal polyps	1	7%	5%
	Polypoidal degeneration	0	2%	0%
	Tubercular granuloma	0	1%	2%
	Retention cyst	0	2%	1%
	Web	2	0%	0%
	Papilloma	0	5%	0%
	Juvenile papilloma	1	0%	0%
	Fibro-angioma	0	3%	1%

Nature of lesion	Cases	No. Of cases operated	No. Of cases improved	No. Of cases not improved	% of success
Non Neoplastic	vocal nodules	11	9	2	81.8
	vocal polyps	13	10	3	76.9
	Polypoidal degeneration	2	2	-	100
	Tubercular granuloma	1	1	-	100
	Retension cyst	3	3	-	100
	Web	2	1	1	50
Neoplastic	Papilloma	5	5	-	100
	Juvenile papilloma	1	0	1	-
	Fibroangioma	4	2	2	50
Nature of lesion	Non neoplastic	32	26	6	81
	Neopastic	10	7	3	70
Nature of treatment	Conservative	8	6	2	75
	Microlaryngoscopy	42	33	9	78.5

We found that 50 cases of benign lesions of vocal cords were studied clinically and investigated. Some of the patients were given conservative and rest were given surgical managements.

It was found that the details of lesions have been analysed and out of 50 cases ,17 were vocal nodules,13 were vocal cord polyps, tubercular granuloma and retention cysts each were 3 in number, 2 cases of polypoidal degeneration and 2 cases of web were seen. In neoplastic category, 5 cases of papilloma of which 1 case was multiple juvenile papilloma. Rest 4 were fibroangioma .

We found that in this study, the highest age was 73 year and lowest 6 year. The highest number of patients were seen in the age group of 31 to 40 year; next common was 21 to 30 year, having number of 10.The individual cases were also analysed in terms of age incidence.

It was found that as discussed earlier, the individual age group incidence of vocal nodules and vocal polyps are given separately as they comprise highest number of cases.

It was found that sex incidence of the present study does not show much sex difference.24 cases were female and 26 were male. But if we take individual cases, most of vocal cord nodules are seen in females.

We found that by professional voice abusers we mean hawkers, bus conductors and shop keepers. By professional voice users we mean singers, teachers. The terms are only qualitative and no quantitative parameters can be established to distinguish between the two. But if they join together, they come to a figure of 34%.

It was found that voice abuse/overuse and general use are described qualitatively and no quantitative parameter is present.

We found that as we all know, voice strain has something to do with non neoplastic tumours .So their incidence is shown separately.

It was found that it was expected that most of the patients will come with voice disorders. But there were other symptoms which were also presenting features. It is observed that they ignored the voice disorder for a long time and come with dysphonia. Presenting features are tabulated as follows.

We found that other surgery necessary in this study other than microlaryngoscopy were tracheostomy (in case No.35 and 50) and laryngofissure in a case of web(case No.22).

It was found that in this series of 50 cases, cases were screened.42 patients underwent microlaryngeal surgery and 8 underwent conservative management. Of the 8 patients who underwent conservative management, 6 had early vocal cord nodules and 2 had tubercular granuloma. This is shown in the table below:

It was found that the cases managed conservatively were asked for regular folowup. The total duration of follow up was for 6 months. The results were analysed after 6 months of follow up. Out of 8 cases manged,6 have shown satisfactory results after 6 months,2 cases did not improve at all. They were recommended for surgical management. Although 50 cases have been treated and out of them 39 cases have shown improvements after follow-up of 6 months. Results of 11 cases were not so satisfactory but most of them got relief to some extent. None of them showed poor result of surgery.

We found that all the 11 cases which did not give satisfactory results, reported late. Such a late reporting may be one of the causes of unsatisfactory management.It was found that the 2 cases which did not respond well with conservative management were recommended for microsurgery.We found that improvement of voice was considered a major parameter for satisfactory results, although other symptoms of improvement were also considered.

6% patients had Tubercular granuloma, 4% patients had web, 8% patients had Papilloma2% patients had Juvenile papilloma, 4% patients had Polypoidal degeneration, 6% patients had Retention cyst, 34% patients had Vocal nodule and 26% patients had Vocal polyp.

DISCUSSION

According to Geyer M, Ledda GP ,Tan N et al (2010) the CO_2 laser set to ultrapulse achieves blood less field with respect to cold instruments.[8] According to Chernobelsky SI (2007)[9] voice therapy postoperatively aims to assure good vocal hygiene and identification and elimination of laryngeal misuse and abuse which may have led to the problem.

In present study out of 50 cases, 40 were non neoplastic(80%) and 10 (20%)were neoplastic.The study was carried out for one year amongst 50 patients.Incidences of benign lesions of vocal cord was 80%. So this study correlates well with the studies of Salinger (77.4%)[10], Epstein(89.6%)[11] and Henry Shaw(86%)[12].The higher incidence of tubercular granuloma in this series is due to higher incidence of the disease in India.PawanSinghal , Amit Bhandari et al(2009)[13] found that the average age in males (37.91 ± 12.17 years) was significantly higher as compared to that of females (30.71 ± 8.51 years).Their study yielded the following table.

Hemant Chopra and Minisha Kapoor(1997)[14] found that 73.14% patients of benign laryngeal lesions presented between the age group of 20-25 years.Their observation of age distribution is tabulated below.

Mahesh Chandra Hegde, M. Panduranga Kamath et al (2005)[15] said that the maximum number of cases were seen in the age group between 31 and 40 years (15 cases). The mean age in years was 38.74 [standard deviation 13.87]. In males the mean age was 39.35 [SD 14.46], while in females the mean age was 36.13 [SD 11.47].

In this study ,maximum number of benign vocal cord lesions havebeen seen in the age group of 31 to 40 years of age(42%).Next common age group was between 21 to 30(20%) year of age and least common age group was 0 to 10 yr where 2 patients were reported.

The findings of present study correlates with findings of Gordon B New and John B Erich and Stewart J.P., Mahesh Chandra Hegde, M. Panduranga Kamath et al.Swapan K. Ghosh, S. Chattopadhyay, H. Bora, and P. B. Mukherjee(2001)[16] in their study of 100 cases found the following results in regard to occupational incidence.

In this study people engaged in different occupations have been studied.The highest incidence(36%) was found amongst those who were housewives or related to household works followed by professional voice abusers (in hawkers,bus conductors and shopkeepes).The incidence of professional voice users like teacher and singer were 10%.In this study, the incidence amongst student and office workers were 10% and 20% respectively.

Singhal P, Bhandari A, Chouhan M, Sharma MP, Sharma S.(2009)[13]observed hoarseness/change of voice being the chief presenting symptoms followed by vocal fatigue, foreign body sensation and difficulty in breathing as depicted in the following table.

In this present study majority of patients came with hoarseness of voice(78%) followed by history of chronic cough(10%) and 8% patients came with pain in throat.2 cases(4%) came with dyspnoea.

Swapan K Ghosh et al(2001)[16] observed that the ratio of unilateral and bilateral affection was near about 5 : 4. In case of vocal nodule it was 1 : 2 and in vocal polyp it was 5 : 1. In their series affection in left side was slightly more than that in right side.

PawanSinghal , Amit Bhandari , MahendraChouhan , Man Prakash Sharma , Shivdutt Sharma(2009)[13]observed that the commonest site of origin of the tumor was vocal cords with 44% on the left vocal cords, 40% on the right vocal cords, and in the remaining 16%, the site of origin was bilateral.

This present study shows vocal nodules were mostly bilateral (58.8%). Out of 50 cases,36 cases were unilateral(72%) of which 26 were situated at right(72%). The single case of papillomatosis was bilateral. Most of the cases of vocal cord polyps in this study were unilateral.Increased industrialisation and overcrowding were blamed for vocal cord lesions. In the present study,the urban incidences is definitely more than rural incidences.74% cases were urban and only 26% cases were from rural area.

PawanSinghal , Amit Bhandari , MahendraChouhan , Man Prakash Sharma , Shivdutt Sharma(2009)[13] in their study showed that the duration of symptoms ranged from 1 month to 24 months.Mahesh Chandra Hegde, M. Panduranga Kamath, Kiran Bhojwani, Ranjith Peter, and Polisetti Ravi Babu(2005)[14] said that the duration of symptoms ranged from 1 month to 2 years;the mean duration of illness in months was 3.93 ± 2.32.In the present study most of the cases came with in the period of 3 months to 6 months(30%).In this age of awareness 5 patients (10%) came within one month of illness of which one case reported with in 10 days of sufferings.

Hossain M.M et al (1997)[17] reported a recurrence of a case of papilloma larynx in a male at the same site and the growth was excised under anesthesia.Hemant Chopra and Minisha Kapoor(1997)[14] in their study commented that recurrence was seen in 7.49% cases and recurrent cases were re-operated.

In this present study, there are 3 cases of recurrences(6%). One of vocal cord nodule recurred after 7 year.There were also 2 cases of vocal polyp,one recurring after 2years and the other after 4 years.

In both cases of polyp, other side of the cord was affected.In all these 3 cases history of vocal abuse was there. These findings correlates well with the findings of Kleinsasser and other workers.

Courey MS, Garrett CG, Ossoff RH(1997)[18] proposed medial microflap technique for surgical treatment of benign vocal cord lesions. Phaniendra Kumar V, Srinivasa Murthy M, Ravikanth S, Kumar R.(2003)[19]also reported their experience in the management of benign vocal fold lesions by phonomicrosurgical techniques based on Hirano's principle with pre and post operative stroboscopic, perceptual and computerized acoustic voice analysis.

Johns MM, Garrett CG, Hwang J, Ossoff RH, Courey MS(2004)[20] remarked saying that the upper pitch limit increased after surgery in women (495.3 Hz to 654.9 Hz, $p < .001$). These results indicate that the voice-related quality of life and some acoustic parameters improve significantly for patients who have undergone laryngeal microsurgery for vocal fold cysts and polyps. Vocal fold scarring remains a difficult clinical problem with less favourable outcomes following surgical treatment in this patient set.

Preuss SF, Klussmann JP, Jungehulsing M, Eckel HE, Guntinas-Lichius O, Damm M.(2007)presented results that add further support to the observation that laser microsurgery is the preferential surgical treatment for recurrent respiratory papillomatosis (RRP). A meticulous follow-up for early recognition of local recurrence and malignant transformation is recommended.In this present study 42 cases were treated with microsurgery.Satisfactory results were found in 78.5% cases.The 8 patients who were treated conservatively,6 had improved(75%).The overall satisfactory results were 78%.This results are similar to results ofKleinsasser who had 80% success rate.

CONCLUSION

Incidence of non neoplastic tumour is more than neoplastic lesion. Polyps and nodules constitute most of non neoplastic lesion and pailloma and fibroangioma constitute the neoplastic group.Benign lesions of vocal cord can occur in all age groups.Age group between 31-40 years have got the highest number of cases as vocal nodules occur in this age group. There is no sex predilection of overall benign lesion of vocal cords. But vocal nodules are commoner in females and polyp and papilloma are commoner in males.

Hoarseness of voice is the commonest symptoms (78%).But some other symptoms like chronic cough,dypnea,pain in throat are also seen. Voice strain both overuse and abuse plays significant roles in formation benign neoplastic tumors of vocal cords.Most of the lesions are seen in right side of the cords. Early vocal nodules when treated conservatively have got better results so far the voice is concerned. The overall results of microlaryngeal surgery is satisfactory and earlier is the report , better are the results.

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