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Clinicopathological Study of Laryngeal Masses

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Abstract:
Background: *The present study was undertaken as analysis of laryngeal masses in a rural population of India has been lacking.*
Aim And Objectives: *The aim of this research work is to study clinicopathological profile of laryngeal masses . To attain this , objectives were directed to describe the socio demographic profile of patients diagnosed with laryngeal masses , describe their symptomatology and risk factors and their endoscopic , radiological and histopathological findings .*
Material And Methods: *This is a 2 year cross-sectional type of observational study done at Pravara rural hospital, Loni ,Ahmednagar, Maharashtra .100 patients of laryngeal masses attended our ENT OPD from 01/07/2011 to 01/07/2013. All cases underwent biopsy by direct or micro laryngoscopy . The clinical diagnosis was made after detailed history and clinical examination by indirect laryngoscopy mirror and palpation of neck.*
Results: *In our study total 100 cases of laryngeal masses were obtained , 86 malignant and 14 benign . Among malignant laryngeal masses supraglottic region was the commonest site and majority patients presented in late stage III & IVA . Among benign laryngeal masses vocal fold polyps were the commonest . Clinical diagnosis was 100 % correct in vocal fold nodule, intubation granuloma and epiglotticcyst whereas it was correct in only 66.66% cases of vocal fold polyp and 98.83% of malignant laryngeal masses .*
Conclusion: *This study showed that proportion of laryngeal cancers was significantly high , they constituted a major burden in our hospital with proportion higher than that reported in any other studies which requires prompt attention . We can be conservative with vocal fold nodules and cysts but we should be aggressive in the management of vocal fold polyps.*
Keywords: *Larynx, mass, laryngoscopy, benign, malignant , polyp , nodule, cyst, histopathology .*

I. Introduction

Only vertebrates with their thoracoabdominal diaphragms are able to use their larynges as flutter valves; altering air flow from their respiratory bellows to produce sound. The production of sound for communication of complex information is limited to the highest orders. Thus, only in humans is the larynx significantly altered for voice production.
The larynx serves three basic functions in humans. In order of functional priority they are

- Protective
- Respiratory and
- Phonatory[1]

The larynx serves to protect the lower airways, facilitates respiration and plays a key role in phonation. The protective function is entirely reflexive and involuntary, whereas the respiratory and phonatory functions are initiated voluntarily but regulated involuntarily. [2]

The present study was undertaken as description of laryngeal masses in rural population of India has been lacking and the aim was to describe the clinico-pathological profile of laryngeal masses in a rural tertiary care hospital in Western Maharashtra of India. Various clinicopathological studies have been conducted in various regions of India as well as all over the world on both laryngeal malignancies as well as benign lesions BUT a study on laryngeal masses describing their clinicopathologicalprofile , as such is scarce . This study is highly relevant in a rural area like Loni where factors like poor socio-economic conditions, oral consumption of tobacco in its various forms, alcohol, smoking habits in form of beedi and cigarette, lack of awareness about cancer, negligence towards the symptom of voice change and primary treatment from quacks , are highly prevalent. This study also can form a basis for future research work on analytical studies like association between beedi smoking and laryngeal cancers , as beedi smoking is more common in rural area of Loni than cigarette smoking probably due to the ease of availability and cost factors.
Masses arising from the larynx can be broadly categorised as follows[3]:

1. Congenital
a) Supraglottis - Saccular cysts
Lymphangioma
b) Subglottis -Subglottic Hemangioma

2. Inflammatory
a) Arytenoid Granuloma/ Intubation Granuloma/ Contact ulcer

3. Structural Or Nodular Lesions
a) Vocal fold Polyps
b) Vocal fold nodules
c) Mucous Retention cysts
d) Epidermoid cysts
e) Pseudocysts

4. Chronic Granulomatous Disease-
a) Tuberculosis
b) Syphilis
c) Leprosy
d) Sarcoidosis
e) Wegener'sGranulomatosis
f) Candidiasis
g) Histoplasmosis
h) Blastomycosis
i) Actinomycosis
j) Rhinoscleroma

5. Tumours Of The Larynx
a) Benign
1. Laryngeal Papilloma – most common
2. Rare - Chondroma, Paraganglioma, Nuerofibroma, Lipoma, Hemangiomas, Rhabdomyomas, Salivary gland tumours, Leiomyomas and benign Schwannoma.

b) Malignant - Squamous Cell Carcinoma – most common Rare –
i. Epithelial – Verrucous carcinoma, Lymphoepithelial carcinoma, Malignant melanoma, Adenocarcinoma, Adenocystic&Acinic cell carcinomas, Mucoepidermoid, Adenosquamous, Neuroendocrine and Sarcomatoid carcinomas like spindle cell, pseudosarcoma and carcinosarcoma .
ii. Mesenchymal – Leiomyosarcoma, Chondrosarcoma, Osteosarcoma, MalignantHistiocytoma, Fibrosarcoma, Liposarcoma, Angiosarcoma, Kaposi sarcoma, Synovial sarcoma, Rhabdomyosarcoma.
iii. Haemopoietic – Non-Hodgkin's lymphoma
iv. Acute or chronic lymphocytic – Very rare, Acute or chronic myelogenous , Multiple myeloma .

II. Aim & Objectives

AIM
1. To study the clinicopathological profile of laryngeal masses in a rural tertiary care hospital.

Objectives
1. To describe the socio demographic profile of patients diagnosed with laryngeal masses.
2. To describe the symptomatology and risk factors associated with laryngeal masses.
3. To describe the endoscopic, radiological and histopathological findings of laryngeal masses.

Research question :
"What is the clinicopathological profile of laryngeal masses amongst patients attending ENT OPD at Pravara Rural Hospital ,Loni ?"

Study group: Patients attending Out patient Department of Otorhinolaryngology, Head and Neck Surgery, and admitted at Pravara Rural hospital, Loni.

Main variables : Laryngeal masses , clinical findings , histopathology findings .

III. Materials And Methods

Study Design: Cross-sectional type of Descriptive Observational Study
Study Sample: Patients attending Out patient Department of Otorhinolaryngology, Head and Neck Surgery and being admitted in ENT ward .
Study Venue: Pravara Rural Hospital , Loni .
Studyduration: 01/07/2011 to 01/07/2013 (2 years)

SAMPLESIZE: Number Of Patients Presenting With Laryngeal Masses Within The Duration Of The Study .
Institutional Ethicalcommitteeapproval: Approved . Ref. no PMIS/RC/2011/124 dated 27/07/2011. (Enclosed in ANNEXURE A)

Inclusioncriteria
All cases with Laryngeal masses .

Exclusioncriteria
Patients with hoarseness of voice, dyspnoea, dysphagia without laryngeal masses .

Methodsofdatacollection :
The Proforma was designed based on objective of study.

As per enclosed proforma all patients were admitted in ENT ward and detailed history was taken followed by thorough systemic and ENT examinations including indirect laryngoscopy mirror examination and clinical diagnosis arrived , investigations like blood ,urine ,radiological like Xray neck soft tissue –AP & lateral views &Xray chest PA view were done . Specific Investigations like Direct laryngoscopy or microlaryngoscopy under general or local anaesthesia were done after taking well informed written consent in Operation theatre where biopsies were taken in all the cases and the biopsy specimen sent for histopathologicalexamination .

Criteria for selecting Direct or Microlaryngoscopy :
Direct Laryngoscopy :was used to see the extent and take biopsy of supraglottic and subglottic laryngeal masses .
Chevaliar Jackson DL scope was used .

Micro Laryngoscopy :was used to see the extent and not only to take biopsy but also for therapeutic excision of masses originating from glottis i.e true vocal cords, anterior & posterior commissure , and even ventricles and ventricular bands. As these lesions are small , ML scopy provides magnification and excellent light for examination and taking more accurate biopsy specimens without damaging the vocal cord .
Kleinsasser ML scope was used .We used Microscope "KARL KAPS D 35614 AsslarEuropastrasse'' (G – Nr11900) Made in Germany with magnification lens of 400 mm objective focal length.

Variables

Sr.No.	Name of Variabe	Type of Variable (Qual/Quan)	Scale	Descriptive Statistics	Method ofMeasurement
1	Laryngeal masses	Qualitative	Nominal	Count &%	History & Clinical examination
2	Age	Quantitative	Ratio	Mean and SD	Interview
3	Gender	Qualitative	Nominal	Count& %	Interview
4	Occupation	Qualitative	Nominal	Count& %	Interview
5	Socio-economic status	Qualitative	Ordinal	Count &%	Revised Prasad's classification Average Latest Consumer price index
6	Residence	Qualitative	Nominal	Count & %	Interview
7	Addictions	Qualitative	Nominal	Count & %	Interview
8	Symptoms	Qualitative	Nominal	Count & %	Interview
9	Clinical staging	Qualitative	Nominal	Count & %	Clinical examination & IDL TNM staging
10	Co-existing lung disease	Qualitative	Nominal	Count & %	X ray Chest –PA view
11	Extent of laryngeal masses	Qualitative	Nominal	Count & %	IDL &Xray neck soft tissue – AP & Lateral views
12	Histopathology	Qualitative	Nominal	Count & %	DL scopy& ML scopy

Socio-economic status:
Revised Prasad's classification was applied for assessing socio-economic status of study subjects[4].

The revised per capita income per month limits have been calculated as follows:
Price index by old base (1960) for the original scale = 100
Price index by new base (1982) for the year 1982 = 100
Linking factor between 1960 and 1982 series = 4.63
Price index by new base (2001) for the year 2001 = 100
Linking factor between 1982 and 2001 series = 4.93
The linking factors have been obtained from the website www.labourbureau.nic.in.
For arriving at the corresponding family income cutoff values for the year 2001,
New income value = (old value × 4.63 × 4.93).
To calculate the values for real-time update, we have to look at the current All-India Average Consumer Price Index Numbers for Industrial Workers (Base 2001 = 100). The value of the index for March 2013 (latest available as of May 2013) is 224. The new values are calculated by further applying a multiplying factor:
Multiplying factor = current index value (=224)/Base index value in 2001 (=100) = 2.24.
The updated values for the per capita monthly income (in Rs./month) for May 2013 are given in .
They have been calculated as: New income value = 2.24 × (old value × 4.63 × 4.93).

Social class	Original classification of the per capita income (in Rs./month)	Revised for 2013 (in Rs./month)
I	100 and above	5113 and above
II	50-99	2557-5112
III	30-49	1533-2556
IV	15-29	767-1532
V	Below 15	Below 767

StatisticalAnalysis :

Statistical analysis was done by descriptive statistics as mean, SD, percentage etc. Data presented in tables and graphs. Z test of difference between two proportions was applied at 5% (p, 0.05) and 1% (p, 0.01) level of significance. Also, Chi-square test was applied to find out association between two variables. Statistical software SYSTAT version 12 (By Cranes software, Bangalore) was used.

The findings were discussed in the light of findings in other similar studies conducted elsewhere based on the objective of study in the foregoing chapters .

IV. Observations And Results

A total of 100 cases of laryngeal masses were studied during the study period.

Table No.1 Age and Sex Distribution

Age in years	Total		Male		Female	
	No.	%	No.	%	No.	%
<10	0	0	0	0	0	0
11-20	0	0	0	0	0	0
21-30	7	7	6	6.7	1	9.09
31-40	4	4	2	2.2	2	18.18
41-50	14	14	12	13.4	2	18.18
51-60	28	28	24	26.96	4	36.36
61-70	31	31	29	32.58	2	18.18
71-80	13	13	13	14.6	0	0
81-90	3	3	3	3.37	0	0
Total	**100**	**100**	**89**	**89**	**11**	**11**
Mean ± SD	**62.93 ± 12.04**		**58.87±11.45**		**49.14±12.66**	

100 cases of laryngeal masses were studied during study period. Maximum number i.e. 31 cases (31 %) belonged to 61-70 years of age group and minimum number i.e.3 cases (3 %) belonged to 81-90 years of age group. 89 cases (89 %) were males and 11 cases (11%) were females. Youngest patient was of 23 years old and eldest patient was of 90 years of age.

Table No.2 Age and Sex Distribution in Laryngeal Malignancies

Age in years	Total		Male		Female	
	No.	%	No.	%	No.	%
< 10	0	0	0	00	0	0
11-20	0	0	0	0	0	0
21-30	1	1.1	0	0	1	12.5
31-40	2	2.3	1	1.2	1	12.5
41-50	11	12.7	10	12.8	1	12.5
51-60	26	**30.2**	23	**29.4**	3	**37.5**
61-70	31	**36.04**	29	**37.17**	2	**25**
71-80	12	13.95	12	15.38	0	0
81-90	3	3.4	3	3.84	0	0
Total	**86**	**100**	**78**	**90.69**	**8**	**9.30**
Mean ± SD	**59.68±12.01**		**60.12±12.77**		**58.98±14.16**	

By applying Z test of difference between two proportions, the proportion of age 51 to 70 years was significantly higher as compared to other ages in male and female in Laryngeal Malignancies ($p<0.01$)

86 cases of laryngeal malignancies were found during study period. Maximum number i.e. 31 cases (36.04 %) belonged to 61-70 years of age group and minimum number i.e.1 case (1.1 %) belonged to 21-30 years of age group. 78 cases (90.69 %) were males and 8 cases (9.3%) were females. Youngest patient was of 23 years old and eldest patient was of 90 years of age.

Table No.3 Age and Sex Distribution In Benign Laryngeal Masses

Age in years	Total		Male		Female	
	No.	%	No.	%	No.	%
<10	0	0	0	0	0	0
11-20	0	0	0	0	0	0
21-30	**6**	**42.85**	**6**	**54.54**	0	0
31-40	2	14.28	1	9.09	1	33.33
41-50	3	21.48	2	18.18	1	33.33
51-60	2	14.28	1	9.09	1	33.33
61-70	0	0	0	0	0	0
71-80	1	7.14	1	9.09	0	0
81-90	0	0	0	0	0	0
Total	**14**	**100**	**11**	**78.57**	**3**	**21.42**
Mean ± SD	**28.25±4.14**		**27.42±3.89**		**45.00±5.65**	

By applying Z test of difference between two proportions, the proportion of age 21 to 30 years was significantly higher in males as compared to females in **Benign Laryngeal Masses ($p<0.01$)**

14 cases of Benign laryngeal masses were found during study period. Maximum number i.e. 6 cases (42.85 %) belonged to 21-30 years of age group and minimum number i.e.1 case (7.14 %) belonged to 71-80 years of age group. 11cases (78.57 %) were males and 3 cases (21.42%) were females.

Table No.4 Occupation

Occupation	Male		Female		Total	
	No.	%	No.	%	No.	%
Farmer	**62**	**69.66**	0	0	**62**	**62**
Driver	11	12.35	0	0	11	11
Factory worker	3	3.3	0	0	3	3
Clerk	3	3.3	0	0	3	3
Street hawker	2	2.2	1	9.09	3	3
Labourer	2	2.2	0	0	2	2
Housewife	0	0	**9**	**81.81**	9	9
Barber	2	2.2	0	0	2	2
Tailor	1	1.12	0	0	1	1
Student	1	1.12	0	0	1	1
Teacher	0	0	1	9.09	1	1
Electrician	1	1.12	0	0	1	1
Sanyasi	1	1.12	0	0	1	1
TOTAL	89		11		100	100

By applying Z test of difference between two proportions, the proportion of occupation farmers in males and housewives in females was significantly higher as compared to other occupations ($p<0.01$).

Out of the 100cases, majority of patients i.e. 62 cases (62%) belonged to farmer class and the least i.e.1 case (1%) were in others group (Tailor, student, teacher, electrician, sanyasi). Among males, farmer was the commonest occupation i.e. 62 cases (69.66%) and majority of the females were housewives i.e 9 cases (81.81%).

Table No.5 Occupation Among Laryngeal Malignancies

Occupation	Male		Female		Total	
	No.	%	No.	%	No.	%
Farmer	**59**	**75.64**	0	0	59	68.60
Driver	10	12.82	0	0	10	11.62
Factory worker	1	1.28	0	0	1	1.16
Clerk	2	2.56	0	0	2	2.32
Street hawker	2	2.56	0	0	2	2.32
Labourer	2	2.56	0	0	2	2.32
Housewife	0	0	**7**	**87.5**	7	8.13
Barber	1	1.28	0	0	1	1.16
Tailor	1	1.28	0	0	1	1.16
Student	0	0	0	0	0	0
Teacher	0	0	1	12.5	1	1.16
Electrician	0	0	0	0	0	0
Sanyasi	0	0	0	0	0	0
TOTAL	78		8		86	100

By applying Z test of difference between two proportions, the proportion of occupation farmers in males and housewives in females was significantly higher as compared to other occupations in **laryngeal Malignancies**($p<0.01$)

Out of the 86 malignant cases, majority of patients i.e. 59 cases (68.60 %) belonged to farmer class and the least i.e.1 case (1 %) were in others group (Tailor, student, teacher, electrician, sanyasi). Among males, farmer was the commonest occupation i.e. 59 cases (75.64%) and majority of the females were housewives i.e 7 cases (87.5%).

Table No.6 Occupation among Benign Laryngeal Masses

Occupation	Male		Female		Total	
	No.	%	No.	%	No.	%
Farmer	**3**	**27.27**	0	0	3	21.42
Driver	1	9.09	0	0	1	7.14
Factory worker	1	9.09	0	0	1	7.14
Clerk	1	9.09	0	0	1	7.14
Street hawker	0	0	**1**	**33.33**	1	7.14
Housewife	0	0	**2**	**66.66**	2	14.28
Pesticide supplier	1	9.09	0	0	1	7.14
Student	1	19.09	0	0	1	7.14
Teacher	1	9.09	0	0	1	7.14
Welder	1	9.09	0	0	1	7.14
Sanyasi	1	9.09	0	0	1	7.14
TOTAL	11		3		14	100

By applying Z test of difference between two proportions, the proportion of occupation farmers in males and housewives and street hawker's in females was significantly higher as compared to other occupations in **Benign laryngeal masses** ($p<0.01$)

Out of the 14 benign laryngeal masses , majority of patients i.e. 3 cases (21.42 %) belonged to farmer class and the least i.e.1 case (1 %) were in others group (Tailor, student, teacher, electrician, sanyasi). Among males Farmer was the commonest occupation i.e. 3 cases (27.27%) and majority of the females were housewives i.e 2 cases (66.66%).

Table No.7 Socio economic status

Socioeconomic status	Male(n=89)		Female(n=11)		Total(n=100)	
	No.	%	No.	%	No.	%
Grade I	8	8.9	6	54.54	14	14
Grade II	17	19.10	2	18.18	19	19
Grade III	**24**	**26.96**	**1**	**9.09**	**25**	**25**
Grade IV	**26**	**29.21**	**2**	**18.18**	**28**	**28**
Grade V	14	15.73	0	0	14	14
Total	**89**		**11**		**100**	

By applying Z test of difference between two proportions, the proportion of socioeconomic status of grade III and grade IV in males and females was significantly higher($p<0.01$)

28 cases (28%) belonged to grade 4and least cases i.e. 14 cases (14 %) belonged each to grade 1 and 5. Among males, maximum cases i.e. 26 cases (29.21%) belonged to grade 4 and minimum belonged to grade 1 i.e. 8 cases (8.9%). Among females maximum cases i.e.6 cases (54.54%) belonged to grade 1 and least cases i.e.1 case (9.09%) belonged to grade 3 .

Table No.8 Socioeconomic Status in Laryngeal Malignancies

Socioeconomic status	Male(n=78)		Female(n=8)		Total(n=86)	
	No.	%	No.	%	No.	%
Grade I	5	6.4	5	62.5	10	11.62
Grade II	**15**	**19.23**	**1**	**12.5**	**16**	**18.6**
Grade III	**20**	**25.64**	**1**	**12.5**	**21**	**24.41**
Grade IV	**25**	**32.05**	**1**	**12.5**	**26**	**30.23**
Grade V	**13**	**16.66**	**0**	**0**	**13**	**15.11**
Total	**78**		**8**		**86**	

By applying Z test of difference between two proportions, the proportion of socioeconomic status of grade III, grade IV and grade V in males and females was significantly higher **in Laryngeal Malignancies** ($p<0.01$)

26 cases (30.23%) belonged to grade 4 and least cases i.e. 10 cases (11.62 %) belonged each to grade 1 . Among males, maximum cases i.e. 25 cases (32.05%) belonged to grade 4 and minimum belonged to grade 1i.e. 5 cases (6.4%). Among females maximum cases i.e.5 cases (62.5%) belonged to grade 1 and least case i.e.1 case (12.5 %) each belonged to grade 2 ,3 and 4 respectively .

Table No.9 Socioeconomic Status Among Benign Laryngeal Masses

Socioeconomic status	Male(n=11)		Female(n=3)		Total(n=14)	
	No.	%	No.	%	No.	%
Grade I	3	27.27	1	33.33	4	28.57
Grade II	2	18.18	1	33.33	3	21.4
Grade III	**4**	**36.36**	**0**	**0**	**4**	**28.57**
Grade IV	1	9.09	1	33.33	2	14.28
Grade V	1	9.09	0	0	1	7.14
Total	11		3		14	

By applying Z test of difference between two proportions, the proportion of socioeconomic status of grade III, and grade IV in males and females was significantly higher in **Benign Laryngeal Masses** ($p<0.01$)

4 cases (28.57%) each belonged to grade 1 and grade 3 and least case i.e. 1 case (7.14 %) belonged to grade 5. Among males, maximum cases i.e. 4 cases (36.36%) belonged to grade 3 and minimum belonged i.e. 1 case (9.09%) each to grade 4 and 5. Among females 1 case each belonged to grade 1,2 and 4 (33.33 %) .

Table No.10 Residence

Residence	Male		Female		Total	
	No.	%	No.	%	No.	%
Urban	4	4.49	2	18.18	6	6
Rural	85	95.5	9	81.81	94	94
Total	**89**		**11**		**100**	

Maximum cases i.e.94 cases (95%) were from rural area and minimum cases i.e. 6 cases (6%) were from urban area.

Table No.11 Residence Among Laryngeal Malignancies

Residence	Male		Female		Total	
	No.	%	No.	%	No.	%
Urban	2	2.56	1	12.5	3	3.48
Rural	76	97.43	7	87.5	83	96.51
Total	**78**		**8**		**86**	

Maximum cases i.e.83 cases (96.51%) were from rural area and minimum cases i.e. 3 cases (3.48 %) were from urban area.

Table No.12 Residence Among Benign Laryngeal Masses

Residence	Male		Female		Total	
	No.	%	No.	%	No.	%
Urban	2	18.18	1	33.33	3	21.42
Rural	9	81.81	2	66.66	11	78.57
Total	**11**		**3**		**14**	

Maximum cases i.e.11 cases (78.57%) were from rural area and minimum cases i.e. 3 cases (21.42 %) were from urban area.

Table No.13 Addictions

Addictions	Male (n=89)		Female (n=11)		Total (n=100)	
	No.	%	No.	%	No.	%
Beedi Smoking	68	76.40	0	0	68	68
Cigarette Smoking	5	5.6	0	0	5	5
Tobacco preparations (Gutka/Beetle Nut with tobacco/Pan)	17	19.10	2	18.18	19	19
Alcohol	42	47.19	0	0	42	42
Misri application	0	0	3	27.27	3	3
Ganja	2	2.2	0	0	2	2
Vocal abuse	2	2.2	0	0	2	2
No addictions	4	4.49	7	63.63	11	11

Value of $\times^2 = 26.24$, d.f.=6, significant, $p<0.05$

By applying Chi-square test there was a significant association between addictions and total laryngeal masses cases ($p<0.05$)

Beedi smoking, alcohol, and tobacco preparations were the commonest addictions. Commonest addiction noted was Beedi smoking in 68 cases (68%) and least common addiction was voice abuse i.e. 2 cases (2%). Among males commonest addiction was Beedi smoking i.e. 68 cases (68%) and least addiction was voice abuse , i.e. 2 cases (2.2%). Among females maximum number had no addictions group 7 cases (63.63%) and least addiction was tobacco chewing i.e.2 cases (18.18%

Table No.14 Addictions in laryngeal malignancies

Addictions	Male (n=78)		Female (n=8)		Total (n=86)	
	No.	%	No.	%	No.	%
Beedi Smoking	66	84.6	0	0	66	76.74
Cigarette Smoking	5	6.4	0	0	5	5.81
Alcohol	39	50	0	0	39	45.34
Tobacco preparations	12	15.38	2	25	14	16.27
No addictions	1	1.28	4	50	5	5.81

Value of $\times^2 = 18.88$, d.f.=5, significant, $p<0.05$

By applying Chi-square test there was a significant association between addictions and cases of **laryngeal malignancies** ($p<0.05$)

Beedi smoking, alcohol, and tobacco preparation were the commonest addictions.

In 86 cases of malignancies Beedi smoking was noted in 66 cases (76.74%) and consumption of alcohol was noted in 39 cases (45.34 %) and chewing tobacco preparations in 14 cases (16.27 %).

Among males Beedi smoking was noted in 66 cases (84.6%), consumption of alcohol was noted in 39 cases (50%) and chewing tobacco preparations noted in 12 cases (15.38%). Among females suffering from malignancy no addictions were noted in majority cases i.e 4 cases (50%) and tobacco chewing in only 2 cases (25 %)

Table No.15 Addictions In Benign Laryngeal Masses

Addictions	Male (n=11)		Female (n=3)		Total (n=14)	
	No.	%	No.	%	No.	%
Beedi Smoking	2	18.18	0	0	2	14.28
Cigarette Smoking	0	0	0	0	0	0
Tobacco preparations (Gutka/Beetle Nut with tobacco/Pan)	5	45.45	0	0	5	35.71
Alcohol	3	27.27	0	0	3	21.42
Misri application	0	0	0	0	0	0
Ganja	1	9.09	0	0	1	7.14
Vocal abuse	2	18.18	0	0	2	14.28
No addictions	3	27.27	3	100	6	42.85

Value of $\times^2 = 15.24$, d.f.=5, significant, $p<0.05$

By applying Chi-square test there was a significant association between addictions and cases of **Benign Laryngeal Masses**($p<0.05$)

Beedi smoking, alcohol, and tobacco preparation were the commonest addictions.

No addictions was found commonest in 6 cases (42.85%) and least addiction was ganja i.e. 1 case (7.14%). Among males commonest addiction was tobacco consumption i.e. 5 cases (45.45%) and least addiction was ganja i.e. 1 case(9.09%). Among females all belonged to no addictions group i.e 3cases (100%).

Table No. 16 AddicitonsAmongst Benign Laryngeal Masses

BENIGN LARYNGEAL MASSES (N=14)	ADDICTIONS	PERCENTAGE (%)
VOCAL FOLD POLYP (n=4)	TOBACCO (n =1) GANJA+BEEDI +ALCOHOL(n=1) VOCAL ABUSE(n=1) , NO ADDICTIONS(n=1)	25% 25% 25% 25%
VOCAL FOLD NODULE (n=4)	TOBACCO +ALCOHOL(n=1) NO ADDICTIONS(n=2) VOCAL ABUSE (n=1)	25% 50% 25%
INTUBATION GRANULOMA (n=3)	NO ADDICTIONS (n=2) TOBACCO (n=1)	66.66% 33.33%
EPIGLOTTIC CYST (n=1)	NO ADDICTIONS	100%
LARYNGEAL TUBERCULOSIS(n=1)	BEEDI, TOBACCO AND ALCOHOL	100%
PYOGENIC GRANULOMA (n=1)	TOBACCO	100%

Among benign laryngeal masses , out of 4 cases of vocal fold polyps 1 case each had addiction to ganja, tobacco, beedi ,alcohol ,vocal abuse and no addictions . No addiction group turned to be commonest in vocal fold nodules as well as in intubation granuloma and epiglotticcyst .

Table No.17 Clinical Presentation of patients with laryngeal masses

Symptoms	Numbers (n=100)	Percentage (%)
Hoarseness of voice	72	72
Dysphagia	70	70
Breathlessness	8	8
Foreign body sensation of throat	15	15
Neck swelling	35	35
Odynophagia	8	8
Earache	10	10

By applying Z test of difference between two proportions, symptoms like Hoarseness of voice, Dysphagia, Neck swelling and Foreign body sensation of throat were significantly higher in patients with laryngeal masses ($p<0.01$)

72 cases (72%) presented with hoarseness of voice followed by 70cases (70%) with Dysphagia, 35 cases (35%) with neck swellings, 15cases 15(%) with foreign body sensation of throat ,10 cases (10%) with earache, and 8 cases (8%) each with odynophagia and breathlessness respectively.

Table No.18 Clinical Presentation of patients with laryngeal malignancies:

Symptoms	Numbers (n=86)	Percentage (%)
Hoarseness of voice	61	70.90
Dysphagia	67	77.90
Breathlessness	7	8.13
Foreign body sensation of throat	14	16.27
Neck swelling	35	40.69
Odynophagia	8	9.3
Earache	10	11.62

By applying Z test of difference between two proportions, symptoms like Hoarseness of voice, Dysphagia, Neck swelling and Foreign body sensation of throat were significantly higher in patients with laryngeal malignancies($p<0.01$)

67 cases (77.90%) presented with Dysphagia followed by 61 cases (70.9%) with hoarseness of voice, 35 cases (40.69%) with neck swellings , 14 cases (16.27%) with foreign body sensation of throat ,10 cases (11.62%) with earache , and 8 cases (9.3%) with odynophagia and 7 cases (8.13%) with breathlessness.

Table No.19 Clinical Presentation of patients with benign laryngeal masses

Symptoms	Numbers (n=14)	Percentage (%)
Hoarseness of voice	11	78.57
Dysphagia	3	21.42
Breathlessness	1	7.14
Foreign body sensation of throat	1	7.14

By applying Z test of difference between two proportions, symptoms like Hoarseness of voice, Dysphagia, breathlessness and Foreign body sensation of throat were significantly higher in patients with benign laryngeal masses ($p<0.01$)

11 cases (78.57%) presented with hoarseness of voice followed by 3 cases (21.42%) with Dysphagia, 1case (7.14%) each with foreign body sensation of throat and breathlessness .

Table No. 20 Indirect laryngoscopic (IDL) examination

IDL –findings	No. of Cases (n= 100)	Percentage(%)
Proliferative growth involving Supraglottic larynx	67	67
Ulcerative growth involving Glottic larynx	18	18
Proliferative growth involving Subglottic larynx	1	1
Vocal fold nodules	4	4
Vocal fold polyp	6	6
Granuloma over vocal process of arytenoids	3	3
Epiglottic cyst over lingual surface	1	1
TOTAL	**100**	

Maximum number of cases i.e.67 cases (67%) presented with Proliferative growth of supraglottic larynx and least number of cases, 1case (1%) each of proliferative growth involving subglottis and epiglotticcyst .

Table No. 21 Investigations

Investigations	Number (n=100)	Percentage (%)
Direct laryngoscopy	86	86
Micro laryngoscopy	14	14

86 cases (86%) underwent direct laryngoscopic examination and 14 cases (14%) underwent microlaryngoscopicexamination .

Table No. 22 DL SCOPY FINDINGS (n=86)

Dl Scopy Findings	No. Of Cases	%Age
Proliferative Growth Involving Supraglottis	67	77.90
Ulcerative Growth Involving Glottis	18	20.93
Proliferative Growth Involving Subglottis	1	1.16
Total	**86**	**100**

Out of 86 patients subjected to DL scopy , 67 cases (77.9%) were proliferative growths involving supraglottic larynx , 18 (20.93%) ulcerative growths involving glottic larynx and only single case turned out to be subglottic proliferative growth . Thus DL scopy confirmed the indirect laryngoscopic findings

Table No. 23 MLscopy Findings

ML SCOPY FINDINGS	NO . OF CASES	%age
Vocal fold polyp	6	42.85
Vocal fold nodule	4	28.57
Intubation granuloma	3	21.42
Epiglottic cyst	1	7.14
TOTAL	**14**	**100**

Out of 14 cases subjected to ML scopy , 6 (42.85%) were vocal fold polyps , 4 (28.57%) vocal fold nodules , 3 (21.42%) intubation granuloma and 1(7.14%) epiglottic cyst . All these cases underwent therapeutic excision of masses .

V. Radiological Findings

Xray chest PA views revealed normal study in majority cases 51(51%) , aspiration pneumonia in 27 cases(27%) ,chronic obstructive pulmonary disease(COPD) in 20 cases(20%) ,COPD with aspiration in 19 cases and least common bronchitis in 2 cases (2%) of all laryngeal masses

X ray neck soft tissue AP & lateral views of laryngeal masses revealed soft tissue shadow in supraglottic region in majority cases 67(67%) , normal study in 23 cases(23%) , 6 cases (6%) showed soft tissue shadow involving glottis and invasion of thyroid cartilage , 3 cases (3%) subglottic narrowing and 1 case showed soft tissue shadow in subglottis .

Table No. 24 Histopathology

Histopathology	Number (n = 100)	Percentage (%)
Well differentiated Squamous cell carcinoma	51	51
Mod. Diff. Squamous cell carcinoma	32	32
Poorly differentiated squamous cell carcinoma	2	2
Adenocarcinoma	1	1
Inflammmatory polyp	4	4
Infected granulation tissue	3	3
Tuberculosis	1	1
Vocal fold nodule	4	4
Pyogenic granuloma	1	1
Epiglottic cyst	1	1

By applying Z test of difference between two proportions, histopathology well differentiated Squamous cell carcinoma, and Mod. Diff. Squamous cell carcinoma was significantly higher ($p<0.01$)

All 100 cases were subjected to histopathological examination. Squamous cell carcinoma was diagnosed in 85 cases (85%) cases ,51 well –differentiated, 32 moderately differentiated and 2 cases poorly differentiated .4 cases each of vocal fold polyp and vocal fold nodule were recorded , 3 cases of intubation granuloma and 1 case each of adenocarcinoma, tuberculosis, pyogenic granuloma, and epiglottic cyst were also noted .

Clinical Stage At Presentation

Most of the patients presented with stage –III tumours (44.18%) followed by stage II (29.06%) and stage IV A (26.74%) .

Table No.25 Distribution of Laryngeal masses

Laryngeal masses	Male (n=89)		Female (n=11)		Total (n=100)	
	No.	%	No.	%	No.	%
Laryngeal malignancy	78	87.64	8	72.72	86	86
Vocal fold nodules	2	2.24	2	18.18	4	4
Vocal fold polyp	4	4.49	0	0	4	4
Intubation granuloma	3	3.37	0	0	3	3
Epiglottic cyst	0	0	1	9.09	1	1
Pyogenic granuloma	1	1.12	0	0	1	1
Laryngeal Tuberculosis	1	1.12	0	0	1	1
Total	**89**		**11**		**100**	

By applying Z test of difference between proportions ,Laryngeal malignancy, Vocal fold nodules, Vocal fold polyp were significantly higher as compared to other masses .($p<0.05$)

Commonest laryngeal mass noted was laryngeal malignancy comprising 78 cases (86%) and least were, 1 case (1%) each of epiglottic cyst, pyogenic granuloma and laryngeal tuberculosis .Among males commonest mass was malignancy i.e. 78 cases (87.64%)as well as among females the commonest mass was also malignancy i.e 8 cases (72.72%).

Table No.26 Distribution of benign Laryngeal masses

Benign Laryngeal masses	Male (n=11)		Female (n=3)		Total (n=14)	
	No.	%	No.	%	No.	%
Vocal fold nodules	2	18.18	2	66.66	4	28.57
Vocal fold polyp	4	22.22	0	0	4	28.57
Intubation granuloma	3	27.27	0	0	3	21.42
Epiglottic cyst	0	0	1	33.33	1	7.14
Pyogenic granuloma	1	9.09	0	0	1	7.14
Laryngeal Tuberculosis	1	9.09	0	0	1	7.14
Total	**11**		**3**		**14**	

By applying Z test of difference between proportions ,Vocal fold nodules, Vocal fold polyp and Intubation granuloma were significantly higher as compared to other benign laryngeal masses ($p<0.05$).

Commonest mass noted among benign laryngeal masses was vocal fold polyp and vocal fold nodule each with 4 cases (57.14%) and least common were 1 case each of epiglottic cyst ,pyogenic granuloma and laryngeal tuberculosis (each 7.14%) .Among males most common laryngeal mass was vocal fold polyp (22.22%) and among females vocal fold nodules were the commonest (66.66%) .

Table No. 27 Clinical and Histopathological findings: Clinically Benign Masses (n= 14)

Clinical diagnosis	Number	Histopathological diagnosis	Number
Vocal fold polyp	6	Inflammatory polyp	4
		Pyogenic granuloma	1
		Squamous cell carcinoma	1
Vocal fold nodule	4	Vocal fold nodule	4
Intubation granuloma	3	Infected granulation tissue	3
Epiglottic cyst	1	Cyst	1
TOTAL	**14**		**14**

Table No . 28 Clinically malignant Masses(N=86)

Histopathological Diagnosis	Squamous Cell Carcinoma	Tuberculosis	Adenocarcinoma
Number	84	1	1

In our study , on clinical examination by indirect laryngoscopy ,14 patients were clinically diagnosed as having benign masses and 86 patients with malignant masses . Out of these 14 patients diagnosed with clinically benign masses one turned out to be Squamous cell carcinoma on histopathology . In the 86 patients clinically diagnosed as having malignant masses , again only one had a benign histopathology of tuberculosis and one was adenocarcinoma .

On indirect laryngoscopy , out of 14 patients clinically diagnosed as having benign masses , 6 patients were diagnosed as having vocal fold polyps . On histopathology , out of these 6 patients , 4 were vocal fold inflammatory polyps ,one turned to be pyogenic granuloma and one squamous cell carcinoma .

VI. Discussion

A total of 100cases of laryngealmasses were studied duringthestudy period.

Age and Sex

In our study age of patients with laryngeal masses ranged from 10 yrs to 81-90yrs, majority of patients i.e. 31 cases (31 %) were in the group of 61-70years and minimum number of patients i.e. 3 cases (3%) were in the age of group of 81-90 years (Mean age: 62.93 ± 12.04) .Among laryngeal malignancies Mean agewas(59.68±12.01) .In a study by Zeba Ahmed[5]on laryngeal malignancies majority of patients were in the 5th decade of life (mean 54±7.9).In a study by Mala BukarSandabe[6] on laryngeal cancers in Sub-Saharan Africa 93 patients were surveyed with carcinoma of the larynx with mean age of 56 years (+ 6-8yrs) .In our study by applying Z test of difference between two proportions, the proportion of age 51 to 70 years was significantly higher as compared to other ages in male and female in Laryngeal Malignancies ($p<0.01$) .

In our study 89 cases (89 %) were males and 11 cases (11%) were females, thus male to female ratio of approximately 8.1:1 was observed. This finding coincides with study by ZebaAhmed[5]on laryngeal malignancies where 89 males presented (89 %) and 11 females(11 %) with male to female ratio of 8.1:1. In a study by Mala BukarSandabe[6] on laryngeal cancers in Sub- Saharan Africa78(83.9%) male and females constituted 15 (16.1%) with male:female ratio 5.2:1 .

In the 1950s, the male-to-female ratio in patients with laryngeal cancer was 15:1. This ratio had changed to 5:1 by the year 2000, and the proportion of womenafflicted by the disease is projected to increase in

years to come. These changes are likely a reflection of shifts of tobacco use (smoked and unsmoked), with women smoking more in recent years[5].In present study male to female ratio was 8.1:1, the obvious difference seems to relate to the social habit of smoking which is rare in our women folk[5]. These results were close to the studies by Adeyemo in Nigeria[5] andDedivitis in Brazil[5].

14 cases of Benign laryngeal masses were found during study period. Maximum number i.e. 6 cases (42.85 %) belonged to21-30years of age group and minimum number i.e.1 case (7.14 %) belonged to 71-80 years of age group. Mean age being 28.25±4years . 11 cases (78.57 %) were males and 3 cases (21.42 %) were females. In a study by Mangal Singh[7] majority of patients i.e. 49 cases (60.5%) were in the age group of 20-50 years , amongbenign laryngeal lesions .By applying Z test of difference between two proportions, the proportion of age 21 to 30 years was significantly higher in males as compared to females in Benign LaryngealMasses ($p<0.01$) .

Occupation

In our study majority of patients i.e.62 cases (62 %) were farmersand least i.e. 1 case (1%) each belonged to other groups like teacher ,tailor,student,electrician and sanyasi . Out of the 14 benign laryngeal masses, majority of patients i.e. 3cases (21.42 %) belonged tofarmer class and the least i.e.1 case (1 %) were in others group (Tailor,student,teacher,electrician,sanyasi). Among males,farmerwas the commonest occupation i.e. 3 cases (27.27%) andmajority of the females were housewives i.e 2 cases (66.66%).By applying Z test of difference between two proportions, the proportion of occupation farmers in males and housewives in females was significantly higher as compared to other occupations($p<0.01$) amongst all laryngeal masses as well as amongst laryngeal malignancies . However, by applying Z test of difference between two proportions, the proportion of occupation farmers in males and housewives and street hawker's in females was significantly higher as compared to other occupations in Benign laryngeal masses ($p<0.01$).

In a study by PawanSinghal et al[8],majority of patients werehousewives followed by teachers class amongbenign laryngeal lesions . In astudyon laryngealmalignanciesby Zeba Ahmed et al [5]majority ofpatientswerelabourers .

Socio economic status

In our study, majority of patients i.e.28 cases (28%) belonged to low socio economic status(grade 4) and also majority of patients among males, i.e.26 cases (29.21%) and females i.e.6cases (54.54 %) belonged to grade 1- alltheseas per Revised Prasad's classification[4].Among benign laryngeal masses 4 cases (28.57%) eachbelonged to grade 1 and grade 3 and least cases i.e.1 case (7.14 %) belonged to grade 5 . Among males, maximum cases i.e. 4cases (36.36%) belonged to grade 3and minimumbelonged i.e. 1case (9.09%) each to grade 4 and 5. Among females1 case each belonged to grade 1,2 and 4 (33.33 %) .By applying Z test of difference between two proportions, the proportion of socioeconomic status of grade III and grade IV in males and females was significantly higher ($p<0.01$) among all laryngeal masses and benign laryngeal masses whereassocioeconomic status of grade III, grade IV and grade V in males and females was significantly higher in Laryngeal Malignancies ($p<0.01$) .In a study by Zeba Ahmed et al[5] most of the patients belonged tolowsocioeconomicclass .

Residence

In our study majority of patients i.e.94cases (94 %) were from rural area and minimum cases i.e 6 cases (6%) were from urban area. In study by ZebaAhmed[5]on laryngeal malignancies mostofthepatients were predominantly from urban areas .

Addictions

In our study commonest addiction noted wasBeedismoking i.e.68 cases (68%)and voice abuse 2 cases(2 %) was least common addiction. Among males commonest addiction was Beedi smoking i.e. 68 cases (68%) and least addiction was voice abuse, i.e.2 cases (2.2%). Among females maximum number belonged to no addictions groupi.e.7 cases (63.63%) and least addiction was tobacco chewing i.e.2cases (18.18%).In our study, among malignancies of86cases (86 %), Beedi smoking was noted in 66cases (76.74 %) and consumption of alcohol in 39cases (45.34 %) , chewing tobacco preparation in 14 cases (16.27%),Misri application in 3 cases(3.48 %). Amongfemales historyof no addictionswasnoted most frequently .By applying Chi-square test there was a significant association between addictions and cases of Benign as well as malignant Laryngeal Masses ($p<0.05$) .

In study by Zeba Ahmed et al[5]Cigarette Smoking was noted in 34 % of cases , 24 % cases of cigarette and pan ,19% cases of pan and tobacco , 7 % berry , 4 % cases of hukkaandleast3%casesof Niswar and cigarette .

The exact etiology of laryngeal carcinoma is not well known, but exposure of the mucosa to a wide variety of ingested and inhaled exogenous carcinogenic agents greatly increase the risk of developing these tumours[5] In present study, majority of the patientsbelonged to low socioeconomic class , with a strong history of Beedi smoking . These observations are in conformity with the prior studies.[5] . Abdul Hadi et al [5](Lahore) identified smoking 90% and 5% each alcohol and pan asrisk factors. Almadori G et al [5](Italy), shows 95% or more have a history ofsmoking, which increases risk in a dose-dependent way, also in many other studies alcohol played a major role as carcinogen. It was reported that in alcoholics the risk of hypopharynx cancer was significantly higher than the risk of larynx cancer, which may be explained by the fact that hypopharynx enters in contactwith the bolus (alcohol) and the air (tobacco smoke) while air pass is through larynx but not the bolus.[5] In addition to tobacco consumption most of the patients had history of tea consumption but in the literature this has not emerged as an important risk factor. However, Eduardo observed that the habit of drinking a local tea called mate was associated with a three fold increase in risk of laryngeal cancer, aftercontrolling for the effects of age, tobacco and alcohol consumption[5]. Avoiding cigarettes and alcohol could prevent about 90% of laryngeal SCC.[5]Correlation also exist between the site of the lesion and the social habit of the patients, with those who smoke Beedi and drink alcohol presenting more with glottis tumoursP< 0.05(0.00) This could be due to the synergistic effect of cigarette smoking and alcohol on head and neck tumours.[6]In a study by Talamini R et al in comparison with patients who never smoked, Odds ratios(OR) were 19.8 for current smokers and 7.0 for ex-smokers. The risk increased in relation to the number of cigarettes (OR = 42.9 for > or = 25 cigarettes/day) and for duration of smoking (OR = 37.2 for > or = 40 years). For alcohol, the risk increased in relation to number of drinks (OR = 5.9 for > or = 56 drinks per week). Combined alcohol and tobacco consumption showed a multiplicative (OR = 177) rather than an additive risk. For current smokers and current drinkers the risk was higher for supraglottis (ORs 54.9 and 2.6, respectively) than for glottis (ORs 7.4 and 1.8) and othersubsites (ORs 10.9 and 1.9). This study shows that both cigarette smoking and alcohol drinking are independent risk factors for laryngeal cancer. Heavy consumption of alcohol and cigarettes determined a multiplicative risk increase, possibly suggesting biological synergy .

In our study among benign masses of larynxtobacco chewing was found to be the commonest addiction(35.71%) followed by alcohol (21.42%), Beedi smoking(14.28%) and Ganja 7.14cases(21.42%). Out of 4 cases of vocal fold polyps 1 case each had addiction to ganja, tobacco, beedismoking ,alcohol ,vocal abuse and no addictions . No addiction group turned to bethecommonest in vocal fold nodules as well as in intubation granulomaand epiglotticcyst . A study byPawanSinghal[8]had found vocal abuse as the mostcommonhabit among benign lesions.

Clinical Presentation- Symptoms

Hoarseness of voice was noted in72 cases (72 %) and next common symptom was dysphagia70 cases (70 %), 35 cases (35 %)were with neck swellings,15 cases (15%) with foreign body sensation of throat ,10cases (10%) with earache ,and8 cases (8%)each with odynophagiaand breathlessnessrespectively.By applying Z test of difference between two proportions, symptoms Hoarsenessofvoice, Dysphagia, Neck swelling and Foreign body sensation of throat were significantly higher in patients with laryngeal malignancies ($p<0.01$) .In a study by Zeba Ahmed et al [5] hoarseness of voice was observed in 92 %cases , least common symptom wasearache (4%) among laryngeal malignancies .

In our study among benign masses of larynx , commonest symptom was hoarsenessof voice (78.57%) followed by dysphagia(21.42%), foreign body sensation and breathlessness (both 7.14 % each) .By applying Z test of difference between two proportions, symptoms Hoarsenessofvoice, Dysphagia, breathlessness and Foreign body sensation of throat were significantly higher in patients with benign laryngeal masses ($p<0.01$) .In astudyby PawanSinghal [8]hoarsenessofvoicewas observed in 100%casesfollowedby vocal fatigue in 52 % ofthe patients ,irritation in nearly 22%,cold/upper respiratory tract infection in 25% and foreign body sensation in 8% cases , alltheseamongbenignlaryngealmasses . Inanother study on benign lesions of larynx by PankajkumarDoloi[9]hoarseness was thecommonest symptom (95%) followed by vocal fatigue (52.5%), cough(30%), dyspnoea(10%) and foreign body sensation(7.5%)

Signs - Indirect laryngoscopic (IDL) examination

On indirect laryngoscopic examination (IDL) commonest finding was -Proliferative growth involvingSupraglotticlarynx(67%) ,followed by ulcerative growth involving glottis (18%) .Only 1 case of subglottic proliferative growth was noted .This is in contrast to other studies in which most laryngeal cancers arisefrom the glottis [6].However , In a study by Zeba Ahmed et al [5], most common finding wasulcerativegrowthinvolvingtransglottis which wasnoted in 39% cases , glottis in 36% cases and supraglottis in 25% cases . In a study by Mala BukarSandabe[6] on laryngeal cancers in Sub- Saharan Africa Transglottic carcinoma was found to be the commonest with 40 cases (43.0%) andsupraglottic 35 cases (37.6%).

Metastasis rate is more common in supraglottic than glottic or subglottic tumours and in tumours with larger surface dimension.[5] In present study neck nodes were present in 40.69% of malignant masses out of which 97.14% were supraglottictumours. IqbalN[5]reported that supraglotticcarcinomas are associated with clinically positivelymph nodes in 55% at initial diagnosis with a 16%incidence of bilateral involvement. In contrast, lesions of the true vocal cordsrarelymetastasize, having 2% to 5% risk of nodal metastasis. This fact is consistentwith the result in the present study .

Among benign masses ,most common IDL finding was vocal fold polyps(42.85%), followed by vocal fold nodules (28.57%) , l case of intubation granuloma (21.42%) and 1 caseof epiglottic cyst . In a studybyPawanSinghal[8] onbenign laryngealmasses mostcommonlesion was found to be vocal fold polyps (66%) followedbyvocal fold nodules (16%) , papilloma, cyst and keratosis (4% each) , Molluscumcontagiosum in 2% patients and 4% had no evidence of tumour . Instudyby Pankaj Kumar Doloi [9]most common benign laryngeal lesion noted was vocal polyp (37.5%) followed by vocal fold nodule (27.5%),multiple laryngeal papillomatosis (10%), Hemangioma (10%), epiglottic cyst (5%) , vocal cord cyst (7.5%) and intubation granuloma (2.5%) . In ourstudymostcommonsiteofinvolvement amongbenign laryngealmasses was true vocal cord i.e. 10 cases outof total14 (71.42%) whichis in accordancewiththestudy of Pankaj Kumar Doloi[9] where true vocal cord was most commonlyinvolvedsite .(83.33%)

Investigations

86 cases (86 %) underwent direct laryngoscopic examination and14 cases(14 %) underwent microlaryngoscopic examination. In study by ZebaAhmed[5] 100% of patients underwent direct laryngoscopy. In a study by MangalSingh[7] 100% casesofbenign laryngealmassesunderwentmicro laryngoscopy .

Out of 86 patients subjected to DL scopy , 67 cases (77.9%) were proliferative growths involving supraglottic larynx , 18 (20.93%) ulcerative growths involving glottis larynx and only single case turned out to be subglottic proliferative growth . Thus DL scopy confirmed the indirect laryngoscopicfindings .Out of 14 casessubjected to ML scopy , 6 (42.85%) were vocal fold polyps , 4 (28.57%)vocal fold nodules , 3 (21.42%) intubation granuloma and 1(7.14%) epiglottic cyst . All these cases underwent therapeutic excision of masses .

Xray chest PA views revealed normal study in majority cases 51(51%) , aspiration pneumonia in 27 cases(27%) ,chronic obstructive pulmonary disease(COPD) in 20 cases(20%) ,COPD with aspiration in 19 cases and least common bronchitis in 2cases (2%) of all laryngeal masses .Xray neck soft tissue AP &lateral views of laryngeal masses revealed soft tissue shadow in supraglottic region in majority cases 67(67%) , normal study in 23 cases(23%) , 6 cases (6%) showed soft tissue shadow involving glottis and invasion of thyroid cartilage , 3cases (3%)subglottic narrowing and 1 case showed soft tissue shadow insubglottis . In a study by Mala BukarSandabe[6]plain X-rays soft tissue neck were done by the entire patient studied. Although plain X-rays soft tissue neck had no role in the current management of patients with carcinoma of the larynx, prevertebral softtissue thickness, the epiglottis can be visualized; it is also affordable in the developing countries. Cost about 8USD. In another study byZebaAhmed[5]X ray chest PA view and CT scan of larynx (from base of skull to root of neck) were done in all patients along with ultrasonography abdomen to rule out metastasis .

Histopathology

All100 cases were subjected to histopathological examination. Squamous cell carcinoma was diagnosed in85 cases (85%) cases ,51 well –differentiated, 32 moderately differentiated and 2 cases poorly differentiated .4 cases eachof vocal fold polyp and vocal fold nodulewererecorded , 3 cases of intubation granulomaand 1 caseeach of adenocarcinoma, tuberculosis,pyogenic granuloma, and epiglottic cyst werealsonoted .By applying Z test of difference between two proportions, histopathology of well differentiated Squamous cell carcinoma, and Mod. Diff. Squamous cell carcinoma was significantly higher ($p<0.01$)

Astudyby ZebaAhmed et al[5] revealed squamous cellcarcinoma in 98% patients –well differentiated type in 57% ,moderately differentiated in 28 % ,poorlydifferentiated in 13 % patients ,while chondrosarcomafoundonly in 2 % patients .

Approximately 95% of all laryngeal and hypopharyngealmalignant tumours are SCC.[5] Carcinoma of the supra- and subglottic larynx are more likely to be nonkeratinizingand poorly differentiated. These are often large at the time of diagnosis, more aggressive in behavior, and tend to metastasize early (20-40% of thecases). In contrast, lesions of the true vocal cords are typically small when detected, and more often moderately to well differentiated, rarely metastasize, and tend to be associated with a better prognosis.In this study98.83% patients had Squamous cell carcinoma and only 1.16% had adenocarcinoma. Well differentiated SCC was more commonly found variety (60%) as compared to poorly differentiated (2.35%).

In a 10 years retrospective study by Mala BukarSandabe[6] on laryngeal cancers in Sub-Saharan AfricaSquamous cell carcinoma was the commonest histological type; in their series it constituted 90.3%, others were verrucous Carcinoma, 32% and Adenocarcinoma 6.5% .

Mostofthe patients presented with clinical stage –III tumours (44.18%) followed by stage II (29.06%) and stage IV A (26.74%) , this is in agreement with most head and neck tumour presentation in developing countries .Abdul Hadi et al [5] (Lahore), reported 91.66% at late stage and only 8.33% at early stage. Adeyemo in Nigeria[5]found 82.9% patients with T3/T4 lesions at presentation and only 6.4% withT1 lesions.In contrast Matsuo JM et al (New York), showed60% early stage and 40% late stage.[5]

Amongbenign lesions , studybyPawanSinghal[8] commonesthistopathologicalfindingwasvocal cord polyp (66%), followed by vocal cord nodules (16%), papilloma ,cystand keratosis (4% each), respectively . Molluscumcontagiosumwas seenin 2 % of the patientsand 4 % had no evidence of tumourin abovestudy.Instudyby Pankaj Kumar Doloi[9] most common benign laryngeal lesion noted was vocal polyp (37.5%) followed by vocal cord nodule (27.5%),multiple laryngeal papillomatosis (10%), Hemangioma (10%), epiglottic cyst (5%) , vocal cord cyst (7.5%) and intubation granuloma (2.5%)

Distributionoflaryngealmasses

In our study commonest laryngeal mass observed wasmalignancy of larynx86 cases (86 %). Among males commonest mass was malignancy of larynx 78 cases (87.64%) and even among females also it wasthe commonest i.e. 8 cases(72.72 %) . Among patients withmalignanciesmales were common78 cases (90.69 %) and females 8cases (9.3 %) with male to female ratio as 9.75 :1. Commonest age group affected was 61-70 years(31%) .Farmersformed the largest group (59%). Majority patients belonged to grade 4 socioeconomic status(26%) and 96.5% patients who had laryngeal malignancies belonged to rural area. Beedi smoking was the commonest addiction among males(84.6%) followed by alcohol (50%), tobacco chewing(15.38%) and cigarette smoking in 6.4% cases . Only 1 case of laryngeal malignancy wasfound in maleswhich had no history of any addictions whereas this was the commonestfinding among females (50%) , followed by Misri application(37.5%) and tobacco chewing (25 %) .Mostof the patients presentedwith clinical features of dysphagia (67%) ,hoarseness of voice(61%) , neck swelling(35%), foreign body sensation in throat (14%) ,earache(10%) ,odynophagia(8%) and breathlessness (7%) . On indirect laryngoscopy most common findingwas proliferative growth involving supraglottic larynx (67%), followedby ulcerative growth involvingthe glottis (18%) and only1 case of proliferative growth involving the subglottis (1%) .All patients underwent Direct laryngoscopic examination with biopsies mostly confirming diagnosis of well differentiated Squamous cell carcinoma (51%) , followed by Moderately differentiated squamous cell carcinoma (32%) , poorly differentiated squamous cellcarcinoma (2%) anda single case of Adenocarcinoma (1%) .In study by Zeba Ahmed et al[5]male to female ratio was 8.1:1,majority ofpatients were in the 5thdecadeoflife andmajoritypatientswerelabourers, belonged to lowsocioeconomicclass and most belonged to urban areas .Cigarette Smoking was noted in 34 % of cases , 24 % cases of cigarette and pan ,19% cases of pan and tobacco , 7 % berry , 4 % cases of hukkaandleast3%casesof Niswar and cigarette .Clinically in females hoarseness was observed in 92 % cases ,followed by odynophagia (58%) ,sore throat(28%) ,dysphagia(18%) ,dyspnoea(17%) ,neck mass(9%), weight loss(8%) ,anorexia(6%) and earache(4%) . , most common finding wasulcerativegrowthinvolvingtransglottisnoted in 39% cases , glottis in 36% cases and supraglottis in 25% cases .The study revealed squamous cellcarcinoma in 98% patients –well differentiated type in 57% ,moderately differentiated in 28 % ,poorlydifferentiated in 13 % patients ,while chondrosarcomafoundonly in 2 % patients . In a 10 years retrospective study by Mala BukarSandabe[6] on laryngeal cancers in Sub- Saharan Africa 93 patients were surveyed with carcinoma of the larynx, 78 (83.9%) male and females constituted 15 (16.1%) mean age of 56 years (+ 6- 8yrs), M: F=5.2:1. Squamous cell carcinoma was the commonest histological type; in their series it constituted 90.3% ,others were verrucous Carcinoma, 32% and Adenocarcinoma 6.5%. Transglottic carcinoma was found to be the commonest with 40 (43.0%), supraglottic, 35 (37.6%).

And 1 case which was clinically diagnosed malignant turned out Tuberculosis on histopathology.This case of laryngeal tuberculosis wasnoted in a 55 year aged male driver by occupation ,belonging to rural area socioeconomic class 3 presenting with chief complaints of dysphagiawith addictions to beedi, tobacco and alcohol .On IDL an ulcerative growth was seen extending from epiglottis to bilateral aryepiglottic folds ,clinically diagnosedas being malignant laryngeal mass , underwent direct laryngoscopy with biopsy revealingtuberculosis .In a study by Yvette E Smulders[10] 50-year-old Caucasian man who presented with the clinical picture of laryngeal cancer, but which turned out to be tuberculosisillustratingthe difficulty of recognizing laryngeal tuberculosisclinically .

Extra pulmonary TB in the head and neck region most frequentlyoccurs in the cervical lymph nodes (>90%), followedby the larynx (2% to 6%) . Involvement of the temporal bone, sinonasal cavity, eye, pharynx, thyroidand skull base are even less frequently observed .The characteristics of laryngeal TB have changed over the years and it has become a challenge for otolaryngologiststo distinguish this disease from others. In the past, laryngeal TB typically affected young people in the second or third decade of life with advanced pulmonary TB. Symptoms were cough, haemoptysis, fever, weight loss and night sweats. An ulcerative, granulomatous lesion was generally positioned on the posterior part of the larynx due to accumulation of sputum in the arytenoid

region in bed-bound patients. Today, laryngeal TB mainly involves people in their 50's or 60's presenting first and foremost with hoarseness (80% to 100%). Other symptoms are odynophagia (50% to 67%) and to a lesser extent, dysphagia, dyspnoea, stridor, cough and haemoptysis.

Systemic symptoms have become rare . Laryngeal TB can involve all parts of the larynx and there is no longer an unmistakable association with pulmonary TB. The larynx becomes infected either by a direct spread from the lungs, or by a haematogenous spread from sites other than the lungs . The former mechanism is most common .In the case of a haematogenous spread, there is no evidence of pulmonary disease . The distinction between laryngeal TB and chronic laryngitis or laryngeal carcinoma in particular has become difficult. Odynophagia is described as an important discriminating symptom, since it is considered rare in laryngeal cancer . Yet, from experience we know that painful dysphagia is a well-known symptom reported among patients suffering from a supraglottic laryngeal carcinoma. Inphysical examination, the true vocal cords aremost frequently affected by laryngeal TB, followed by the epiglottis, false vocal cords and ventricles, arytenoids, posterior commissure and the subglottic area . Laryngeal TB can manifest as oedema, hyperaemia or ulcerative lesions, but can also present as a nodule, an exophyticmass or obliteration of an anatomical structure . Aside from chronic laryngitis and laryngeal carcinoma, these various presentations give rise to a comprehensive differential diagnosis including cat-scratch disease, syphilis, sarcoidosis, Wegener's granulomatosis and fungal infections . Since pathognomonic characteristics indicative of laryngeal TB do not exist and the fact that it is an uncommon disease in industrialised countries, the infection is easily mistaken for the more frequently occurring laryngeal carcinoma [10].

In our study second commonest mass was vocal foldpolyp . Clinically 6 cases ofvocal fold polyps were diagnosed , which on histopathology revealed 4 cases to be inflammatory polyps ,1 case to be pyogenic granuloma and 1 case to be squamous cell carcinoma which are as discussed below.4 cases (4%) of vocal fold polyps were the commonest mass among benign laryngeal masses (28.57%). Male to female ratio was found to be 4 :1,commonly involving the age group 21-30 years . 1 case each found in farmer, sanyasi,pesticide supplier and welder. All 4 casesbelonged to rural areas with grade 3 being commonest socioeconomic status(50%). Varied addiction habits noted in the 4 cases- tobacco chewing in 1 case, ganja,beedi, alcohol in 2nd case, voice abuse in 3rdcaseand no addictions in the last case . All4 cases presented withonly one complaint of hoarseness of voice (100%) .On IDL vocal fold polyp wasseen in all4 cases ,pedunclated in 2 cases and sessile in 2 cases arising from true vocal cords .These patients underwent microlaryngoscopic excision which confirmed the diagnosis .In a study by Mangal Singh[7] majority of patients i.e.33 cases (40.7%) were vocal cord polyps among benign lesions of larynx. A study byPawanSinghal[8]has found vocal abuse as the mostcommonhabit among benign lesions .Instudyby Pankaj Kumar Doloi[9] most common benign laryngeal lesion noted was vocal polyp (37.5%).

A case of pyogenic granuloma seen in 74 year aged male ,farmer ,belonging to rural area ,class 3 with chief complaints of hoarseness of voicewith history of addiction to tobacco chewing in the form of gutka . IDLrevealed greyish polypoidal mass over the anterior commissure of larynx , clinically diagnosed as vocal fold polyp which underwent microlaryngoscopic excision revealing the diagnosis as pyogenic granuloma . In a study by Katherine Perry[11]a 35 year old male presented with symptoms of muffled voice and a foreign body sensation in his throat. The patient had been evaluated at an outside facility six months previously for similar symptoms and a mass was identified on the laryngeal surface of the epiglottis. The patient was treated at the outside facility with removal of the mass via suspension microlaryngoscopy and cold instrumentation. The surgeon reported a pedunculated lesion on a narrow pedicle. Pathology revealed granulation tissue. The patient's symptoms resolved, but returned four months later. Transnasalfibreopticlaryngoscopyshowed a mass originating from the laryngeal surface of the epiglottis obstructing the view of the patient's endolaryngeal airway .The patient was treated using suspension microlaryngoscopy and excision of the granuloma from the laryngeal surface of the epiglottis, followed by topical application of mitomycin C.

A 67 year old male patient presenting with hoarseness of voice for 6 months , having addictions to beedi smoking and alcohol, indirect laryngoscopy revealed a wide base polyp-like mass with smooth epithelial lining appearance at left vocal cord , underwent microlaryngoscopic excision . Unexpectedly pathology revealed well-differentiated squamous cell carcinoma . In a studybyChien-Mei Chen[12]a similar case of glottic cancer masquerading as a vocal polypwas reported .There was another case report of a vocal cancer that was obscured by a prominent vocal fold polyp which was only noted during microlaryngoscopyexamination[13]. There was also another case report of an unusual giant, pedunclated polyp which was later proved as a metastasis of the colic adenocarcinoma[14].

Third common laryngeal mass in our study was vocal fold nodule .Among males incidence was2 % (2cases) and among females2%(2 cases), with male to female ratio as 1:1 and 41-50 years age group affected mostly (50%) . 2 patients belonged to urban areas with occupation being teacher and street hawker and rest 2 belonged to rural areas ,one being farmer and the other housewife . 50% belonged to

grade 1 socioeconomic status , rest belonging to grade 4 and 2 .No addictions were found in 50% cases while remainder had vocal abuse and tobacco ,alcohol addictions . All 4 cases (100%) presented with hoarsenessof voice with no other symptoms .IDL revealed bilateral symmetric nodules on true vocal cords at junction of anterior and middle 2/3rd .Microlaryngoscopic excision was performed in 4 cases which confirmed diagnosis of inflammatory nodule . In a study by Mangal Singh[7]vocal cord nodules were found in 23 cases (28.4%) being the second most common etiology among benign laryngeal masses out of which 18 patients underwent microlaryngoscopicexcision .

The fourth common mass was Intubation granuloma 3 cases (3 %) with male to female ratio3:1 with 21-30 years age group affected mostly . 1 patient belonged to urban area with occupation being factory worker and other 2 patients were of rural areas , one being a student and the other farmer. Grade 1 socioeconomic status was commonest seen .All3 cases had a history of prolonged endotracheal intubation presenting to OPD with complaints of hoarseness of voice(100%) ,dysphagia and breathlessness bothin 1 case each .On IDL Polypoidal granulation tissue was seen over vocal processes of arytenoids bilaterallyin all3 cases . Microlaryngoscopic excision was donewhich confirmed the diagnosis .Ina studyby Pankaj Kumar Doloi[9]intubationgranulomawasnoted in 2.5% cases .

A single case of Epiglotticcyst was seen in a 35 year aged female ,housewife , belonging to rural area ,grade 2 socioeconomic class with chief complaints of foreign body sensation in throat and dysphagia and no history of addictions .IDL revealed cystic swelling over lingualsurface of epiglottis . Microlaryngoscopic excision was done which confirmed the diagnosis .Epiglottic cyst was noted in 5% cases in a study by PankajKumarDoloi[9]whichunderwentsuprahyoidpharyngectomy .

Clinical and Histopathologicalfindings :

In our study clinical diagnosis was 100 % correct in diagnosing vocal fold nodule, Intubationgranuloma ,epiglottic cyst and 66.66% for vocal fold polyp and 98.83% for malignant laryngeal masses .

We had 6 cases clinically diagnosed asvocal fold polyp which on histopathology revealed only 4 cases to be polyps, 1 caseof pyogenic granulomaand 1case turned out to besquamous cell carcinoma .Thus in 33.34% ofthe cases the diagnosiswas one of a benign mass and one malignant mass .

In malignant laryngealmasses , our study indicates that we had a very high clinical suspicion of 98.83% i.e. outof 86totalclinicallymalignant masses only one massturned outto be tuberculosison histopathology .

In a study by NupurNerurkarand Sunil Garg[15] on correlation between rigid laryngoscopy and histopathology of laryngeal lesions at their voice clinic in Mumbai , their clinical diagnosis was 100% accurate in vocal fold subepithelial cyst ,vocal fold nodule, laryngeal papilloma and ulcer . Their clinical diagnosis had reliability of 30% for vocal fold polyp, 50% for leukoplakia and 66%for malignant lesions .

VII. Conclusion

A total of100cases of laryngeal masses were obtained during study period .Commonest massnoted was laryngeal malignancy comprising 86 cases (86%) and least were, 1 case (1%) each of epiglottic cyst, pyogenic granulomaand laryngeal tuberculosis . Among males commonest mass was malignancy i.e. 78 cases (87.64%) aswellas among females thecommonest mass was also malignancy i.e 8 cases (72.72%).

This study showed that proportion of laryngeal cancers was significantly high 86 % .Majority of Laryngeal cancers were histologically squamous cell carcinomas affecting age group 61– 70 yrs with males outnumbering females(9.75 :1). Therefore, laryngeal cancers constituted a major burdenin our hospital withproportion higher than that reported in any other studies which requires prompt attention. The increasing number of laryngeal cancer cases is a cause of major concern as it is associated with high morbidity &mortality in a sizeable population, factors involved are poor socio-economic conditions, oral consumption oftobacco in its various forms, use of lime with betal -leaf &betalnuts,alcohol& smoking habits, over & above, lack of awareness about cancer & non-existent cancer prevention programmeshave all made the scenario even worse.

This study helps to quantify & analyze the spectrum of laryngeal cancers& should help as a stable point for a much needed population based study in a rural area like Loni. A Comprehensive effort is needed to identify the cause of such high proportion, generate awareness & treatment options suited to meet this challenge.

Commonestbenign laryngeal mass was vocal fold polyp and vocal fold nodule each with 4 cases (57.14%)and least common were 1 case each of epiglottic cyst ,pyogenic granuloma and laryngeal tuberculosis (each 7.14%) .Amongmales most common laryngeal mass was vocal fold polyp (22.22%) andamong females vocal fold nodules were the commonest (66.66%).The benign laryngeal lesion produces symptoms which can vary from mild hoarseness to life-threatening stridor. These lesions can create a lot of mental and emotional tension in the patient and the family. Early diagnosis of the lesions can lead to effective management and good recovery. As such, the standard treatment of choice in all types of benign tumours of the larynx should consist

of a triad of approach by microlaryngeal surgery (either microscopic or endoscopic,with or without use of lasers), voice rest and vocal rehabilitation .

In ourstudy , on clinical examination by indirect laryngoscopy ,14 patients were clinically diagnosed as havingbenign masses and 86 patients with malignant masses. Out of 14 patients diagnosed with clinically benign masses one turned out to be squamous cell carcinoma on histopathology .

Amongst the 86 patients clinically diagnosed as having malignant masses , again only one had a benign histopathology of tuberculosis .

Laryngeal Tuberculosisis uncommon, particularly in developed countries, but it still occurs. There are no pathognomonic features indicative of this disease and it can mimic many others. If misdiagnosed, laryngeal TB can have severe consequences for the patient and anyone he comes into contact with. Therefore, it is important for otolaryngologists to recognise the altered pattern of laryngeal TB and to be familiar with its resemblance to malignancy. Laryngeal TB should be considered as a differential diagnosis in any laryngeal disease and in particular in the case of laryngeal carcinoma.

On indirect laryngoscopy , out of 14 patients clinically diagnosed as having benign masses , 6 patientswere diagnosed as having vocal fold polyps . On histopathology , out of these 6 patients , 4 were vocal fold inflammatory polyps ,one was pyogenic granulomaand one squamous cell carcinoma .This unusual presentation alerts us to the suspicion of malignancy if there are risk factors such as age>40 years and smoking. It also emphasizes the importance of a microlaryngosopy examination and biopsy.

In our study , clinical diagnosis was 100 % correctin diagnosing vocal fold nodule, intubation granuloma and epiglottic cyst . The clinical diagnosis had reliability of 66.66% for vocal fold polyp and 98.83% for malignant laryngeal masses .

In conclusionpatients in our study typically presented late which accounts for the higher number of supraglottic cancers. Among some of the reasons for late presentations are lack of affordability and accessibility by most patients to tertiaryhealth facility in rural areas like Loni. Also the proportion of laryngeal cancers is closely correlated with tobacco and alcohol use which is very common in rural area like Loni .Finally there is a need to educate the general public and especially health care providers to promptly refer patients with hoarseness of voice of more than 2 weeks duration for direct laryngoscopy and biopsy by an otolaryngologist.

From our study , we alsoconclude that clinical examination alone gives 100 % accuracy in cases of clinically suspected nodules, granuloma and cyst .Therefore , it is justified to follow a conservative approach in these situations if the lesion is one that will respond to speech therapy , such as vocal fold nodules or if surgery is associated with a high risk .We can be conservative with vocal fold nodules and cysts but we should be aggressive in the management of vocal fold polyps .

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