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A clinico-pathological and radiological examination of malignant tumors of the larynx

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Abstract
Introduction: The larynx has an unique position because it is the major component of the upper respiratory tract and it is located just anterior to the upper end of the digestive tract. It consists of 3 regions - supraglottis, glottis and subglottis. Each region is anatomically and embryologically distinct with separate lymphatic channels. Cancer of each region is therefore different in terms of its presentation, growth patterns, spread, treatment and prognosis. Smoking, tobacco and alcohol are the major risk factors of the tumor of larynx.
Materials and Methods: It is a hospital based study conducted on 50 patients of laryngeal tumor which showed that most of the patients were male and they had carcinoma on the left of the larynx than the right. Hoarseness and foreign body/sticky sensation in the throat were the most common presenting symptoms. The follow up period of a minimum of five to eight years is necessary to evaluate the survival rates, morbidity, and the correct, exact outcome of the treatment modality for management of laryngeal malignancy.
Result: The peak incidence of cancer occurred in the 60-70 (38.8%) year age group followed by the 51-60 (22.3%) year age group 90% of the patients were male. The male to female ratio was 9:1. According to the occupation statistics, Farmers constituted 55.5% of patients.
Conclusion: In conclusion an integrated diagnostic and treatment program is necessary for patients with Malignant Tumors of the Larynx because various factors are responsible for the disease. Still the major risk factor of the tumor is tobacco and alcohol.

Keywords: larynx, malignant tumors

Introduction
The management of the airway has always been of great importance throughout the history [1] and ancient physician have focused on the disease contributing to the airway and respiratory system [2-5]. The larynx consists of 3 regions - supraglottis, glottis and subglottis. Each region is anatomically and embryologically distinct with separate lymphatic channels. Cancer of each region is therefore different in terms of its presentation, growth patterns, spread, treatment and prognosis. Cancer of the larynx is a common cancer of the head and neck [6]. Because of the aging and growth of the world's population with an increasing adoption of cancer-causing elements and behaviors, such as smoking, tobacco etc in economically developing countries, cancer continues to increase largely [7]. Major cancers types and subtypes, including human papillomavirus (HPV)-related tumors are increasing day by day [8]. The larynx being the major component of the upper respiratory tract and it is located just anterior to the upper end of the digestive tract; hence it has an unique position [9] it is rare in nonsmokers. Cigarette smoking is the principal risk factor of malignant tumors of the larynx. There is a very strong correlation between tobacco and laryngeal cancer. It is also the causative factor for all cancers in all parts. Combination of alcohol & smoking increases the risk of supra glottis tumors. Manguso and Hanfo have done extensive study of the larynx in 1982 by using computerized tomography in benign tumors and laryngeal trauma. In cases of tumor extension, CT has made in possible to detect, Spread to anterior commissure, Deep extension to paraglottic, para anytenoid areas, pre epiglottic spaces, Cartilage invasion, Extension of pyriform fossa tumors. The tumors of larynx can be classified into benign and malignant. About 95% of laryngeal carcinomas are typical squamous cell tumors. Rarely adenocarcinomas are seen to arise from larynx, presumably arising from mucous glands [10]. Most optimal treatments must be qualified and used within the multidisciplinary team in all patients with cancer of the head and neck [11].

Material and Methods

This study was conducted in the tertiary care hospitals in Jaipur, India for a period of three years from September 2015 to august 2018. It included the cases of laryngeal malignancy respective of any age, sex, religion and socio-economic status. We recruited 50 patients for the study with their consent. They were recruited for a one-year period, and then followed for one year. No patients with growths other than malignant tumors and laryngeal malignancies with incomplete treatment were included in the study. Follow up was performed at 1, 3, 6 and 12 months. The basis of clinical diagnosis of laryngeal malignancy was the clinical presentation it included hoarseness, foreign body sensation in the throat, dysphasia, pain or discomfort in swallowing, dyspnea, cough, aspiration, or the presence of a neck mass. A thorough history and a complete otorhinolaryngological examination were performed for each patient which included laboratory tests for hematology and biochemistry, indirect laryngoscopy, fine needle aspiration cytology (FNAC) in cases with neck edema, an endoscopy and radiological studies. Any patient with suspected malignant growth in the larynx was admitted. For direct laryngoscopy under general anesthesia. A biopsy was taken from the lesion and sent for histopathological examination. Proper staging was done after confirmation of the diagnosis. Each patient was provided with the appropriate treatment modality. Necessary investigations were performed at each visit during follow-up.

Result

In this study, the patients of age between 40-78 years were included. The peak incidence of cancer occurred in the 60-70 (38.8%) year age group followed by the 51-60 (22.3%) year age group 90% of the patients were male. The male to female ratio was 9:1. According to the occupation statistics, Farmers constituted 55.5% of patients. Most of the patients were residents of rural areas and some of urban areas. Risk factor exposure showed that most of the patients used tobacco in the form of smoking, were addicted to alcohol, and consumed the betel nut. In our study hoarseness was the most common presenting symptom in most of the patients followed by foreign body or sticky sensation, dysphagia, cough, dyspnea, swelling in the neck, neck pain, otalgia, blood stained sputum, and aspiration. Most of the patients had carcinoma on the left side of the larynx than on the right side. In the patients with bilateral extension the maximum bulk of the tumor was taken as the site of origin. On indirect laryngeal examination, patients had exophytic growth followed by proliferative, ulceroproliferative and ulcerative. Glottic cancer was the most common among the patients followed by supraglottic and glottic with supraglottic extension. Even though very few patients complained about neck edema, on clinical examination many patients had evidence of neck node enlargement. Fine needle aspiration cytology (FNAC) was performed on all patients who had palpable neck nodes. Some patients were positive for metastatic squamous cell carcinoma and a few had non-specific reactive lymphadenitis for which they were prescribed antibiotics. The swelling subsided in these patients, which showed that patients had lymph node enlargement because of an infection rather than metastasis, even though there might have been micrometastasis present in the lymph nodes. The most common involved lymph node was observed at level III. All patients underwent a direct laryngoscopic examination under general anesthesia for staging workup and biopsy. All tumor types and differentiation were recorded histopathologically. Many patients were diagnosed with moderately differentiated squamous cell carcinoma followed by well and poorly differentiated squamous cell carcinomas. All patients had squamous cell carcinomas with different differentiations; none of the other types of carcinomas were found in our study. We staged the patients according to TNM staging. For the patients who presented with dyspnea a surgical tracheostomy was performed in some of those patients and the rest had a medical tracheostomy with steroids. None of the patients underwent surgery because the majority presented at a late age and poor general condition. These patients were not able to undergo major surgery under general anesthesia. Following an explanation of sequelae and surgical complications, the patients and relatives preferred conservative treatment with voice preservation in the form of radiotherapy and chemotherapy or chemotherapy alone. The majority of patients were from low socioeconomic backgrounds which made it difficult to convince them to undergoes surgery. Many patients received concurrent chemoradiotherapy (CCRT) followed by radiotherapy alone in some and neoadjuvant chemotherapy in a few patients. Chemotherapy drugs administered were cisplatin or carboplatin and 5-flurouracil based chemotherapeutic regimens. Radiotherapy was given as external beam radiotherapy. All patients received a 70 Gy dose in 35 divided doses over 7 weeks with a weekly two-day rest period for normal tissue repair. Patients had the radiation therapy induced complications like: xerostomia, taste alteration, dysphagia and mucositis. The most frequent chemotherapeutic complications were nausea and vomiting seen in 90% of patients. Renal toxicity was the least common in patients. At the 12 months follow up, a few patients were removed from the study because they were not able to make it for the follow up and three patients expired due to nonresponsive disease. Some patients did not have detectable disease and some had residual disease.

Table 1: Distribution of cases of laryngeal cancer according to age

Age range (years)	No. of cases	Percentage (%)
40-49	10	20
50-59	12	24
60-69	18	36
70-78	10	20
Total	50	100

Table 2: Distribution of cases according to occupation

Occupation	No. of cases	Percentage (%)
Farmer/agriculture	26	52
Service	11	22
Business	4	8
Driver	4	8
Carpenter	1	2
Household	4	8
Total	50	100

Table 3: Distribution according to risk factors

Risk factor	No. of cases	Percentage (%)
Smoking cigarette/bidi	27	90
Alcohol	25	83.3
Alcohol + smoking	24	80
Pan/betel nut	9	30
Alcohol + tobacco + betel nut	7	23.3
Tobacco chewing	6	20
zarda/khaini	0	0
Occupational risk factor/ factory exposure	0	0
Non-smoker+ non-alcoholic	0	0
Other	0	0

Table 4: Distribution of cases according to clinical presentation and duration of symptoms

Presenting symptoms	No. of cases	Percentage (%)	Duration of symptoms		
			<1 month	1-3 months	>3 months
Hoarseness	39	78	9	19	11
Foreign body	37	74	17	9	11
sticky sensation in the throat	23	46	17	6	0
Dysphagia	20	40	14	5	1
Cough	16	32	16	0	0
Dyspnea	12	24	8	4	0
Swelling in the neck	9	18	7	2	0
Neck pain	6	12	4	2	0
Otalgia	3	6	3	0	0
Blood stained sputum Aspiration	3	6	0	3	0
Neurological symptoms	0	0	0	0	0

Table 5: Type of growth on indirect laryngeal examination

Type of growth	No. of cases	Percentage (%)
Exophytic	17	34
Proliferative	15	30
Ulceroproliferative	12	24
Ulcerative	6	12
Total	50	100

Table 6: Distribution of cases according to histopathological characteristics

Histopathological findings	No. of cases	Percentage (%)
Well differentiated squamous cell carcinoma	17	34
Moderately differentiated squamous cell carcinoma	29	58
Poorly differentiated squamous cell carcinoma	4	8

Table 7: Distribution of cases according to TNM staging

Stages	TNM	No. of cases	Percentage (%)
I	T1N0M0	11	22
II	T2N0M0	3	6
III	T3N0M0	7	38
	T1N1M0	0	
	T2N1M0	3	
	T3N1M0	7	
	Total	22	
IV	T4N0M0	2	
	T4N1M0	0	
	T4N2M0	0	
	T4N3M0	0	
	T1N2M0	0	
	T1N3M0	7	
	T2N2M0	8	
	T3N2M0	0	
	Any T, any N, M1	0	
	Total	17	34
Total		50	100

Table 8: Survival rate after follow up at 12 months

Survival	No. of cases	Percentage (%)
Surviving without disease	19	38
Surviving with disease	21	42
Drop out	7	14
Death	3	6
Total	50	100

Discussion

This was a hospital based study of 50 cases of laryngeal tumor conducted in RIMS between September 2015 and August 2018 with patients of age range between 40-78 years. No cases were found below the age of 40 years. Saedi *et al*. [12] in their study reported the mean age to be 59.92 years. Lam *et al*. [13] reported the peak age of presentation of laryngeal carcinoma to be 62 years with only 1.6% of cases who presented below 40 years of age. In our study 52% of the patients were farmers and maximum number of them resided in rural areas. This showed that the incidence was higher in people from a lower socioeconomic status as well as poor nutritional status and environmental hygiene. Jaimanti [14] found 78% of cases from a rural areaa and 22% of cases from an urban area. Risk factors in this study backed the other studies which showed that tobacco and alcohol use were the most common factors for the development of laryngeal carcinoma [14-17].

Hoarseness was the most common presenting symptom and foreign body or pricking sensation of the throat was also seen in maximum patients. Difficulty in swallowing and cough was seen in nearly half of the population of the study similarly difficulty in breathing and neck swelling in was also observed. Dysphagia was either in the form of foreign body sensation, irritation or feeling of hair stuck in the throat. Verma *et al*. [18] reported hoarseness in 73.92%, difficulty in swallowing in 59.95% and cough with expectoration in 39.04%. Amusa *et al*. [19] reported hoarseness in all cases, cough in 53.8%, and referred ear pain in 43.6% of case.

According to this study there was more carcinoma of the larynx on the left side compared to the right side. The reason why the left side was more common was unknown; it could be attributed to one-sided swallowing as one side may be predominant in function. In the current study, histopathological findings from FNAC of the neck nodes determined that all cases were metastatic squamous cell carcinoma. Histopathological study of the larynx tissues howed that all cases were squamous cell carcinoma. Suen *et al*. [20] concluded that squamous cell carcinomaw as the predominant histologic type. Wiligen *et al*. [21] reported that 95% of laryngeal carcinoma were typically squamous cell carcinoma and adenocarcinoma was rarely seen. Lam *et al*. [22] in their study reported that there were 67.3% of patients with moderately differentiated squamous cell carcinoma. The current study results confirmed the finding of the above authors. There were three deaths and five dropouts in the study. One death was after 3 months of the completion of the treatment, other was after 7 months of the completion of the treatment while the third death was after 12 months of the completion of the treatment. Lund *et al*. [23] concluded that despite the different treatment modalities, there was no definite treatment comparable to those achieved by preventing people from smoking tobacco and avoiding other risk and predisposing factors.

Conclusion

In conclusion an integrated diagnostic and treatment program is necessary for patients with Malignant Tumors of the Larynx because various factors are responsible for the disease. Still the major risk factor of the tumor is tobacco and alcohol. It was mostly seen in lower socio-economic groups in rural areas. Hoarseness and foreign body/sticky sensation in the throat were the most common presenting symptoms. The carcinoma was more common on the left side than the right. The follow up period of a minimum of five to eight years is necessary to evaluate the survival rates, morbidity, and the correct, exact outcome of the treatment modality for management of laryngeal malignancy.

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