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STUDY OF SQUAMOUS CELL CARCINOMAS OF THE LARYNX AND THE REGIONAL LYMPH NODES INVOLVEMENT

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ABSTRACT

Objective: The purpose of this study is to analyze epidemiological data of patients with laryngeal cancer and to point out the grade of tumors and lymph node metastasis in different stages of the tumors. **Materials and Methods:** This study is a retrospective cohort study of the records of patients who reviewed AlMouwasat University Hospital and were diagnosed with squamous cell carcinoma (SCC) of the larynx. This study included all records of patients from January 2016 to November 2019. Statistical analysis was done using SPSS 25.0. **Results:** The males were more predominant than females with a ratio of (4:1). 87% of all patients diagnosed with laryngeal cancer were smokers. Alcohol consumption has been reported in 7% of all patients diagnosed with laryngeal cancer. 45% of all cancers were in the glottis, while 51% were found in the supraglottic region and 4% were in the subglottic region. Most of the patients regardless of the location of the tumor had an advanced staging. Lymph node metastasis was found in 39% of glottic tumors, in 56% of the supraglottic tumors and in 83% of subglottic tumors. **Conclusion:** Most of the patients had an advanced staging of the tumors. Lymph node metastasis was most common in subglottic tumors followed by supraglottic tumors then glottic tumors, which were the least common.

KEYWORDS: Malignant Laryngeal Tumors, Lymph node metastasis, Syrian Population, AlMouwasat University Hospital.

INTRODUCTION

Malignant tumors of the larynx are relatively uncommon in the head and neck region. It could arise from any of the epithelial and non-epithelial structures of the larynx. Squamous cell carcinoma (SCC) is the most common histologic variant and accounts for 85–95% of all malignant tumors of the larynx.[1] According to a report from the World Health Organization, it is the second most common malignancy of the upper aerodigestive tract.[2] It occurs more in people above 40 years of age and more common in males. Its male preponderance has been linked to increased exposure to the risk factors of malignancies rather than an inherent gender predilection. The etiology is unknown but has been strongly associated with frequent exposure of laryngeal mucosa to wide varieties of ingested and inhaled exogenous carcinogenic agents. Tobacco smoking and alcohol consumption are the two most important risk factors for the development of SCC of the larynx.[3,4] Viral infections such as human papillomavirus (HPV) and human immunodeficiency virus, laryngopharyngeal reflux, exposure to industrial toxins, and some dietary deficiencies have also been associated with its development.[5,6,7,8,9,10,11,12,13]

The incidence of laryngeal tumor is high in the regions where tobacco smoking and alcohol consumption are common.[14,15] In the developing countries, the incidence of malignant tumor of the larynx is on the increase. The reason for this is unknown but may not be unconnected to frequent exposure to inhalational irritants at workplaces, homes as well as malnutrition.[10,11,12]

Malignant laryngeal tumors could involve any or all the three laryngeal subsites, namely, the supraglottis, glottis, and subglottis. The tumor in the glottis is associated with hoarseness and as a result, patients tend to present early to clinicians. In the developing countries, most patients with laryngeal cancer still present in the advanced disease stage. Other symptoms of laryngeal tumors include difficulty with breathing, noisy breathing, cough, referred otalgia, hemoptysis, neck swelling, and dysphagia.

SCC of the larynx may spread regionally to the neck nodes and/or distantly to lungs, liver, and backbones. Isolated glottis tumor rarely spread to the regional lymph nodes because of its poor lymphatic drainage. The propensity for regional lymph nodes and distant metastatic spread depends on the involved subsite (s) and the T-stage of the tumor.[16,17]

Up to our Knowledge, this study is the first of its kind in our country.

MATERIALS AND METHODS

This study is a retrospective cohort study of the records of patients who reviewed AlMouwasat University Hospital and were diagnosed with SCC of the larynx regardless of the stage or grade of the tumor. This study included all records of patients with laryngeal SCC from January 2016 to November 2019. We found 160 cases in the studied period with laryngeal SCCs. To ensure the privacy, only the authors collected the data and all the names were blinded. Statistical analysis was done using SPSS 25.0.

RESULTS

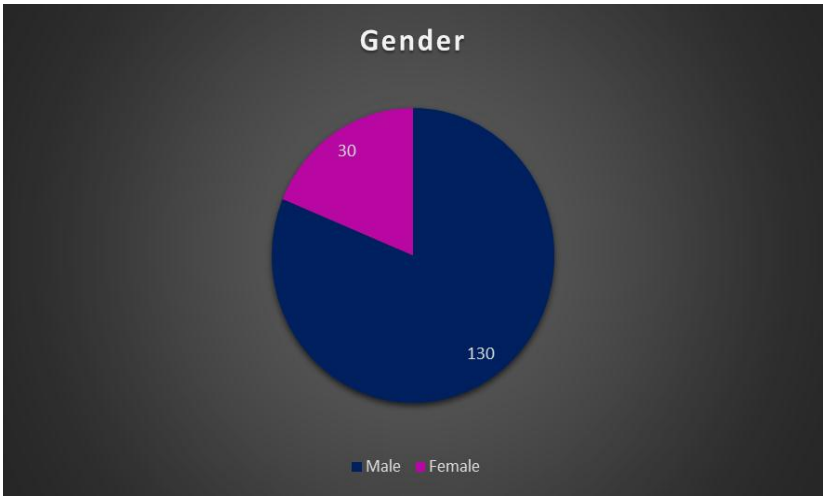

Figure 1: Gender Distribution of Participants of Our Study.

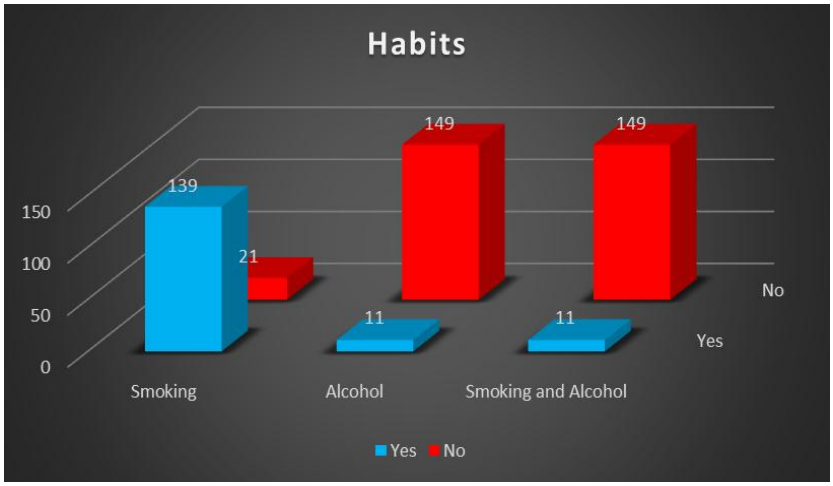

Figure 2: Habits (Smoking and Alcohol Consumption) of Participants of Our Study.

The males were more predominant in 130 cases and females in 30 cases with a ratio was about (4:1). (Figure 1). 87% of all patients diagnosed with laryngeal cancer were smokers, while 13% were non-smokers. Alcohol consumption has been reported in 7% of all patients

diagnosed with laryngeal cancer. 7% of all patients diagnosed with laryngeal cancer were both smokers and alcohol consumers. (Figure 2).

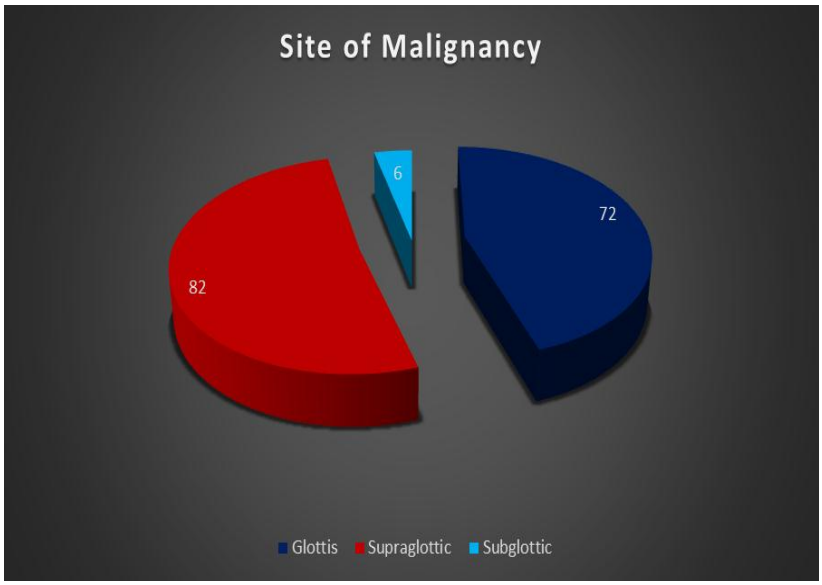

Figure 3: Site of Malignant Laryngeal Tumors in Our Study.

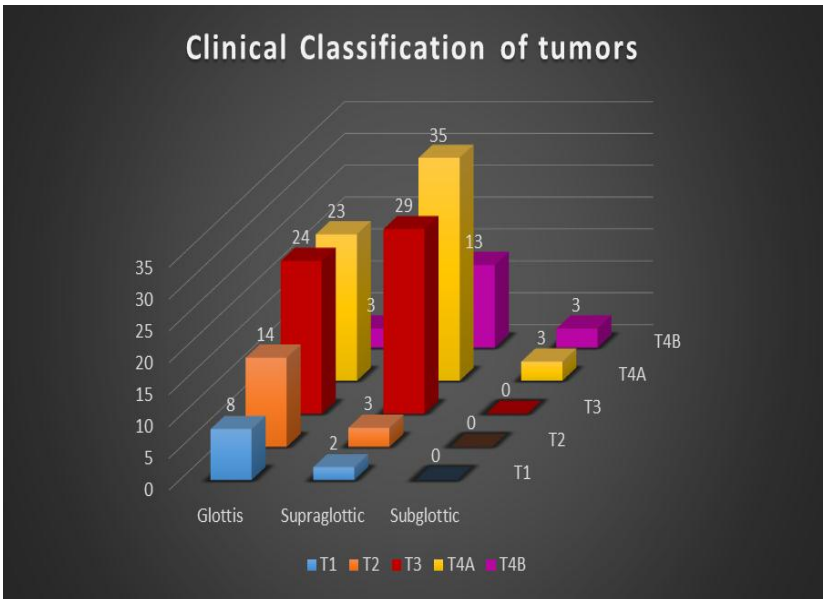

Figure 4: Clinical Classification of Tumors in our Study.

45% of all cancers were in the glottis, while 51% were found in the supraglottic region and 4% were in the subglottic region. (Figure 3). Most of the patients regardless of the location of the tumor had an advanced staging with glottic tumors of T3 and T4 with 31%, Supraglottic tumors with stage T3 and T4 with 48% and regarding subglottic region all cases were stage T4. (Advanced Tumor). (Figure 4).

Table: Lymph nodes metastasis (Cervical Nodes) according to the location of the tumor.

			Nodes						Total
			N0	N1	N2a	N2b	N2c	N3	
Clinical Staging	Glottis	Count	44	13	2	7	4	2	72
		% within Clinical Staging	61%	19%	2.5%	9.5%	5.0%	3%	100.0%
	Supraglottic	Count	36	20	3	8	10	5	82
		% within Clinical Staging	44%	24%	4%	10%	12%	6%	100.0%
	Subglottic	Count	1	0	2	1	0	2	6
		% within Clinical Staging	17%	0%	33%	17%	0%	33.%	100.0%
Total Sample									160

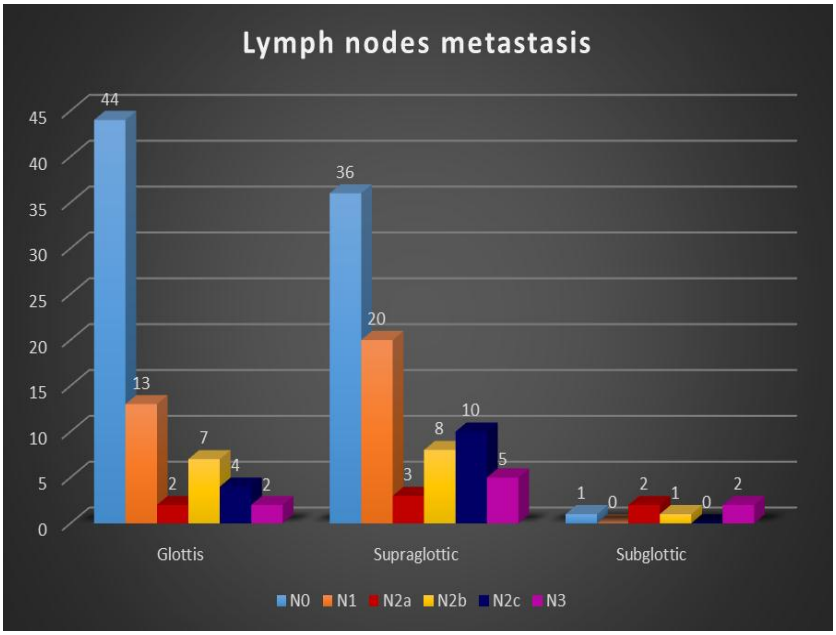

Figure 5: Lymph nodes metastasis (Cervical Nodes) according to the location of the tumor.

There was a statistical significance between the clinical staging of tumor and lymph nodes metastasis ($p=0.02<0.05$). lymph node metastasis was found in 39% of glottic tumors, while in the supraglottic tumors it was found in 56%. 83% of subglottic tumors had lymph node metastasis. (Table, Figure 5).

DISCUSSION

The last fifty years we have witnessed a significant increase in the incidence of laryngeal cancer, especially in certain countries, as well as a decrease in the rate difference between men and women.

Cancer of the larynx is a predominantly male disease. The male to female ratio varies internationally from 30:1 to 5:1. In Europe, the ratio is 7:1.[18,22] The increasing proportion of women is mainly attributed to the increased tobacco and alcohol consumption. In Greece[28], the male to female ratio is significantly higher (30:1).

Tobacco is evidently the most important risk factor for the development of laryngeal carcinoma.[23] According to data from the international literature, smoking is associated with 95% of carcinomas of the larynx. In a similar study In Greece[28], of all those with laryngeal cancer 86.8% were smokers, 5.6% non-smokers and 7.6% ex-smokers. A study by Tuyns et al concerning central Europe showed that the risk for developing cancer of the larynx is 16 times greater in heavy smokers than in non-smokers.[24]

Alcohol has been implicated as well, as an important risk factor in the pathogenesis of laryngeal cancer. Indeed, the relation between alcohol consumption and the development of laryngeal carcinoma is proportional to the dose and duration of exposure.[25] A German study reports that from all patients with cancer of the larynx, daily alcohol consumption was noted in 85.1%, while another study shows that 76.3% of the patients consumed more than 25 gr of ethanol daily.[21] A study In Greece[28] shows that daily alcohol consumption was observed in 43.2% of patients with laryngeal cancer.

Smoking and alcohol consumption are considered to act synergistically. The exact mechanism of this action has yet to be clarified.[20]

Significant differences are observed in the percentage of the anatomical position of the site of cancer in the larynx. The data of the international literature indicate the glottis as the most frequent location, while tumors found in the subglottic region are considered extremely rare.[1,3,7] The frequency of the location however, varies considerably among countries. In a study in Uruguay, one of the countries with the highest rates in tumors of the larynx, the percentage of the supraglottic carcinomas was 60% versus 30% of the glottic ones.[26] In Italy, the percentage is 50% for the glottis and 50% for the supraglottic region. On the contrary, in Scandinavian countries and France there is a clear preponderance of glottic carcinomas over supraglottic ones at rates 85% and 65% respectively. Finally, in U.S.A., the rate of glottic tumors is 30-40%.[19,7] In Greece[28], the percentage of glottic carcinomas is significantly higher, almost double from that of supraglottic ones (60.2 to 32.8).

It is proven by numerous studies that prognosis of supraglottic and subglottic carcinomas are clearly worse than the glottic ones. Jakobsen et al reported in their study that the rate of lymph node metastasis at the time of diagnosis for the glottic and supraglottic carcinomas were 1% and 29% respectively.[27] In Greece[28], the majority of patients with glottic tumors were diagnosed at early stages: 65.7% of these patients were in stage Tis, T1 and T2, in contrast with the patients who had supraglottic tumors of whom 71.4% belonged to stages T3 and T4.

Moreover, In Greece[28], the percentage of lymph node metastasis in the neck was 3.8% for the glottic tumors while it was 28.8% for the supraglottic ones.

CONCLUSION

Most of the patients regardless of the location of the tumor had an advanced staging with glottic tumors of T3 and T4 with 31%, Supraglottic tumors with stage T3 and T4 with 48% and regarding subglottic region all cases were stage T4. (Advanced Tumor). Lymph node metastasis was found in 39% of glottic tumors, in 56% of the supraglottic tumors and in 83% of subglottic tumors.

Compliance with Ethical Standards

Funding: This study was not funded by any institution.

Conflict of Interest: The authors of this study have no conflict of interests regarding the publication of this article.

Ethical approval: The names and personal details of the participants were blinded to ensure privacy.

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