sciendo

Journal of Interdisciplinary Medicine

ORIGINAL RESEARCH

PATHOLOGY // ONCOLOGY

The Demographics of Patients with Head and Neck Squamous Cell Carcinoma: a Retrospective Study

Timea Szatmári[1], Simona Mocan[2], Zsuzsanna Pap[3]

[1] PhD student, "George Emil Palade" University of Medicine, Pharmacy, Science and Technology, Târgu Mureș, Romania
[2] Department of Pathology, County Emergency Hospital, Târgu Mureș, Romania
[3] Department of Anatomy and Embryology, "George Emil Palade" University of Medicine, Pharmacy, Science and Technology, Târgu Mureș, Romania

CORRESPONDENCE

Timea Szatmári
Email: szatmaritimeaa@gmail.com

ARTICLE HISTORY

Received: December 7, 2024
Accepted: December 13, 2024

ABSTRACT

Background: Head and neck cancers, primarily squamous cell carcinomas (HNSCC), represent a significant health burden, being localized predominantly on the mucosal surfaces of the head and neck region. Approximately 3% of all cancer cases reported worldwide are attributed to head and neck cancer. **Aim:** In this study, we aimed to characterize the demographics and histopathological features of patients with HNSCC. **Material and methods:** We reviewed histologically verified cases of HNSCC between 2010 and 2016 from the pathology archive of the County Emergency Hospital, Targu Mures. Data regarding the patients' age, sex, tumor localization, histopathological type, and grade of differentiation were collected. **Results:** The majority of tumors were classic squamous cell carcinomas, with variants and mixed types also identified. The analysis revealed a predominance of male patients, along with a correlation between sex and tumor localization, and an association between age and specific tumor sites. **Conclusions**: Our findings underscore the importance of sex, age, and etiological factors in the development and management of HNSCC.

Keywords: head and neck squamous cell carcinoma, demography, histopathological type, localization

INTRODUCTION

Head and neck cancers typically originate from squamous cells lining the mucosal surfaces of the head and neck, including those found inside the mouth, throat, and larynx. These cancers are known as squamous cell carcinomas of the head and neck (HNSCC).[1] The global incidence of head and neck cancer is estimated to be around 3% of all cancer cases reported worldwide. They are more prevalent in men, occurring over twice as frequently as in women. Additionally, these cancers are typically diagnosed more frequently in individuals aged 50 and above compared to younger individuals.[2,3] Head and neck cancers are frequently associated with tobacco and alcohol use or a combination of both. Conversely,

oropharyngeal cancers are increasingly linked to human papillomavirus (HPV) infection, especially HPV-16.[4]

The initial symptoms of head and neck tumors can vary greatly depending on which anatomical region they affect. HNSCC is classified by its location and originates from various anatomical sites: oral cavity, pharynx (including nasopharynx, oropharynx and hypopharynx), larynx, nasal cavity, paranasal sinuses and salivary glands.[5]

Squamous cell carcinoma is the most predominant malignant mucosal neoplasm in the head and neck, comprising over 90% of all malignancies in this region. Conventional squamous cell carcinoma along with several variants, collectively, constitutes about 10–15% of all squamous cell carcinomas. These variants include basaloid, spindle cells (sarcomatoid), acantholytic, verrucous, lymphoepithelial, papillary, and adenosquamous carcinomas. Each of these variants has a distinct histomorphological appearance, and mixed histological types are also encountered.[6,7]

Our aim was to characterize the demographics of patients with HNSCC by analyzing their anatomical localization, histopathological type, and associated risk factors.

MATERIAL AND METHODS

In this retrospective study conducted at a single institution, we reviewed histologically verified cases of HNSCC from the pathology archive of the County Emergency Hospital, Târgu Mureș. The data sampling period was between 2010 and 2016 and included a total of 91 patients. We collected data regarding the patients' age, sex, tumor localization, type of squamous carcinoma, and grade of differentiation.

We categorized tumor localization into three subgroups: laryngeal (L), extralaryngeal (E), and mixed (E-L). The laryngeal group contained patients with HNSCC affecting one or more anatomical areas of the larynx: supraglottic, glottic, or subglottic. Squamous cell carcinomas occurring in areas other than the larynx were classified into the extralaryngeal (E) group, encompassing tumors from the pharynx (oro-, naso- and hypopharynx), and oral cavity and mobile tongue. Patterns of extralaryngeal spread of laryngeal squamous cell carcinoma were included in the mixed group (E-L).

All patients diagnosed with squamous cell carcinoma exhibited different histological types, necessitating the formation of distinct groups: classic squamous cell carcinoma (CSCC), squamous cell carcinoma variants (SCC variants), and squamous cell carcinoma mixed-type (SCC mixed-type). CSCC included both keratinized and non-keratinized tumors. SCC variants included basaloid, spindle cells (sarcomatoid), acantholytic, verrucous, lymphoepithelial, papillary, and adenosquamous cell carcinomas. The mixed group encompassed tumors displaying characteristics from two different histological types of squamous cell carcinoma, such as classic basaloid, classic sarcomatoid, classic acantholytic, classic papillary, and adenosquamous.

To grade the tumors, we used a WHO-recommended three-tier grading system: G1 for low-grade or well-differentiated tumors, G2 for intermediate grade tumors, and G3 for high grade or poorly differentiated tumors. This system allowed for a standardized assessment of tumor differentiation levels, providing valuable insights into the aggressiveness and potential behavior of the tumors.

For statistical analysis we used GraphPad InStat 3 software, version 3.06 (GraphPad Software Inc.). A significant association was taken into consideration at a p value of < 0.05, with a 95% confidence interval.

Ethics

This study was approved by the ethics committee of "George Emil Palade" University of Medicine, Pharmacy, Science and Technology of Târgu Mureș, Romania (approval no. 3211/10.06.2024).

RESULTS

During the examined 7-year timeframe, a total of 91 patients with HNSCC were registered, of whom 87 were male (95.6%) and 4 female (4.40%), resulting in a male-to-female ratio of 21.75:1.

The median age at diagnosis was 65 years. The youngest patient diagnosed was 39 years old, whereas the oldest was 81 years old. When examining the occurrence of HNSCC across different age groups, we observed that the majority of patients developed the disease between the ages of 51

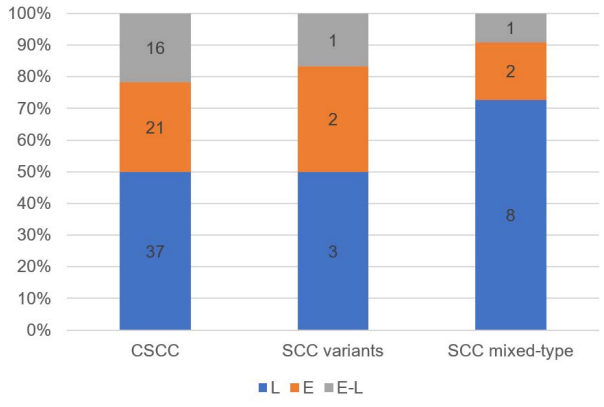

FIGURE 1. The histological subtype of HNSCC in relation to its localization

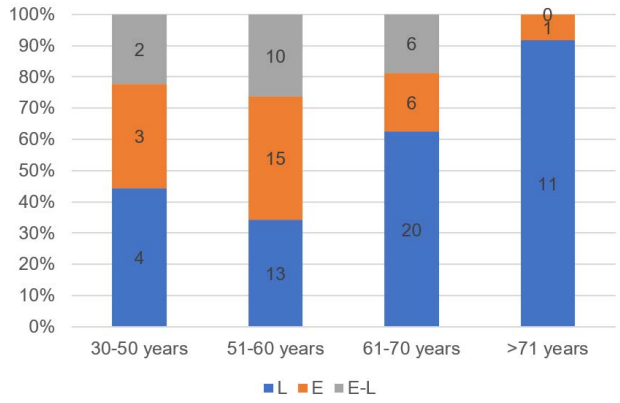

FIGURE 2. The age of patients in relation to the localization of HNSCC tumors

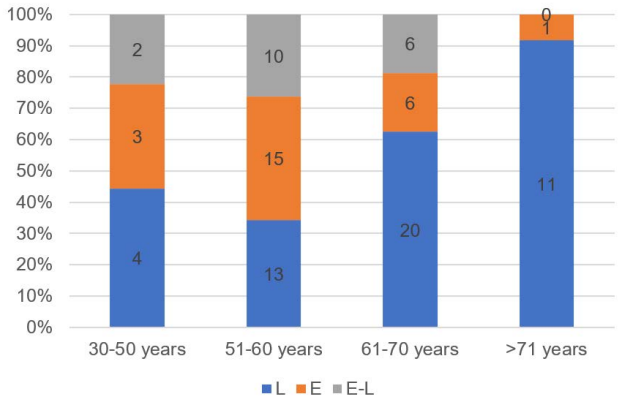

FIGURE 3. The age of patients in relation to the histopathological subtype of HNSCC

and 60. Specifically, 41.76% of cases occurred among individuals aged between 51 and 60 years, while 35.16% were in the 61–70 age group.

Upon surveying the different anatomical locations, we discovered 48 cases (52.74%) had their origin in the larynx (L). The primary extralaryngeal localizations included 11 cases (12.08%) in the oropharynx, 11 cases (12.08%) in the hypopharynx, 3 cases (3.29%) in the oral cavity and mobile tongue. A total of 18 tumors (19.78%) affecting multiple regions (E-L) were registered.

The majority of SCC mixed-type tumors (80%) developed in the larynx, whereas only 50% of classic SCC and SCC variants presented this localization (p = 0.7; Figure 1). We found a statistically significant correlation between patient sex and tumor localization, indicating that the distribution of tumor sites varies significantly based on sex. The tumors that developed in women presented an extralaryngeal localization.

A significant correlation was established between the age of the patients and tumor localization, highlighting a notable association between age and the specific sites where tumors occur. The majority of extralaryngeal tumors, as well as those with mixed localization, were more common in individuals under the age of 70 (Figure 2).

Regarding the main histopathological groups observed, the majority consisted of 74 cases (81%) classified as CSCC. Additionally, there were 6 cases (7%) categorized as variants (SCC variants), and 11 cases (12%) identified as mixed-type (SCC mixed-type). Analyzing patient sex and histopathological types, we found that both CSCC and variants occurred in both sexes, whereas mixed-type tumors exclusively affected men. Comparing the age of

TABLE 1. Histopathological type and localization of HNSCC in relation to the sex and age of patients and the degree of differentiation

	CSCC	SCC variants	SCC mixed-type	p value	L	E	E-L	p value
Sex								
Male	71	5	11	0.26	48	21	18	0.004
Female	3	1	0		0	4	0	
Age (years)								
30–50	8	0	1	0.68	4	3	2	0.025
51–60	31	3	4		13	15	10	
61–70	26	3	3		20	6	6	
>70	9	0	3		11	1	0	
Grade								
G1	2	0	0	0.24	2	0	0	0.77
G2	39	0	2		22	11	8	
G3	29	1	7		20	9	8	

patients and the histopathological types of tumors, we noticed that while CSCC and SCC mixed-type affected all age groups, SCC variants were only diagnosed between 50 and 70 years of age (Figure 3).

The majority of tumors were classified as grade G2, accounting for 41 cases (51.25%), or G3, with 37 cases (46.25%). Only 2.5% of cases were identified as well-differentiated, G1 grade. In the case of CSCC, all three grades of differentiation were observed, whereas G2 and G3 occurred for mixed-types, and SCC variants exclusively showed G3 grade (Table 1).

DISCUSSION

The incidence of head and neck cancer seems to be rising in recent decades, with potential changes in its etiology, possibly influenced by the decrease in smoking rates, especially in developed countries.[8]

In our study population, we found that over 95% of patients diagnosed with head and neck cancer were male. This finding is similar to those reported in the literature[9]; however, in our study, the male-to-female ratio was higher than usual, 21.75:1. That said, in western countries, the incidence gap between men and women has been narrowing over the past three decades.[10]

The risk of head and neck cancer increases with age across populations. Similarly, in our institution, the majority of patients were between the ages of 51 and 60, consistent with international data.[11]

We discovered that there was a meaningful link between patient sex and tumor localization, meaning that the locations of tumors differed significantly between men and women. Women are most likely to develop an extralaryngeal HNSCC.[12]

Globally, laryngeal cancer cases have risen by 23% in the last decade. However, in countries with higher socioeconomic levels, the rates of new cases have decreased owing to changes in smoking and alcohol consumption habits.[13] We found that as the patients were older at the time of diagnosis, it became increasingly likely that we find a tumor affecting the larynx, whereas in younger patients, the occurrence of HNSCC affecting extralaryngeal areas was more common.

We found a wide variety of histological types in the studied population, present across all age groups. However, SCC variants were only observed in individuals aged 50 to 70.

Grading a tumor is important because it provides critical information about its aggressiveness and potential behavior. It helps in predicting prognosis, guiding treatment, assessing recurrence risk, and standardizing communication for healthcare professionals. Lower-grade tumors typically grow slowly and are less likely to spread, whereas higher-grade tumors tend to grow rapidly and are more likely to spread. 97.5% of the tumors we analyzed were graded as G2 and G3, indicating a rather poor prognosis.[14]

CONCLUSIONS

Our findings underscore the importance of sex, age, and etiological factors in the development and management of HNSCC. In our geographical area, most HNSCC cases are of the classic histopathological type, are located in the larynx, and primarily affect men. However, SCC with extralaryngeal localization tends to develop predominantly in women and individuals under the age of 70.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

FUNDING

This research received no external funding.

REFERENCES

1. Marur S, Forastiere AA. Head and Neck Squamous Cell Carcinoma: Update on Epidemiology, Diagnosis, and Treatment. *Mayo Clin Proc*. 2016;91(3):386-396.
2. Siegel RL, Miller KD, Fuchs HE, Jemal A. Cancer statistics, 2021. *CA: A Cancer Journal for Clinicians*. 2021;71(1):7-33.
3. Stoyanov GS, Kitanova M, Dzhenkov DL, Ghenev P, Sapundzhiev N. Demographics of Head and Neck Cancer Patients: A Single Institution Experience. *Cureus*. 2017;9(7):e1418.
4. Johnson DE, Burtness B, Leemans CR, Wai Yan Lui V, Bauman JE, Grandis JR. Head and neck squamous cell carcinoma. *Nat Rev Dis Primers*. 2020;6(1):92.
5. Anniko M, Bernal-Sprekelsen M, Bonkowsky V, Bradley PJ, Iurato S. European Manual of Medicine, Otorhinolaryngology. Springer-Verlag Berlin Heidelberg; 2010, p. 639-651.
6. Pathak J, Swain N, Patel S, Poonja LS. Histopathological variants of oral squamous cell carcinoma-institutional case reports. *J Oral Maxillofac Pathol*. 2014;18(1):143-145.
7. Thompson LD. Squamous cell carcinoma variants of the head and neck. *Curr Diagn Pathol*. 2003;9:384-396.
8. Gormley M, Creaney G, Schache A, Ingarfield K, Conway DI. Reviewing the epidemiology of head and neck cancer: definitions, trends and risk factors. *Br Dent J*. 2022;233(9):780-786.
9. Miranda-Filho A, Bray F. Global patterns and trends in cancers of the lip, tongue and mouth. *Oral Oncol*. 2020;102:104551.
10. Nocini R, Molteni G, Mattiuzzi C, Lippi G. Updates on larynx cancer epidemiology. *Chin J Cancer Res*. 2020;32(1):18-25.
11. Warnakulasuriya S. Global epidemiology of oral and oropharyngeal cancer. *Oral Oncol*. 2009;45:309-316.
12. Oukessou Y, Chebaatha A, Berrada O, et al. Primary carcinoma of the larynx in females: A case series. *Ann Med Surg (Lond)*. 2022;78:103851.
13. Global Burden of Disease Cancer Collaboration. Global, Regional, and National Cancer Incidence, Mortality, Years of Life Lost, Years Lived With Disability, and Disability-Adjusted Life-years for 32 Cancer Groups, 1990 to 2015: A Systematic Analysis for the Global Burden of Disease Study. *JAMA Oncol*. 2017;3:524-548.
14. Wunschel M, Neumeier M, Utpatel K, et al. Staging more important than grading? Evaluation of malignancy grading, depth of invasion, and resection margins in oral squamous cell carcinoma. *Clin Oral Investig*. 2021;25(3):1169-1182.