ORIGINAL ARTICLE

Malignant tumors of the upper aerodigestive tract as seen in a Nigerian tertiary health institution

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Abstract

Background: Cancers of the upper aerodigestive tract constitute a diverse heterogeneous group of malignant neoplasms with unique epidemiological, pathological, and treatment considerations. Only few studies have been conducted so far on these tumors in Nigeria. This study aims to study in greater detail, the pathological features of these cancers in Nigerian patients.

Materials and Methods: The surgical specimens of patients diagnosed with malignant tumors of the upper aerodigestive tracts in the Department of Morbid Anatomy and Forensic Medicine, Obafemi Awolowo University Teaching Hospital Complex (OAUTHC) in Ile-Ife, Nigeria, over a 10-year period, formed the basis of this study. Analysis was done for differences in proportion using the Chi-square test (*P* is significant at < 0.05) by SPSS version 15.

Results: There were a total of 62 cases. The overall mean age was 50.7 years, while the age range was from 3 years to 90 years. The male to female ratio was 3.1:1. A majority of the patients (67.7%) were older than 40 years. About 30.6, 27.4, and 16.1% of cases occurred in the larynx, nasopharynx, and nasal cavity, respectively, while 93.5% of the tumors were carcinomas. Squamous cell carcinoma was the most common histological variety. Nonepithelial tumors were not seen below the age of 20 years.

Conclusion: This study shows that malignant upper aerodigestive tract tumors seen in our environment are mainly diseases of adulthood that tend to occur about seven to nine years earlier than in other populations. Squamous cell carcinoma is the predominant histological variety. Although the larynx is the most frequent anatomic site, the nasopharynx and nasal cavity are more commonly affected than the oral cavity unlike in other populations. Nonepithelial tumors are extremely rare below the age of 20 years.

Key words: Malignant tumors, Nigeria, upper aerodigestive tract

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Introduction

Cancers of the upper aerodigestive tract constitute a diverse heterogeneous group of malignant neoplasms that involve numerous head and neck sites.[1] These tumors present with unique sets of epidemiological, pathological, and treatment considerations and exhibit considerable variation in geographical distribution, both within and between countries.[2-5] Although relatively rare when compared individually with malignant tumors in other parts of the body, together they constitute the sixth most common group of malignant neoplasms and the eighth leading cause of cancer-related death worldwide.[5-7]

Overall, these tumors are known to demonstrate a male preponderance.[2,8] Although they are known to occur much earlier in blacks, they have been found to affect primarily older patients, between the ages of 50 and 80 years.[8,9]

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Although epidermoid carcinomas are known to constitute a great majority of these cancers at different anatomical sites, lymphomas and sarcomas are the most common in children.[9] Tobacco products and heavy alcohol consumption are well established major risk factors for the development of these tumors.[5,10,11] Other risk factors include human papilloma virus (HPV), poor diet, certain occupational exposures, low education and socioeconomic status, immunodeficiency, and poor oral hygiene among others.[7,12,13]

As previously noted, studies of malignant head and neck tumors in Nigeria are scanty.[6,14,15] This study, therefore, aims to consolidate on what is already established and study in greater detail the pathological features of cancers of the upper aerodigestive tract, especially in a resource-poor country like Nigeria.

Materials and Methods

This retrospective study was carried out at the Department of Morbid Anatomy and Forensic Medicine, Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), in Ile-Ife, Nigeria. The hospital has 576 beds and serves a population of over 1,333,603 with a slight female predominance (1991 census). All cases histologically diagnosed as malignant tumors of the upper aerodigestive tract in the department's surgical day books, between January 2000 and December 2009, were included in the study. The surgical biopsy reports and the original request cards of the patients were scrutinized. The hematoxylin and eosin stained sections of the identified cases were also retrieved and reviewed in order to reconfirm the diagnosis, and where necessary, revise such in the light of available clinical and histological details. Where the slides were faded or missing, the original archival tissue blocks were retrieved and new histological sections cut and stained with routine hematoxylin and eosin. Appropriate histochemical and immunohistochemical stains were used to confirm the diagnosis, where indicated. The tumors were classified according to the World Health Organization classification scheme. The tumors were then analyzed for age, sex, tumor location. and histopathological type. Tumor stage could not be assessed because of the prevailing technical difficulties.

For the purposes of this study, the upper aerodigestive tract included the oral cavity, oropharynx, nasopharynx, hypopharynx, larynx, paranasal sinuses, nasal cavity, middle ear, auditory tube, and mastoids. These sites were defined using the criteria adopted by the American Joint Committee on Cancer (AJCC) and the International Union against Cancer (IUCC) as outlined in the TNM staging manual.[16] The major salivary glands were excluded because cancers at these sites differed in their etiology, histology, and natural history.[1] Statistical analysis was performed for differences in proportion using the Chi-square test (*P* was significant at < 0.05) by SPSS version 17. The mean and standard deviation were also calculated where applicable. Ethical approval was obtained from the local Ethics and Research Committee of OAUTHC, Ile-Ife, Nigeria.

Results

A total of 62 cases of malignant tumors of the upper aerodigestive tract were seen during the period under review and all were included in this study, having fulfilled all necessary requirements. Thus, these tumors constituted about 2.1% of all 3011 malignant tumors diagnosed during this period and about 35.0% of all 177 tumors occurring in the head and neck region. The overall mean age at diagnosis was 50.7 years, while the age range was from three to 90 years. There were 46 males (75.8%) and 15 females (24.2%) with a male to female ratio of 3.1:1. All cases below the age of 40 years affected only males.

A majority of the patients (67.7%) were older than 40 years at diagnosis with only five cases (8.1%) younger than 20 years [Figure 1]. The highest frequency of cases was seen in the sixth decade of life with a total number of 17 cases (27.4%). There was a steady increase in the number of cases in each age group from the second decade up to the sixth decade of life followed by a gradual decrease thereafter. The least frequencies of cases were seen in the second and ninth decades of life with one case (1.6%) and three cases (4.8%) respectively. The overwhelming majority of malignant upper aerodigestive tract tumors occurred in the larynx, nasopharynx, and nasal cavity, with 19 cases (30.6%), 17 cases (27.4%), and 10 cases (16.1%), respectively [Table 1]. Only two cases (3.2%) each were seen in the hypopharynx and paranasal sinuses. Table 1 shows that the vast majority of the tumors were carcinomas and these accounted for 58 cases (93.5%). Squamous cell carcinomas formed the majority of these epithelial tumors with a total number of 40 cases (69.0%). About 19 (47.5%)

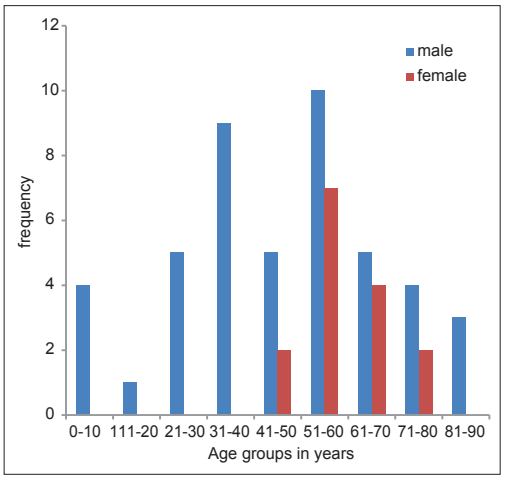

Figure 1: Age and sex distribution of malignant upper aerodigestive tract tumors

Table 1: Histological types and primary tissue site of malignant upper aerodigestive tract tumors

Tumor category	Histological type	Mean age	Primary site								Total (%)
			Larynx	Lips	Oral cavity	Nasal cavity	Naso-pharynx	Oro-pharynx	Paranasal sinuses	Hypo-pharynx	
Carcinoma	Squamous cell carcinoma	49.6	19	3	3	6	7	1	-	1	40 (64.5)
	Undifferentiated carcinoma	52.2	-	-	-	3	7	2	-	-	12 (19.4)
	Adenocarcinoma	57.7	-	-	-	1	-	-	2	-	3 (4.8)
	Adenoid cystic carcinoma	69.0	-	-	-	-	-	2	-	-	2 (3.2)
	Mucoepidermoid carcinoma	28.0	-	-	-	-	1	-	-	-	1 (1.6)
Sarcoma	Embryonal rhabdomyosarcoma	48.5	-	-	1	-	-	-	-	1	2 (3.2)
Lymphoma	Non-Hodgkin lymphoma	49.0	-	-	-	-	2	-	-	-	2 (3.2)
Total (%)			19 (30.6)	3 (4.8)	4 (6.5)	10 (16.1)	17 (27.4)	5 (8.1)	2 (3.2)	2 (3.2)	62 (100.0)

Table 2: Age distribution of the various histological types of malignant upper aerodigestive tumors

Age groups (years)	Squamous cell carcinoma	Undifferentiated carcinoma	Adenocarcinomas	Adenoid cystic carcinoma	Mucoepidermoid carcinoma	Embryonal rhabdomyosarcoma	Non-Hodgkin lymphoma	Total (%)
0-10	3	1	-	-	-	-	-	4 (6.5)
11-20	1	-	-	-	-	-	-	1 (1.6)
2-30	2	2	-	-	1	-	-	5 (8.1)
31-40	7	-	1	-	-	1	-	9 (14.5)
41-50	5	1	-	-	-	-	2	8 (12.9)
51-60	13	3	-	1	-	-	-	17 (27.4)
61-70	4	3	1	-	-	1	-	9 (14.5)
7--80	3	2	1	-	-	-	-	6 (9.7)
81-90	2	-	-	1	-	-	-	3 (4.8)
Total (%)	40 (64.5)	12 (19.4)	3 (4.8)	2 (3.2)	1 (1.6)	2 (3.2)	2 (3.2)	62 (100.0)

of these squamous cell carcinomas primarily developed from the larynx, while seven (17.5%) and six (15.0%) originated from the nasopharynx and nasal cavity, respectively. Other epithelial tumors included 12 cases (20.7%) of undifferentiated carcinomas, three cases (5.1%) of adenocarcinomas, two cases (3.4%) of adenoid cystic carcinoma, and one case (1.7%) of mucoepidermoid carcinoma. About seven (58.3%) cases of undifferentiated carcinomas were primarily located in the nasopharynx, while three (25.0%) and two (16.7%) cases were in the nasal cavity and oropharynx respectively. Two of the three adenocarcinomas were found in the paranasal sinuses, while the third case originated from the nasal cavity. The three salivary gland-type tumors (adenoid cystic carcinoma and mucoepidermoid carcinoma) were located in the oropharynx (66.7%) and nasopharynx (33.3%) respectively. There were only four (6.5%) nonepithelial tumors with two cases (3.2%) each of embryonal rhabdomyosarcoma and non-Hodgkin lymphoma. Table 2 shows the age distribution of the various histological types.

Discussion

This study, like various other studies both within and outside Nigeria, shows that malignant tumors of the upper aerodigestive tract occur more commonly in male patients. The male to female ratio of 3.1:1 found in this study is similar to what has been documented in various parts of the world.[6-8,17] According to this study, a male predominance was noted with all histological tumor types as well as in all anatomical locations. This male preponderance has been putatively attributed to various environmental factors including cigarette smoking, alcohol consumption, tobacco, and kola nut chewing, which are known to be more prevalent among males.[2-4,18] It is interesting to note that there were no females below the age of 40 years. Although the reason for this observation cannot be readily explained, it may not be unconnected with the role played by the aforementioned environmental factors in the pathogenesis of these tumors. Notwithstanding the fact that malignant upper aerodigestive tract tumors may occur at any age, they are well known to predominantly affect middle-aged to elderly individuals. In fact the peak age of occurrence of these tumors is between 50 and 80 years, while the mean age is typically between 57 and 59 years.[8] Interestingly, these tumors are also known to occur much earlier in blacks than in individuals of other populations, including Caucasian and Hispanic Whites as well as the Arabian and Oriental populations.[8] These facts are well corroborated by this study, which shows an age range of three to 90 years and a mean age of 50.7 years. This earlier occurrence may be attributed to different etiologies in different populations; differences in susceptibility,

pathogenesis, or coexisting illnesses that lead to a more rapid development of disease; or differences in environmental factors such as nutrition or early age of exposure to putative causative agents.[8,19] With regard to the various histological types, only mucoepidermoid carcinoma showed a mean age below 48 years. This may, however, be due to the fact that there was only one case of this tumor variety. In addition, our study also showed that slightly more than two-thirds of the cases were older than 40 years at diagnosis, with only 8.1% of cases younger than 20 years, while a little over half of the cases were between 50 and 80 years.

As has been well documented by previous studies, our study also shows that the vast majority of malignant tumors of the upper aerodigestive tract are carcinomas with non-epithelial tumors accounting for only a small percentage of cases.[2,7,9,20,21] Indeed, squamous cell carcinomas accounted not only for the majority of these epithelial tumors, but constituted the most frequent histological type overall. In addition to this, it was the major histological type at virtually all anatomical locations except the oropharynx and the paranasal sinuses. These observations may not be unconnected with the role played by the putative etiological agents in the pathogenesis of these tumors.[5,10,11] This study also showed a significantly high frequency of undifferentiated carcinomas and these were predominantly located in the nasopharynx, oropharynx, and nasal cavity. This was similar to what was observed in studies done in Korea, which showed a relatively more important role played by undifferentiated carcinomas in Koreans as opposed to Western countries.[21] With regard to the tumor location, our study showed that the most common anatomical sites were the larynx, nasopharynx, and nasal cavity. Together, these three sites represented about 74.2% of all primary anatomical sites. Although the vast majority of previous reports have also documented the larynx as the most common anatomical location, our study showed that the nasopharynx and nasal cavity were more commonly involved by these malignant tumors than in the Western and Asian countries where the oral cavity appeared to play a more significant role.[8,10,21] Interestingly, a report from Lagos and Northern Nigeria showed that the nasopharynx was the mpst common tumor location encountered.[3,22] This was not surprising as these tumors were known to show great diversity both within and between countries.[2-5]

In sharp contrast to the widely held views, our study did not record any cases of sarcomas or lymphomas in children.[23,24] This may be due to the fact that our study only included tumors of the upper aerodigestive tract, while excluding other head and neck sites. Indeed there were only five cases in individuals younger than 20 years old. These included four cases of squamous cell carcinoma, three of which occurred within the first decade of life, and one case of undifferentiated carcinoma, which was also seen within the first decade of life. The two cases of embryonal rhabdomyosarcoma were seen in the fourth and seventh decades of life while the two cases of non-Hodgkin lymphoma were seen in the fifth decade. The reasons for this observation cannot, however, be readily explained.

Conclusion

In summary, our study shows that malignant upper aerodigestive tract tumors seen in our environment are mainly diseases of adulthood that tend to occur on an average about seven to nine years earlier than in other populations, with squamous cell carcinoma being the predominant histological variety. The tumors more commonly involve the larynx, nasopharynx, and nasal cavity with a low frequency of oral cavity involvement. In our series, sarcomas and non-Hodgkin lymphoma, although generally less common than other tumor types, have been extremely rare below the age of 20 years.

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