



Full Length Research Paper

Histopathological review of head and neck squamous cell carcinoma at a tertiary hospital in Sub-Saharan Africa.

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ABSTRACT

Background: Head and neck squamous cell carcinoma (HNSCC) is recognized as a significant cause of morbidity in sub-Saharan Africa. This study retrospectively reviewed the socio-demographic characteristics and clinical information of HNSCC cases providing insights into the patterns of the disease within the geographical region.

Methods: Information on tumor site, extent of differentiation, age and gender of HNSCC patients were retrieved consecutively from the surgical day book of the Pathology department. Additionally previous haematoxylin and eosin-stained tissue slides were reviewed to confirm the diagnosis and tumor grading.

Results: A total of 301 HNSCC cases were extracted from the surgical day book with male preponderance of 72.1% and a mean age of 54.97 years. The most common site of occurrence was the oral cavity (28.9%), followed by larynx (26.2%). Majority of the cases were high grade tumors with most of the cases involving patients aged <30 years being poorly differentiated (65.7%).

Conclusion: Majority of the reported cases of HNSCC were seen in males and were of moderate to poor differentiation portending worse prognosis and requiring more aggressive treatment. The pattern of HNSCC was similar to earlier reported studies recording a higher prevalence in oral cavity followed by larynx.

Keywords: Squamous cell carcinoma, HNSCC, Morbidity, Histopathology, sub-Saharan Africa

INTRODUCTION

Tumors of the head and neck ascribe to a broad range of malignancies that arise from the upper aerodigestive tract. This includes tumors of the oral cavity, paranasal sinuses, larynx, nasal cavity and pharynx (Pai SI, 2009). Majority of head and neck cancers (HNCs) originate from squamous cell and thus they are usually termed as head and neck squamous cell carcinoma (HNSCC) (da Silva Reis AA, 2012). The leading predisposing factors for developing this type of tumor are alcohol and tobacco, together accounting for over 72% of HNCs (Hashibe M, 2009; Pezzuto F, 2015). Human papillomavirus and Epstein-Barr virus have also been implicated in subsets of HNCs, particularly oropharyngeal carcinomas and nasopharyngeal carcinomas respectively (Niedobitek G, 1991; Kreimer

AR, 2005). HNSCC is recognized as a significant cause of morbidity due to interference with vital functions of life such as swallowing, vision, breathing, sense of taste, sense of smell and the sense of hearing (Pai SI, 2009; Fitzmaurice C, 2017).

Head and neck cancers contribute to over 380,000 deaths and more than 550,000 new cases yearly according to global statistics (Fitzmaurice C, 2017). Oral cancer is the most common form of HNC, followed by laryngeal cancer, and together account for over 350,000 new cases each year globally (Ferlay J, 2010). According to the report by Global Cancer Statistics, GLOBOCAN 2018 (Global Cancer Observatory, 2018) the number of new cases of cancers of the oral cavity, larynx, and oropharynx in Africa was 13613, 10058, and 2514 respectively. Also the numbers of these

cancers in Ghana were 244, 188 and 93 for cancers of the oral cavity, larynx and oropharynx respectively. An earlier review of HNSCC by Fagons CE et al. (Faggons CE, 2015) in sub Saharan Africa confirmed the trend reported and also revealed that majority of the HNSCC patients in the sub-Saharan African region did not use alcohol or tobacco. Overall HNCs seem to affect black Africans at a younger age than in Caucasians (Jemal A, 2006). Males are also found to be the major victims of HNCs with studies reporting a male to female ratio ranging from 2:1 to 4:1 (Faggons CE, 2015; Jemal A, 2006; Bray F, 2013).

The pattern of occurrence of HNCs varies from one geographical area to another and between races, but etiological factors determining individual susceptibility to HNCs are still not fully known (Nwawolo CC, 2001). Diverse histological types of tumors are found in the head and neck region with more than 90% originating from the epithelial cells, of which squamous cell carcinoma constitutes the greatest majority (Adeyemi BF, 2008; Ologe FE, 2005). Other histological types include blastomas, lymphomas, and sarcomas (Ologe FE, 2005). The management of HNCs present a significant challenge to health practitioners mostly due to the varied nature of histological patterns including the natural history, sites of origin and varied treatment modalities involving radiotherapy, chemotherapy and surgery (Nwawolo CC, 2001; Tobias JS, 1994; Licitra L, 2009). Thus, the present study retrospectively reviewed HNSCC cases in a tertiary hospital in sub-Saharan Africa, providing insights into the socio-demographic and tumor characteristics (including tumor differentiation, site of tumor and size of cells at the tumor site) within the sub-Saharan African region.

MATERIALS AND METHODS

Study design and setting

This was a retrospective cross-sectional study of head and neck squamous cell carcinoma cases at the Pathology Department of Komfo Anokye Teaching Hospital (KATH). KATH is the second largest referral Hospital in Ghana providing health services to other five regions in the country. The review covered a period of 10 years (from January 2007 to December 2016).

Participants

Patients who were 10 years and above and who were histopathologically diagnosed with HNSCC within the specified duration were included in the study. Patients were essentially excluded from the study when no consensus was found in diagnosis after a review of the slides of the selected cases by two Pathologists. Ethical approval for the study was obtained from the Committee on Human Research, Publication and Ethics of the study site.

Data collection and tissue specimen selection

Data regarding age, sex, tumor site and histological diagnosis on HNSCCs were extracted from the surgical day book of the Department of Pathology of KATH. In consecutive order (from 2007-2016) all tissue blocks and slides of selected HNSCC cases were retrieved from the archives of the Department. The slides were then reviewed independently by two Pathologists to confirm diagnosis. In case of sub-optimal information the cut section of a tissue block was stained with haematoxylin and eosin and assessed again by the Pathologists. The tumors were then graded based on the recommended guidelines of the American Joint Commission on Cancer as Well-differentiated (GI), Moderately-differentiated (GII), Poorly-differentiated (GIII) and undetermined (GX) (Lydiatt WM, 2017).

Analysis of data

Data was entered into a Microsoft Excel (2016) sheet. Data were cleaned, edited and exported into IBM SPSS version 22 for analysis. Quantitative variables were summarized by means, standard deviations and medians while percentages and proportions were used to summarize qualitative variables.

RESULTS

Within the period of January 2007 to December 2016 a total of 301 head and neck squamous cell carcinoma (HNSCC) cases were recorded in the surgical day book of the Pathology Department of Komfo Anokye Teaching Hospital (KATH). The number of males were 217 (72.1%) with females accounting for 27.9% (n=84). The mean age of the patients was 54.97 ± 18.10 (median age, 57 years) with age range of the patients between 11 years and 96 years and majority of the patients were in the age range of 50-59 years representing 25.6% (n=77). The distribution is shown in (Table 1).

Table 1. Age and Gender of Head and Neck Cancer Patients.

Description	Age range	Frequency (%)
Age (years)	10-19	17 (5.6)
	20-29	18 (6.0)
	30-39	17 (5.6)
	40-49	44 (14.6)
	50-59	77 (25.6)
	60-69	53 (17.6)
	≥70	75 (24.9)
Gender	Male	217 (72.1)

	Female	84 (27.9)
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(Figure 1) shows the yearly distribution of HNSCCs within the period of the study (January 2007-December 2016). The highest number of cases were recorded in 2010 and 2014 (n=53, 17.6%). The least number of cases reported in 2007 (n=3, 1%).

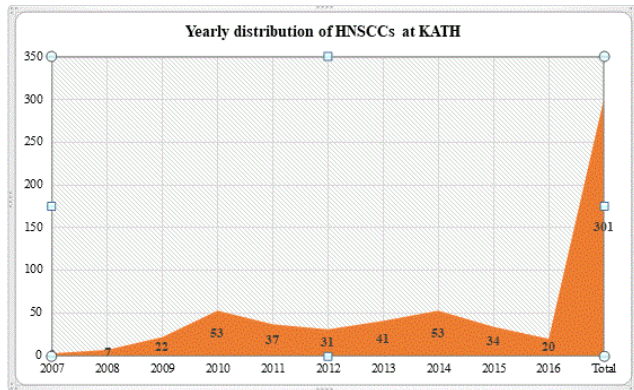


Figure 1. Yearly distribution of Head and Neck Squamous Cell Carcinomas at KATH.

Table 2. Tumor Characteristics.

Characteristics	Distribution	Frequency (%)
Tumor site	Oral cavity	87 (28.9)
	Oropharynx	26 (8.6)
	Hypopharynx	2 (0.7)
	Larynx	79 (26.2)
	Nasopharynx	10 (3.3)
	Nasal cavity and Paranasal sinuses	53 (17.6)
	Salivary gland	6 (2.0)
	Undetermined*	38 (12.6)
Tumor differentiation	Well-differentiated (Grade I)	70 (23.4)
	Moderately-differentiated (Grade II)	142 (47.2)
	Poorly-differentiated (Grade III)	89 (29.6)
Size of cells at tumor site	Small size	111 (36.9)
	Large size	190 (63.1)
Undetermined*- written as head and neck without specification		

The most common site of occurrence was the oral cavity (n=87, 28.9%), followed by larynx (n=79, 26.2%) and the least being hypopharynx (n=2, 0.7%). Most of the tumors were Moderately-differentiated (n=142, 47.2%) followed by Poorly-differentiated (n=89, 29.6%). Majority of the cells at the tumor sites were large cells (n=190, 63.1%). All grade I tumors were large cells while grade II and grade III had variable cells. Images of

The tumor sites were classified according to guidelines of American Academy of Otolaryngology-Head and Neck Surgery Foundation (Deschler DG, 2014). The tumors were then graded according to the American Joint Commission on Cancer (Lydiatt WM, 2017) with a report on the size of cells at the tumor sites. The distribution is shown in (Table 2).

Well-differentiated, Moderately-differentiated and Poorly-differentiated cases are shown in (Figures 2, 3 and 4) respectively.

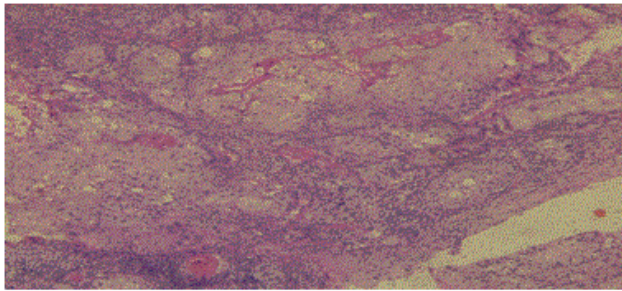


Figure 2. Photomicrograph of H&E slide showing sheets and cords of malignant squamous cells with large pleomorphic and hyperchromatic nuclei having moderate cytoplasm and producing keratin pearls consistent with well differentiated squamous cell carcinoma (Grade I).

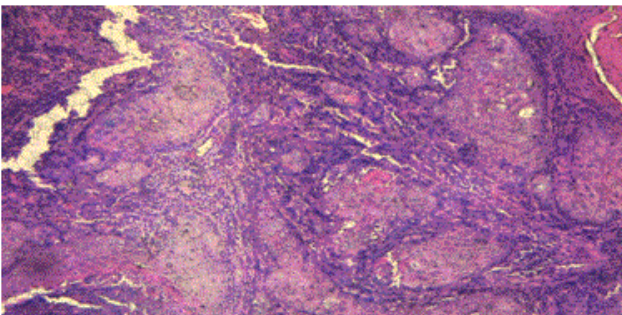


Figure 3. Photomicrograph of H&E slide showing sheets and cords of malignant squamous cells with large pleomorphic and hyperchromatic nuclei having moderate cytoplasm and producing focal keratin materials consistent with moderately differentiated squamous cell carcinoma (Grade II).

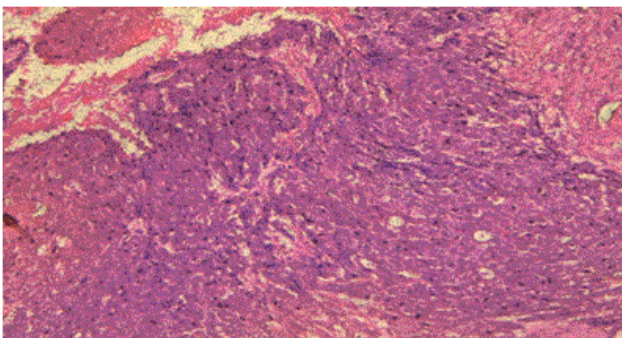


Figure 4. Photomicrograph of H&E slide showing sheets of malignant squamous cells having pleomorphic and hyperchromatic nuclei and scanty cytoplasm without keratin production consistent with poorly differentiated squamous cell carcinoma (Grade III).

Further classification of the tissues according to size of cells at the tumor site revealed that all the Well-differentiated samples were large cells (n=70, 100%), while the Moderately-differentiated and Poorly-

differentiated samples had variable cell sizes as shown in (Figure 5).

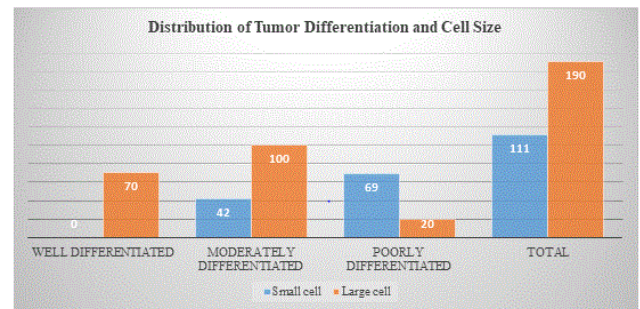


Figure 5. Distribution of Tumor Differentiation and Cell Size at tumor site.

DISCUSSION

This was a retrospective study of HNSCC cases over a ten-year period at the Pathology Department of Komfo Anokye Teaching Hospital (KATH), Ghana. The number of cases (n=301) reviewed in the current study was higher than that reported in a 6-year review of HNCs at the same study site which recorded 125 cases of HNSCC with documentary evidence (Larsen-Reindorf R, 2014). The highest number of cases in this study was recorded in 2010 and 2014, and the least number of cases were reported in 2008 and 2007, probably due to lack of proper documentation in the early years of the study. The mean age of the patients in this study was 54.97 years, similar to that recorded by Kaba G et al. (Kaba G, 2014) (mean age of 57.02 years) but higher than that reported by Larsen-Reindorf R et al. (Larsen-Reindorf R, 2014) (mean age of 48 years) and Asante DB et al. (Asante DB, 2017) (mean age of 36.33) within the same geographical region. This indicates that the condition is seen more in the older generation in recent years at our study setting. The study also recorded peak incidence at the 6th decade of life (50-59 years; n=77, 25.6%). This is consistent with the observation by da Lilly-Tariah OB et al (da Lilly-Tariah OB, 2009) that the peak incidence of HNC patients is between the 3rd and 6th decade of life. Again, the study showed a male preponderance with a male to female ratio of 2.58:1. The observation is consistent with a lot of studies in HNSCC (Faggons CE, 2015; Jemal A, 2006; Bray F, 2013; Gillison ML, 2000). This was no surprise as males are found to be the major victims of the leading predisposing factors of HNC (tobacco and alcohol).

The most common site of HNSCC occurrence was the oral cavity followed by larynx with a prevalence of 28.9% and 26.2% respectively. This was in line with the report on Cancer Incidence and Mortality worldwide (Ferlay JI, 2015). Various studies in HNSCC have also reported similar findings (Glenny AM, 2010; Byakodi R, 2012). The most common sites of occurrence in males

were the larynx and nasal cavity while paranasal sinuses were the most common sites in females. Majority of the cases reported were of Moderate-differentiation (Grade II), followed by Poor-differentiation (Grade III), together accounting for about three-quarter of the cases (76.8%). This shows that majority of the HNSCC cases were high-grade tumors at diagnosis and thus have the tendency to grow and spread more rapidly portending worse prognosis (Ozyigit G, 2010). This observation may be attributed to paucity of infrastructure, trained manpower and funds in a low resource setting like Ghana. Thus there is a need to establish screening services for commonly diagnosed cancers that will be accessible to majority of the population as the first line of combating the rise in these cancer cases. Also, majority of the samples of patients who were <30 years were Poorly-differentiated (n=23, 65.7%), portending worse prognosis and requiring more aggressive treatment in these younger subjects. Further evaluation showed majority of our cases were large cells (Grade I and II) while the small cells were found in Poorly-differentiated cases. This validate the histological diagnosis as small cell carcinomas compared to large cell carcinomas have higher growth fraction, shorter doubling time and earlier development of metastasis, characteristic of high-grade tumors as reported in this study (Renner G, 2007).

CONCLUSION

Head and neck squamous cell carcinoma is recognized as a significant cause of morbidity in our study population. Majority of the reported cases of HNSCC were seen in males and were of moderate to poor differentiation, portending worse prognosis and requiring more aggressive treatment. The pattern of HNSCC was similar to earlier reported studies with a higher prevalence in the oral cavity followed by the larynx.

DECLARATION/ACKNOWLEDGEMENT

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