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Pattern of malignant head and neck tumors among children in a Nigerian Teaching Hospital

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Abstract: *Background:* The pattern of head and neck cancer in children are well documented among Caucasians and the Orientals but this cannot be said among African children especially in developing country like Nigeria.

Aim: To evaluate the pattern of malignant head and neck tumours among children in a Nigerian Teaching Hospital.

Method: A retrospective study of cases of head and neck childhood malignancies at the University of Benin Teaching Hospital, Benin-City, Nigeria over a 12-year period, from January 2009 to December 2020.

Results: A total of 127 children with head and neck malignant tumours were seen in this period. The mean age of children was 5.27 ± 4.72 years (age range, 0.3 to 18 years). There were 83(65.4%)

males and 44(34.6%) females. The most frequently seen tumour was retinoblastoma (44.1%) and this was followed by rhabdomyosarcoma (18.1%) and Burkitt's lymphoma (16.5%). Apart from Burkitt's lymphoma that was commonest in the 6-12 years group, all other cancers were most frequent during the 0-5 years. The peak incidence of cases was seen in 2015 followed by 2016 and 2019. Regarding the outcome of the treatment, 8(6.3%) of the patients died of their disease while just only 1 (0.8%) was discharged against medical advice

Conclusion: Retinoblastoma followed by rhabdomyosarcoma and Burkitt's lymphoma were the most common tumors in study locality.

Keywords: Malignant, head, neck, children, tumors

Introduction

Worldwide, cancer is one of the leading causes of morbidity and death.¹ It is estimated that by 2020, the number of new cases of cancer will increase to more than 15 million, with deaths increasing to 12 million, and the burden of incidence, morbidity and death will be greater in developing countries.²

Because of the complex anatomy and development of the head and neck, neoplasms during infancy and childhood arising at this site pose diagnostic and management challenges in clinical practice.^{3,4} It is important to emphasize that tumors of the head and neck in children show considerable differences in their behavior, histology and management from those of the adults.^{5,6} It is also notable that they are not as rare as many clinicians assume.⁷ They represent 5-10 % of all childhood solid tumors and 2-3% of all head and neck tumours⁴.

Cancers are relatively rare in children unlike in the older age groups; nonetheless cancers have become a major cause of paediatric deaths worldwide even in developed countries. Children constitute a significant proportion of the population in many developing countries, accounting for up to a third of the population in some instances. In

Nigeria, children constitute more than half of the population, 52.4%, hence emphasizing the need to focus appropriately on this segment of the society.

It is reported that the incidence of malignant tumors is higher during the first five years of life than it is during the subsequent ten years.^{8,9} This probably reflects the embryonic nature of certain tumors encountered during this time. Such embryonic neoplasms tend to mimic structures normally present during organogenesis.¹⁰ They may be present at birth or arise postnatally from such immature cells. It is these group of neoplasms that characterize the greatest differences between tumors in childhood and in adults.¹¹ Most malignant tumors of the head and neck in infancy and childhood manifest themselves by the presence of a solid mass, which may attain a large size quite rapidly.¹² It is therefore sensible to regard all such masses in an infant or child as malignant until proven otherwise.

There is a need to document data on childhood cancer in each country. Documentation is essential for planning medical/treatment services, resource allocation and policy formulation. Studies on the profile of head and neck childhood malignancies are well documented among the Caucasians and Orientals.¹³⁻¹⁷ However, few studies are

reported in sub-Saharan Africa.^{18,19,20} Hence, this present study evaluated the pattern of malignant head and neck tumors among children in the south-south geopolitical region of Nigeria.

Patients and method

This was a retrospective study of all head and neck childhood malignancy seen in the paediatric ward at the University of Benin Teaching Hospital, Benin-City, Nigeria. Cases of malignant tumors diagnosed from January 2009 to December 2020, were included in the study. Being a retrospective, with negligible risk, we sought for an exemption from ethical approval from the Institution’s Ethical and Research Committee. Data was collected from the case notes and clinic registers of patients. The data obtained were age of children at presentation, gender, histological diagnosis, year of diagnosis, treatment given, history of discharge against medical advice (DAMA) and outcome of treatment. In descriptive statistics, continuous data were summarized as range, means and standard deviations while categorical data were summarized as frequency and percentages. Data were presented as tables or charts where necessary. All data were analyzed using Statistical Package for Social Sciences version 20.0 (IBM corp., Armonk, NY, USA).

Results

A total of 127 patients with head and neck childhood malignant tumors were seen in this 12-year period given a hospital-based incidence of head and neck cancers of 13 cases per year. The mean age was 5.27±4.72 years (age range, 0.3 to 18 years). The distribution of head and neck childhood malignancy by gender is shown in Table 1. There were 83(65.4%) males and 44(34.6%) females. The pattern of head and neck childhood malignancy and age-group of the children is presented in Table 2. More than half of the patients were less than 5 years. The most frequently seen malignancy was retinoblastoma (44.1%) and this was followed by rhabdomyosarcoma (18.1%) and Burkitt’s lymphoma (16.5%). The distribution of head and neck malignancies by age-group is shown in Table 3.

Apart from Burkitt’s lymphoma that was commonest in the 6-12 years group, all other cancers were most frequent during the 0-5 years. The trends in years of occurrence are shown in Figure 1. The peak incidence of cases was seen in 2015 followed by 2016 and 2019.

All the children with retinoblastoma had chemotherapy with orbital enucleation. Burkitt’s lymphoma patients had solely chemotherapy while rhabdomyosarcoma and other malignancies had chemotherapy with or without radiotherapy. Regarding outcome, 8(6.3%) of the patients died of their disease while just only 1 (0.8%) was

discharged against medical advice.

Table 1: The distribution of head and neck childhood malignancies by gender (n=127)

Diagnosis	Males	Females	Total(%)
Burkitt’s lymphoma	17(13.4)	4(3.1)	21(16.5)
Non-Hodgkin’s lymphoma	5(3.9)	4(3.2)	9(7.1)
Hodgkin’s lymphoma	8(6.3)	0(0.0)	8(6.3)
Rhabdomyosarcoma	15(11.8)	8(6.3)	23(18.1)
Retinoblastoma	30(23.6)	26(20.5)	56(44.1)
Langerhan’s histiocytosis	1(0.8)	0(0.0)	1(0.8)
Nasopharyngeal carcinoma	3(2.4)	0(0.0)	3(2.4)
Neuroblastoma	5(3.9)	1(0.8)	6(4.7)
Total	83(65.4)	44(34.6)	127(100.0)

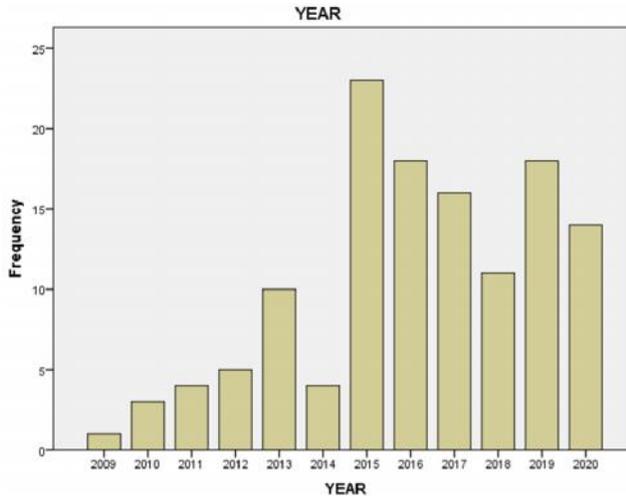
Table2: The age groups and histological diagnosis of head and neck childhood malignant tumors (n=127)

Variable	Category	Frequency (n)	Percentage (%)
Age groups	0-5	88	69.3
	6-12	25	19.7
	13-18	14	11.0
Diagnosis	Burkitt’s lymphoma	21	16.5
	Non-Hodgkin’s lymphoma	9	7.1
	Hodgkin’s lymphoma	8	6.3
	Rhabdomyosarcoma	23	18.1
	Retinoblastoma	56	44.1
	Langerhan’s histiocytosis	1	0.8
	Nasopharyngeal carcinoma	3	2.4
Neuroblastoma	6	4.7	

Table 3: The distribution of head and neck childhood malignancies by age (n=127)

Diagnosis	0-5years	6-12 years	13-18 years	Total(%)
Burkitt’s lymphoma (%)	9(7.1)	10(7.9)	2(1.6)	21(16.5)
Non-Hodgkin’s lymphoma(%)	2(1.6)	2(1.6)	5(3.9)	9(7.1)
Hodgkin’s lymphoma(%)	3(2.4)	5(3.9)	0(0.00)	8(6.3)
Rhabdomyosarcoma(%)	13(10.2)	4(3.1)	6(4.7)	23(18.1)
Retinoblastoma(%)	55(43.3)	1(0.8)	0(0.00)	56(44.1)
Langerhan’s histiocytosis(%)	0(0.00)	1(0.80)	0(0.0)	1(0.80)
Nasopharyngeal carcinoma(%)	2(1.6)	0(0.00)	1(.08)	3(2.4)
Neuroblastoma(%)	5(3.9)	1(0.8)	0(0.00)	6(4.7)
Total	88(70.1)	25 (18.9)	14 (11.0)	127(100.0)

Fig 1: The trends in years of occurrence of head and neck childhood malignant tumors



Discussion

With rising incidence of head and neck childhood malignancy in resource-poor countries, measuring the baseline occurrence of such tumors is imperative to provide much needed allocation of scarce resources.

Incidence of head and neck tumors is relatively rare in children compared to adults, but it is on the rise.²¹⁻²³ In the United States, approximately 1 in 333 individuals between the ages of 0 and 20 years will be newly diagnosed with cancer each year, affecting a total of nearly 7,500 children under the age of 15 years and another 3,500 adolescents between 15 and 20 years of age. Five percent of all childhood cancers are head and neck malignancies, thereby affecting approximately 550 children every year.²¹⁻²⁴ The overall annual incidence of cancer in children under 15 years of age rose from 11.22 cases/100,000 person-years in the time period of 1973–1975, to 14.03 cases/100,000 person-years in 1994–1996 - an increase of 25%; an even larger increase in the incidence of pediatric head and neck malignancies.²⁴ In this subset, the incidence rate increased from 1.10 to 1.49 cases/100,000 person-years in the same time frame, an increase of 35%.²⁴

Studies of head and neck malignancies among the adult patients are well reported globally²⁵⁻²⁷. Most of the studies reported squamous cell carcinoma as the most frequent of all the malignancies. Review of studies is available in the world literature about childhood malignancies.²⁸⁻³⁰ The most reported sites were head and neck followed by the abdomen.²⁹ The most frequently reported tumours were Burkitt's lymphomas.²⁸ Albright et al¹⁵ reported that the incidence of head and neck malignancy among children younger than 15 years in the United States from 1973 through 1996 increased at a greater rate than childhood cancer in general¹⁵. Similarly in our study, greater number of children less than 5 years was more affected compared to the older ones. The hospital based incidence of head and neck cancer of

13 cases per year seen in this study is lower than those reported in previous studies in Nigeria^{18,19}. The duration of study, cultural and life style differences could be the reasons for the difference in incidence seen in this study and in previous studies carried out in the western region of Nigeria^{18,19}. In the present study, there was a clear male predilection for head and neck childhood cancers. This is seen in all ages and for all type of lesion considered. Similar findings were reported by previous studies^{13,14,16-19} however, some reports from the United States suggest girls were more affected than boys.¹⁵ The possible reason for this male preponderance is unknown.

Retinoblastoma and rhabdomyosarcoma are the leading causes of head and neck childhood malignant neoplasm seen in our study. Same findings were reported by previous studies.^{15,19} The prevalence of retinoblastoma was fairly consistent throughout the study period. Retinoblastomas have a high genetic undertone and thus tend to develop earlier in those with the genetic aberration. This may account for the high prevalence found in this study. Rhabdomyosarcoma is a common neoplasm in the pediatric age group; it is the commonest form of soft tissue sarcoma in children. It was listed among the top five common cancers in children from previous reports.^{7,18,19,22} Like in previous studies¹³⁻¹⁷, majority of rhabdomyosarcoma in children in this study are seen in those less than 5 years unlike what was documented by Adeyemo et al¹⁹ who reported higher frequency among children aged 6-18 years. The reason for the high incidence in those less than five years could be due to the fact that rhabdomyosarcoma is an embryonal tumor which tends to occur more in children under the age of five years.

In Africa, the association of cancers with infectious diseases has been noted to be responsible for the high incidence of non-Hodgkin's lymphomas (NHL); particularly Burkitt's lymphoma.³¹ Burkitt's lymphoma is a B-cell NHL which has been associated with *Epstein Barr* virus and *falciparum* infection.³² It has been reported to account for nearly 90% of paediatric lymphomas and half of all paediatric cancer cases in these high risk area.³³ In the current study, Burkitt's lymphoma was the third commonest tumor contrary to what has been documented that Burkitt's lymphoma is the commonest malignant tumor in children in Africa. The fact that Burkitt's lymphoma is not as common in this study as previously reported may signify a changing pattern of malignancies in the sub-region. It may also be due to the fact that this study focused on head and neck malignancies and not on overall malignancies in children. Also, for head and neck tumors, only jaw Burkitt's lymphoma would be captured, thus, this may account to the low prevalence reported.

Limitation of this study was the lack of documentation on the exact site of the lesion making it impossible to assess the distribution of head and neck childhood malignancy according to the site of lesion

Conclusion

Of the head and neck childhood malignancies, retinoblastoma followed by rhabdomyosarcoma and Burkitt's lymphoma are the most common tumors in the southern geographic area of Nigeria.

Recommendation

Awareness of a potential malignancy and careful follow-up of children with suspicious head and neck cancers is mandatory so that more and more head and neck cancers

in children are brought to treatment before it is too late. In resource limited settings where diagnoses depend majorly on clinical acumen, an awareness of predictors of a disease can shorten the time spent on arriving at a working diagnosis and guide the immediate choice of investigations and treatment.

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