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A RETROSPECTIVE STUDY OF OCULAR NEOPLASMS IN BENIN CITY, NIGERIA

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ABSTRACT

Ocular neoplasm is one of the least investigated ocular disorders in Nigeria. Although relatively rare, they play a role in causing blindness and even death in adults and children. In this study, the records of all patients/seen at the eye clinic and specimen received at the histopathology department of the University of Benin, Benin City, with ocular neoplasm between January 1998 and October 2002 were analyzed. Sixty-one ocular neoplasms grouped into fifteen different types were seen. Of these, 54.8% were in adults, 15 years and above while 45.2% were in children. Retinoblastoma was the most frequently occurring neoplasm i.e. 32.79% of the total population. It is also the most frequently occurring tumor in the pediatric group, while inflammatory tumors were the most in adults. On the whole 26 (42.62%) were malignant while only 35 (57.37%) were benign. Statistical analysis showed that there was no significant difference in the manifestation of ocular neoplasms in relation to age and sex.

The frequency of retinoblastoma was higher than previously reported while the frequency of choroidal malanoma was less than that seen in Literature. This may necessitate the need for further studies on retinoblastomas in Nigeria.

KEYWORDS: Ocular Neoplasms, Malignant tumors, age, sex.

INTRODUCTION

Ocular neoplasm has been described as an abnormal mass of ocular tissue, the growth of which is excessive, uncoordinated with that of the surrounding tissue, and persists after the cessation of the stimuli which evoked the change Willis (1952). This abnormal mass is purposeless and preys on the host, in the sense that it depends on the normal cells and tissues for nutrition and vascular supply. Ocular neoplasms can be found in the eyelids, conjunctiva, uveal tract (iris, ciliary body and choroids), retina and optic nerve, but rarely on the cornea. Vaghan and Asbury (1980). These neoplasms may be benign or malignant, while the benign have well differentiated cells, typical of tissue of origin and slow in growth, they are rarely fatal except they lie next to vital structures or produce excess hormones.

The malignant ones lack differentiation and are atypical of tissue of origin. They are locally invasive, infiltrating surrounding normal tissues and usually characterized by metastasis. Most ocular neoplasms are benign. Retinoblastoma has been shown to be the most common malignant intraocular neoplasm in childhood, Cotran *et al* (1999) while choroidal melanoma has been reported as the most common intraocular neoplasm in adults, Hunter (1997), Cotran *et al* (1999).

There are two basic causes of neoplasm: (a) inherited mutations and (b) acquired (environmental) causes. In inherited mutations, we have genes affecting DNA repairs and genes affecting cell growth apoptosis. Oncogenes or cancer causing genes are derived from prontooncogenes. These prontooncogenes encode proteins that promote cell growth and may become oncogenic by retroviral transducton or influences that alter their behaviour *in situ*. Weinberg (1996), Hunter (1997). The loss of these prontooncogenes is a key factor in human neoplasm.

Evidence of acquired neoplasm was first suggested in 1775 when Sir Percival Pott related the increase incidence of skin neoplasm including neoplasms of the eyelid in chimneysweepers to chronic exposure to soot. Tenant (1997) Since then, hundreds of chemicals have been shown to initiate or promote carcinogenesis in cells and animals. Tenant (1997). Initiation results from exposure of cells to appropriate dose of a carcinogenic agent, resulting in the cell being somewhat altered, i.e. D.N.A damage, rendering it likely to give rise to a neoplasm. Initiation alone does not cause neoplasm, but promoters are required to induce tumours in initiated cells. They are non-tumorigenic in themselves.

Knudson, reported by Contran *et al* (1999) proposed a two hit hypothesis for oncogenesis, to explain familiar and sporadic occurrence of an

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apparently identical tumour. He suggested that in hereditary cases, one genetic change (first hit), is inherited from an affected parent, and is therefore present in all somatic cells whereas, the second mutation (second hit), occurs in one of the many cells (which already carry the first mutation). In sporadic case, both mutations (hits), occur somatically within a single cell.

METHODOLOGY

This was a retrospective study involving analysis of the histology reports, at the pathology department of the University of Benin Teaching Hospital, Benin City. This hospital serves as a referral center for histology to hospitals in Benin City and its environs. The ledgers of all patients/specimens received between January 1988 and October 2000, were examined. The information obtained includes: age of patient, sex, and whether they were malignant or benign.

RESULTS

In all, 8,755 cases of neoplasm were obtained from the ledgers, only sixty-one (61) of which were cases of ocular neoplasm. The ocular neoplasm group was made up of 35 males and 26 females. 15 different types of neoplasm were identified in all as shown in Fig 1. retinoblastoma ranked highest in the study population, representing 32.79%, followed by papilloma 21.31%, then inflammatory tumours 18.03%, squamous cell carcinoma had a frequency of 6.56%, choristoma 4.19%, while all other tumors occurred only once, representing 1.64% each. The neoplasms were also classified according to age. All those between he ages of

Table 1 DISTRIBUTION OF OCULAR NEOPLASM ACCORDING TO AGE

	TYPES OF NEOPLASM	PEDIATRIC AGE GROUP	ADOLESCENCE – ADULT AGE GROUP 16 YEARS AND ABOVE
1	Retinoblastoma	14	6
2	Papilloma	6	7
3	Inflammatory tumors	2	9
4	Squamous cell carcinoma	0	4
5	Choristoma	2	1
6	Haemgioma	0	1
7	Uveal tract melanosis	1	0
8	Harmatoma	1	0
9	Conjuctival melanoma	0	1
10	Haematoma	0	1
11	Granuloma	1	0
12	Fibroma	0	1
13	Angio sacrcoma	1	0
14	Choriod malignant melanoma	0	1
15	Conjuctiva Nevus	0	1
	Total	28	33

TABLE 2: FREQUENCY OF MALIGNANT TUMORS

Types of Neoplasm	No of Cases	Percentage (%)
Retinoblastoma	20	76.95
Squamous cell carcinoma	4	15.38
Choriod malignant melanoma	1	3.85
Conjuctiva Nevus	1	3.85

TABLE 3 DISTRIBUTION OF OCULAR NEOPLASM ACCORDING TO SEX

		MALES		FEMALES	
		No of cases	%	No of cases	%
1	Retinoblastoma	12	34.29	8	30.77
2	Papilloma	5	14.29	8	30.77
3	Inflammatory tumors	5	11.43	6	15.28
4	Squamous cell carcinoma	1	2.86	3	11.54
5	Choristoma	3	8.57	0	0.00
6	Haemgioma	1	2.86	0	0.00
7	Uveal tract melanosis	1	2.86	1	0.00
8	Harmatoma	1	2.86	0	0.00
9	Conjuctival melanoma	1	2.86	0	0.00
10	Haematoma	1	2.86	0	0.00
11	Granuloma	1	2.86	0	0.00
12	Fibroma	1	2.86	0	0.00
13	Angio sacrcoma	1	2.86	0	0.00
14	Choriod malignant melanoma	0		1	3.85
15	Conjuctiva Nevus	1	2.86	0	0.00
	Total	**35**	**100.00**	**25**	**100.00**

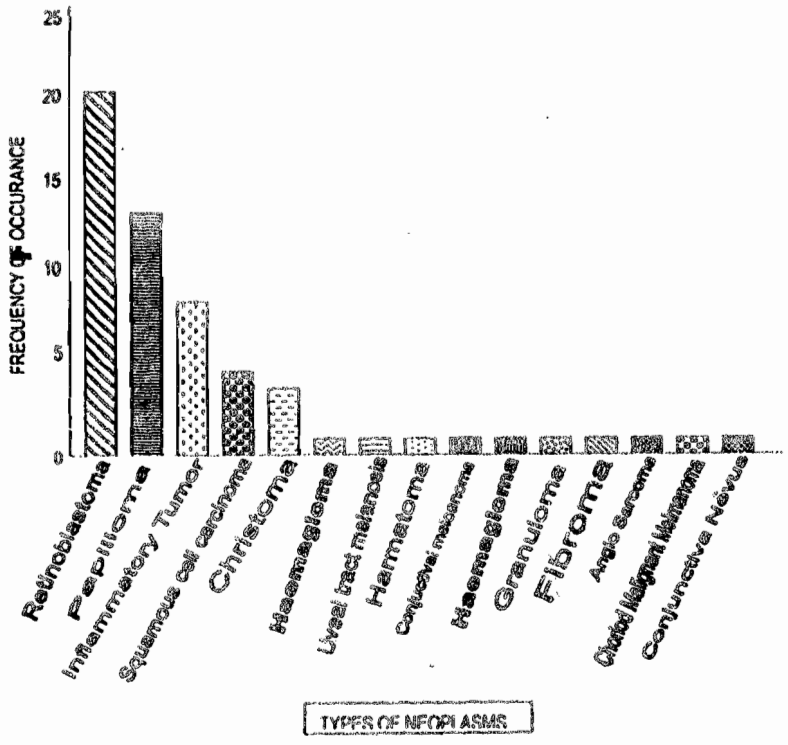

Fig. 1: Bar Graph showing the distribution of ocular neoplasm

0-15 years were regarded as the pediatric group while those above 16 years of age were regarded as the adult group. 28 subjects were in the pediatric, while 33 were adults. Table 1 shows the distribution of neoplasm in the pediatric and adult population. Retinoblastoma was the most frequently occurring tumor in the pediatric group (50%), while inflammatory tumours occurred most

frequently in the adult group (21.21%). Table 1 shows frequency of neoplasm in the two groups. The neoplasms were also divided into benign and malignant. 26(24.62%) were malignant, while 35 (67%) were benign. Table 2 shows the malignant neoplasms. Of the malignant ones, retinoblastoma accounted for 76.9% followed by squamous cell carcinoma with 15.39% each. Of the benign papilloma was the most frequently occuring (37.14%). Inflammatory tumors were next 31.43% then choristoma 8.51%, while all other had 2.86% each.

The sex distribution of ocular tumors is shown in table 3, there were more neoplasms in males than females (this however was statistically insignificant). Retinoblastoma was highest in both groups, then papilloma and inflammatory tumors. All cases of choristoma was in males while all other types of tumors had a frequency of 1 males, except for choroidal melanoma, where the only case was found in a female. In females, frequency of all tumors was less than in males except for pailloma and squamours cell carcinoma. The above results were subjected to Chi-square analysis, which showed that the distribution of tumors was dependent on the age and sex of subjects at the 95% confidence level.

DISCUSSION

In this study, retinoblastoma was found to be the most common ocular neoplasm. It was much more common in the pediatric, where it represent 50% of all neoplasm, than in the adult group, where it represented only 18.18%. This is in consonance with some earlier studies, which showed that retinobalstoma is the commonest ocular neoplasm among young children. Abramson *et al* (1998). Several other studies showed that it is almost completely a childhood disease with 95% of case occurring in children under 5 years of age. Donaldson *et al* (1993), Shield *et al* (1999). In this study however, we found that subjects over 15 years accounted for 24% of those seen. This difference may be, because the samples were from histology and so do not represent when the neoplasms were first noticed, but when a biopsy was done. However, this study showed that retinoblastoma begins to decline from the age of 6 years, and therefore implies that it is a childhood disease. The frequency of retinoblastoma was higher in this group than previously reported. Donaldson et al (1993), Shield et al (1999). In the adult population, retinoblastoma ranked amongst the most frequently occurring tumors preceded only by inflammatory tumors and papilloma, and was the most frequent malignant tumor in adults. This is in contrast to previous studies which showed that choroidal malignant melanoma is the most frequently occurring malignant neoplasm in the adult population, Neaser *et al* (1998), Hick *et al* (1998), Lamke *et al* (1999), Shield et al (1999). This study revealed only one case. Squamous cell carcinoma ranked next to retinolastoma in the malignant neoplasm in adults. All cases of squamous cell carcinoma were in adults. This suggests that it may be a predominantly adult disease, which is in agreement with previous reports. Abramson *et al* (1998). The only case of agiosarcoma was found in the pediatric group. This differs from previous studies which described it as more in adults than children. This could be due to the small number of affected subjects which in the study population. The result of this study showed that more tumors were seen in the adult group than in the pediatric group. Although statistical testing showed that there was no significant difference in the manifestation of ocular neoplasm in the different age groups, more cases of choristoma were seen in children than adults, again, the few subjects seen may be responsible for this.

More tumors were seen in the males in terms of diversity as well as frequency, however, statistical testing showed no significant difference in distribution between sexes.

Retinoblastoma, appears to be most studied intraocular tumor, it is said to affect 1 in 20,000 infants and children, with approximately 60% being transmitted as an autosomal dominant trait. Zajaczek et al (1998). The mutation involves the Rb gene located on chromosome 13q 14. In familial cases, children are born with one normal and one defective copy of the Rb gene. They loose the intact copy through some form of somatic mutations (interstitial delection of 13q 24 or even complete loss of the normal chromosome 13). In sporadic cases, both normal Rb alleles are lost by somatic mutation in one of the retinoblast, Kachin *et al* (1997), Lui (1996). The higher than previously recorded occurrence in this population may imply that the Nigerian population may be more predisposed to retinoblastoma than others, especially as it is the leading malignant neoplasm in the pediatric as well as adult population. Unlike other studies where choroidal malignant melanoma was the leading cancer in adults. It is therefore necessary that further studies be done on early detection and management of retinoblastoma in the Nigeria population.

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