Original Article

Pattern of Ophthalmic Lesions in a Tertiary Health Institution in South-South, Nigeria

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Abstract

Objective: Ophthalmic tumors are tumors that occur in the eyes and other related structures. These lesions involve a wide range of pathologic conditions ranging from benign to malignant lesions and are common in Africa. Although there have been a number of published reviews on this subject, none was carried out in this environment. This study seeks to determine the pattern, prevalence, and types of ophthalmic tumors reported in Calabar, southern Nigeria. **Methods:** Patient's hospital records were retrieved from the Department of Pathology, University of Calabar teaching hospital within the period of 2008 to 2016 and analyzed to obtain required information. **Results:** A total of 70 ophthalmic tumors were diagnosed during the study period of which 50.0% were malignant. Males were slightly more affected than females (ratio 1.3:1) accounting for about 55.7%. The top three ophthalmic malignant tumors were squamous cell carcinoma, retinoblastoma, and embryonal rhabdomyosarcoma contributing 21.4%, 17.1%, and 5.7%, respectively, of all eye tumors. Dermoid cyst (8.5%) was the most common benign ophthalmic tumor reported. In all, three cancer incidence peaks were observed at 0 to 10 (42.9%), 21 to 40 (43.2%), and 41 to 50 (14.3%) age groups. Retinoblastoma was the most common cancer in children and squamous cell carcinoma was commoner among adults. **Conclusion:** The prevalence of malignant and benign eye tumors was the same in this review. A delay in diagnosis was a characteristic feature. Early presentation to eye-care facilities for appropriate and early intervention is highly recommended to prevent potential loss of eyesight and even death.

Keywords: Benign eye tumors, Calabar, cancer, dermoid cyst, epithelial tumors, malignant eye tumors, ophthalmic lesions, retinoblastoma, squamous cell carcinoma

Introduction

Ophthalmic lesions simply refer to the pathology of the eye and its related structures. It involves a wide range of pathologic conditions ranging from benign lesions (noncancerous) to malignant lesions (cancerous) that develop in or around the eye. However, benign or malignant ophthalmic lesions can cause vision problems or disfigurement if they are left untreated. They can also spread to various parts of the body such as the optic nerve, the brain, and the rest of the body, posing a threat to the life of an individual.[1] The eye which is a special and unique sensory organ exhibits a diverse histologic feature; hence, the knowledge of normal ocular structure and spectrum of pathologic changes is of utmost importance especially in providing histologic diagnosis of ophthalmic lesions. There exists a high variation in the pattern and frequency of ophthalmic lesions in different regions of the world. According to a World Health Organization (WHO) 2010 report, out of the world's 39.4 million blind population, the African region accounts for 5.9 million (15%) ranking third after China (20.9%) and India (20.5%).[2] Symptoms of

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ophthalmic tumors vary depending on if they are benign or malignant and their site. In children with eye tumors, common symptoms include a large white or reddish painful pupil, redness or swelling near the eye, bulging or crossed eye, and bright red birthmark on or near the eye.[1] It is strongly advised that patients who notice such symptoms visit the clinic immediately as early diagnosis will increase the chances of preservation of sight. Although there have been different reports on ophthalmic lesion in Nigeria and in other countries, we could not find any such report in Cross River State (CRS) which is situated in the southern region of Nigeria. This study would probably be the first report of the pattern and prevalence of ophthalmic lesions in CRS, South-South Nigeria.

Research design

This was a retrospective study involving the review of patient's ophthalmic biopsy records from 2008 to 2016 in the Department of Pathology, University of Calabar.

Materials and Methods

The University of Calabar teaching hospital (UCTH) is located in the southern senatorial district of CRS. It is a tertiary hospital with a capacity of 600 bed spaces and receives referrals from all secondary health facilities within and outside CRS. The Department of Pathology is involved in the evaluation, categorization, and diagnosis of tumors from any part of the body. No record was available for the year 2012. The specimen had been fixed, processed, and stained with hematoxylin and eosin (H&E). The use of special stains such as Mallory phosphotungstic acid hematoxylin and immunohistochemistry for CD20, S100, and Desmin were employed where necessary.

Biodata comprising of age, sex, nature of specimen, site of tumor, and diagnoses was retrieved from the laboratory records and the tumors were classified as either benign or malignant following the WHO international classification of eye tumors and its adnexa.[3] Analysis was performed by EPI Info and variables were expressed as frequencies and percentages. The study was approved by the Health Research Ethics Committee of the UCTH.

Results

A total of 70 ophthalmic lesions were recorded within the study period. Thirty percent were benign and 50% malignant, whereas borderline tumors and pseudotumors constituted approximately 7% and 13%, respectively [Figure 1]. Males were slightly more affected than females (ratio = 1.3:1) accounting for about 55.7%. The top three ophthalmic malignant tumors were squamous cell carcinoma (15), retinoblastoma (12), and embryonal rhabdomyosarcoma (4) comprising 43%, 34%, and 11% of the malignant tumor, respectively [Table 1]. A few border-line, premalignant lesions were also observed; these were predominantly conjunctiva squamous cell intraepithelial neoplasia (4) and low-grade astrocytoma (1). Dermoid cyst (6) was the most common benign tumor accounting for about 8.6% of total ophthalmic lesions. Also reported were some pseudotumors; granulation tissue (4) was the commonest among this group followed by chronic granulomatous inflammation (most probably tuberculosis; 2) and panophthalmitis (2) [Table 2]. Forty percent (28) of all the tumors were from mesenchymal origin, followed closely by epithelial tumor (33%) [Table 3]. Although there were more mesenchymal tumors, epithelial malignancies were still the predominant malignant tumors observed [Table 3]. All the developmental tumors were benign, whereas all the pigmented tumors were malignant. Of the 12 cases of retinoblastomas reported, 11 (91.7%) occurred in children under the age of 10 years. Cases of squamous cell carcinomas (21.4%) were reported in adults 20 years and older and accounted for 83.3% of all ophthalmic malignancies among adults between 21 and 40 years of age. The peak incidence of ophthalmic tumors was at the first decade of life accounting for about 21.4% [Table 4].

Discussion

Ophthalmic lesions remain an important cause of morbidity and mortality worldwide. Several studies have indicated that 50% to 70% of adult patients with acquired immunodeficiency syndrome (AIDS) will experience

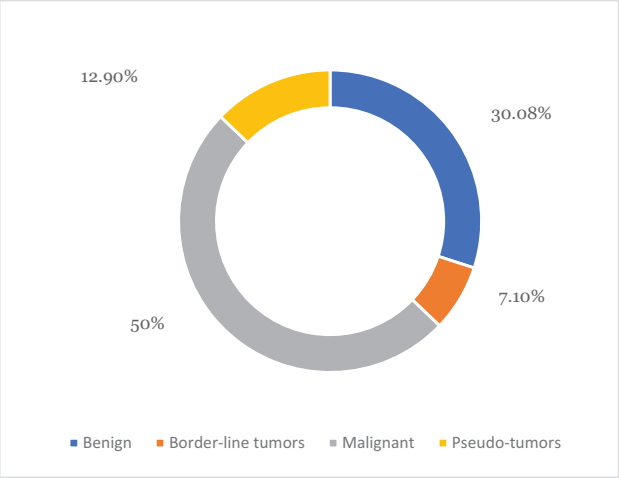

Figure 1: Type of tumor, frequency, and percentage of ophthalmic lesion.

Table 1: Histologic variants of malignant ophthalmic tumor

Histologic variant	Frequency	Percentage
Squamous cell carcinoma	15	42.9
Retinoblastoma	12	34.3
Embryonal rhadomyosarcoma	4	11.4
Kaposi sarcoma	2	5.7
Melanoma	2	5.7
Total	35	100

ophthalmic complications in their lifetime.[4-7] As incidence rate of HIV and AIDS are reported to increase, there is a likelihood of an increase in ophthalmic lesions especially in developing countries such as Nigeria. However, a staring observation in our study was the relatively small number of ophthalmic specimens sent to the pathology department for diagnosis during the period under review in comparison with studies from other centers covering comparable duration. Some researchers elsewhere reported as much as 210 and 440 orbital samples[8,9] in Lagos and Ibadan over a 10- and 11-year period, respectively. The former was limited by age conducted among children 14 years and younger. Umar *et al*.[10] in Kano and Akpe *et al*.[11] in Benin City, Nigeria reported patient populations of 438 and 148 over comparable durations of 12 and 8 years, respectively. One reason for the relatively low samples in our study may be that some of the patients with ophthalmic tumors did not reach our center possibly due to the location of the teaching hospital in the state. The UCTH is located at one end of the CRS some 300 km away from some local government areas in the state. This distance may be as much as three times more than other teaching hospitals located in neighboring states such as Ebonyi and Enugu. Doctors working at secondary health facilities may consider it more convenient to send patients to these other relatively closer government-owned tertiary hospitals. Another possible reason could be due to the periodic free eye surgery program that is organized by the CRS government. Many people take advantage of this program especially because it is free. Access to eye care at the University of Calabar teaching hospital will require out of pocket expenses. Unfortunately, surgical biopsies from such programs rarely get to the pathology departments for proper diagnoses probably due to the fee for service involved. It may also be due to lack of poor usage of laboratory services by patients in the center or that such tissues are rather sent to other private pathology facilities around the institution.

In this study, males were slightly more affected than females with a male to female ratio of 1.3:1. This was similar to findings of several studies on the pattern of ocular tumors in Nigeria[6,8-15] and even outside Nigeria.[16] This male preponderance in our environment has been attributed by some researchers to be due to higher attendance of male subjects at hospitals in Nigeria arising from the relative importance the society attaches to the male over the female child.[11] This may not be far from the truth as most communities in Nigeria see the male child as the

Table 2: Summary of different lesions, number of cases, and percentages

Tumors	Number of cases	Percentage
Squamous cell carcinoma	15	21.4
Retinoblatoma	12	17.1
Embryonal rhabdomyosarcoma	4	5.7
Kaposi sarcoma	2	2.9
Ocular melanoma	1	1.4
Conjunctival melanoma	1	1.4
Low-grade pilocystic astrocytoma	1	1.4
Excision teratoma	1	1.4
Dermoid cyst	6	8.5
Chalazion	3	4.3
Pterygium	3	4.3
Conjunctival intraepithelial neoplasia	3	4.3
Squamous papilomma	3	4.3
Pyogenic granuloma	3	4.3
Panophthalmitis	2	2.9
Capillary hemangioma	2	2.9
Chronic granulomatous inflammation	2	2.9
Conjunctival lipoma	2	2.9
Granulation tissue	1	1.4
Conjunctival dysplasia	1	1.4
Phthisis bulbi	1	1.4
Trichoepithelioma	1	1.4
Total	70	100

Table 3: Classification of ophthalmic lesions according to cell of origin

Category	No. of patients	Percentage
Epithelial tumors	23	32.9
Mesenchymal tumors	28	40.0
Developmental tumors	8	11.4
Pigment tumors	2	2.9
Inflammatory/pseudotumors	9	12.9
Total	70	100.1

Table 4: Age distribution of malignant tumors

Diagnosis/age (years)	0–10	11–20	21–30	31–40	41–50	51–60	61–70	*N* (%)
Squamous cell carcinoma			4	6	3	1	1	15 (42.9)
Retinoblastoma	11		1					12 (34.3)
Embryonal rhabdomyosarcoma	4							4 (11.4)
Kaposi sarcoma			1		1			2 (5.7)
Melanoma		1			1			2 (5.7)
Total	15	1	6	6	5	1	1	35 (100)

n, number.

future of the family and this is likely to influence care, attention, and educational investment on them. The same male predominance though was reported by researchers outside Africa.[16] However, a male to female ratio of 1:1 was reported by researchers in Benue State, North-Central Nigeria.[17] Other studies reported more ophthalmic tumors in females (1:1.2) in the South-West,[18] North-West region of Nigeria[19] and in Nepal.[19] There was a wide variation in the distribution of ophthalmic lesions from these studies. Malignant ophthalmic lesions were as common as benign ones accounting for 50% of all tumors in this study. This is at variance with most similar studies conducted among Nigerians.[6,9,11,14,17,20] The relatively small number of cases in this study may have contributed to this observation. Studies with more cases have consistently demonstrated a higher percentage of malignant over benign eye lesions.[9,10] The general observation is that malignant eye tumors are more frequent than benign ones. This is not likely the case but probably due to the fact that most surgeons will not send benign lesions for histologic appraisal.

Our study indicated that the most common ophthalmic malignancies in Calabar were squamous cell carcinoma and retinoblastoma accounting for 21.4% and 17.1%, respectively. This is similar with reports from a study carried out in Benin City, Nigeria, although with slightly lower frequencies than ours.[11] Retinoblastoma was reported by other researchers in Nigeria to be the most common ophthalmic malignancy.[6,10-12,18] It is important to note that 98% of retinoblastoma occurs within the age range of 0 to 10 years and that is the same trend we observed in this study where over 90% occurred in the same age bracket. It still remains the most prevalent childhood ophthalmic cancer as reported in Singapore.[16] Squamous cell carcinoma was the most common ophthalmic malignancy in adults in Nigeria and Africa as a whole and most prevalent skin cancer.[21] The upsurge in the prevalence of squamous cell carcinoma may be the association of the tumor with HIV/AIDS.[7]

Rhabdomyosarcoma of embryonal origin was diagnosed in four cases accounting for about 5.7% of the entire ophthalmic tumor and 11.4% of the malignant lesions. This finding is similar to studies carried out in Kano, northern Nigeria, where incidence rate of rhabdomyosarcoma was recorded to be 6%.[10] All the four cases of embryonal rhabdomyosarcoma in our study were within the age range of 0 to 10 years. Furthermore, all the pigmented tumors were malignant and were found to be melanoma. Studies by Omotoso *et al*.[22] showed that melanoma could be distributed all over the body with only 2.8% on the orbital region.Benign lesions constituted 30% of all cases reviewed. Dermoid cyst was the commonest benign tumor accounting for 75% of the developmental lesions. This is at variance with the Kano report,[10] where squamous papilloma and hemangioma were the predominant benign lesions. Pediatric orbital tumors differ and are distinct substantially from adult types, more often congenital benign lesions and infections ranging from developmental cystic lesions (e.g., dermoids, teratoma), to vascular lesions (e.g., capillary hemangioma, lymphangioma) to optic nerve gliomas (e.g., pilocysticastrocytomas).[23] Inflammatory lesions or pseudotumors often mimic lesion that would require surgical intervention. Omotoso *et al*.[24] in 2013 described onchocercoma, histoplasmosis, mycetoma, and tuberculosis as some of the common inflammatory conditions that mimic tumor. Chronic granulomatous inflammation most probably TB constituted 22.2% of the inflammatory lesion reported in the study.

Conclusion

This study revealed a high prevalence of retinoblastoma among our children and squamous cell carcinoma among young and middle-aged adults. Late presentation is the rule rather than the exception. Doctors and patients alike should be encouraged to utilize the histologic services available in the institution. There is need for further studies on the progression of some of the premalignant lesions reported in this study and more advocacies for early intervention on these tumors.

What is already known on this topic

(1) HIV/AIDS may aid the development of ophthalmic malignant eye tumors
(2) Malignant ophthalmic lesions are commoner than benign tumors

What this study adds

(1) Malignant eye lesions may just be as common as benign one in CRS contrary to most other states in Nigeria
(2) Ophthalmic cancers have bimodal peaks in CRS, one in children 0 to 10 years of age (retinoblastoma) and the second peak in adults 21 to 10 years old (squamous cell carcinoma).

Authors' contributions

A. Omotoso conceived the study, collected data, and wrote the initial draft. K. Inaku edited the manuscript and made further inputs as required. A. Ibanga, S. Okonkwo, M. Kooffreh-Ada, and P. Ada reviewed the manuscript for intellectual content and accuracy. G. Ebughe and I. Bassey had a final overview of the manuscript. All authors reviewed and approved the final manuscript.

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Conflicts of interest

There are no conflicts of interest.

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