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CONTENTS

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A historical perspective of registered cases of malignant ocular tumors in Zimbabwe (1990 to 1999). Is HIV infection a factor?

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Abstract

Introduction: Anecdotal and published reports suggest that ocular tumours are on the increase in Zimbabwe.
Objectives: To determine the trends in incidence rates of common malignant ocular tumours registered with the Zimbabwe Cancer Registry during the last decade (1990 to 1999).
Design: Retrospective study.
Setting: Data were collected from the Zimbabwe National Cancer Registry, the Zimbabwe National Census 1992 and 2002 Reports, and patient records from hospitals.
Subjects: All cases of malignant ocular tumours registered with the Zimbabwe National Cancer Registry between 1 January 1990 and 31 December 1999.
Main Outcome Measures: Age standardized annual incidence rates for registered cases of common ocular tumours.
Results: The age-adjusted annual incidence rates of squamous cell carcinoma of the conjunctiva had a more than 10-fold increase from 0.17 to 1.8 per 100 000 people during periods 1990 and 1999 respectively. Retinoblastoma dropped by more than half from 0.8 to 0.34 per 100 000 during the same period. The annual age standardised incidence rates for all ocular tumours showed a significant upward linear trend (χ^2 : 362.78, df = 9 and $p<0.001$). There was no significant gender difference in the distribution of these tumours amongst the study population.
Conclusion: The increasing trend in the age-adjusted annual incidence rates of ocular surface squamous neoplasms could be attributed to the worsening HIV and AIDS pandemic in Zimbabwe or improved access/utilization of health services by the public.

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Introduction

In 1998 the Zimbabwe National Cancer Registry ranked eye tumours as the sixth commonest group of tumours reported in Zimbabwe (3.9%). The leading tumours included Kaposi's sarcoma (26%), cervical and uterine tumours (23%), non-melanoma tumours of the skin (12%), breast tumours (9%) and prostatic tumours (8%) respectively. These data were striking, since the proportion of eye tumours among all registered tumours for 1998 of 4% had more than trebled the 1990 proportion of 1.2%.[1] Work done by Chokunonga and colleagues in 1999 showed a dramatic increase in the number of reported cases of squamous cell carcinoma of the conjunctiva between 1993 and 1995.[2] A retrospective study conducted by Pola and colleagues on ocular surface squamous neoplasia (OSSN) seen at Sekuru Kaguvi Eye Unit (SKEU) showed that the annual frequency of squamous cell carcinomas of the conjunctiva among conjunctival biopsies rose from 33% in 1996 to 58% in the year 2000.[3]

Published studies have found a higher incidence of squamous cell carcinoma in patients with HIV and AIDS.[4,5] Two Australian retrospective studies found that older males were predominantly affected by ocular surface squamous neoplasia (including invasive squamous cell carcinoma).[6,7] Retrospective studies done in Africa on tumours of the eye and adnexae have shown that squamous cell carcinoma of the conjunctiva and retinoblastoma are the leading malignant tumours affecting these tissues.[8-11]

Information on the trends of ocular tumours over a decade is of immense value in a number of ways. Namely: when assessing the impact of an intervention on the incidence rates of tumours, when predicting the

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magnitude of the problem in the future and when determining the effect of emerging diseases like HIV and AIDS on the tumours. Unfortunately published studies from Africa did not address the historical perspective on patterns of incidences of common ocular tumours in their settings.[8-11]

The aim of this study was to determine the patterns of annual incidence rates of the two commonest registered malignant ocular tumours in Zimbabwe during the period 1 January 1990 to 31 December 1999.

Materials and Methods

Data was obtained from the Zimbabwe National Cancer Registry and hospital records using purpose designed data collection tools which captured the following information:

(1) Patient details included patient names, age, gender, residential address, race, occupation and national registration number.

(2) Tumour details included date of diagnosis, histology report, duration of symptoms, site of primary tumour, stage of tumour and treatment received.

(3) Institution details included name and address of reporting hospital, hospital number, ward and source of information.

Estimates of annual population figures for the various age groups in Zimbabwe were based on inter-census projections from the years 1992 and 2002 national census figures and these were used to calculate the annual incidence rates.[12,13]

Data Analysis.

A direct method of standardizing the incidence rates was employed using the latest Zimbabwe National Census population figures as of the night of 17/18 August, 2002.[13] The age-adjusted rate for each year was calculated using the formula:

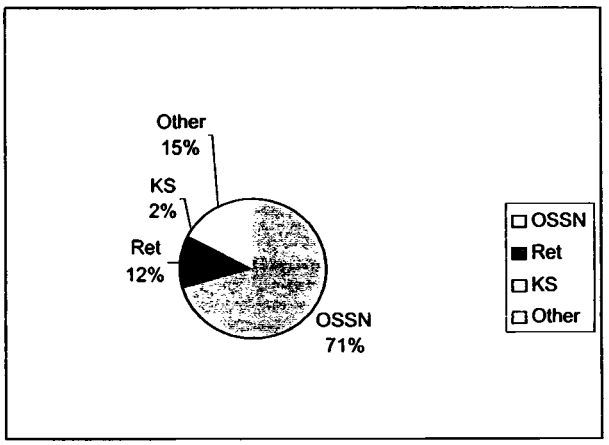
Age adjusted rate = Sum (age specific rate x proportion of standard population in age category)[14]

Chi-squared tests for age-standardized rates over the 10 year period were calculated and their p values determined. The total population for the year 2002 was used with age groupings (zero to five, six to10, 11 to15, etc) for calculating the age-standardised annual incidence rates for squamous cell carcinomas, while the zero to 10 year age group population was used for retinoblastomas.[15]

Results

A total of 1 741 patients with malignant ocular tumours were registered with the Zimbabwe National Cancer Register between 1 January 1990 and 31 December 1999. Of these patients 1 226 (71%) had squamous cell carcinomas of the conjunctiva, while 209 (12%) had retinoblastomas; 38 (2%) had Kaposi's sarcoma of the eye lids and the rest had various other malignant tumours of the eye. (See Figure I)

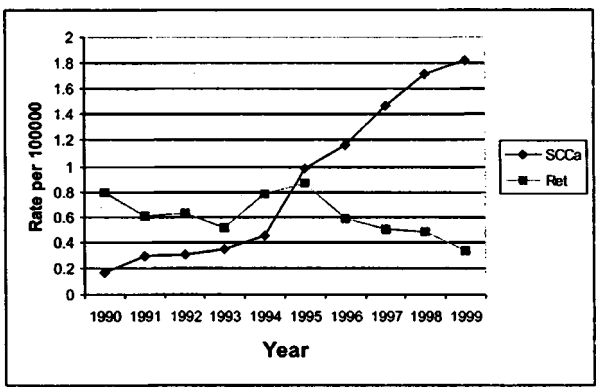
Figure I: Tumor distribution by histology diagnosis.



ossn- ocular surface squamous neoplasia; Ret Retinoblastoma; KS Kaposi's Sarcoma.

The trend of age-adjusted annual incidence rates of the top two registered ocular tumours in Zimbabwe is illustrated in Figure II.

Figure II: Age adjusted incidence rates for common malignant ocular tumours in Zimbabwe.



Scca: squamous cell carcinoma of the conjunctiva /100 000 people: (age-adjusted rates).
ret: retinoblastoma of the eye /100 000 children: 0 to 10 years of age (age-adjusted rates).

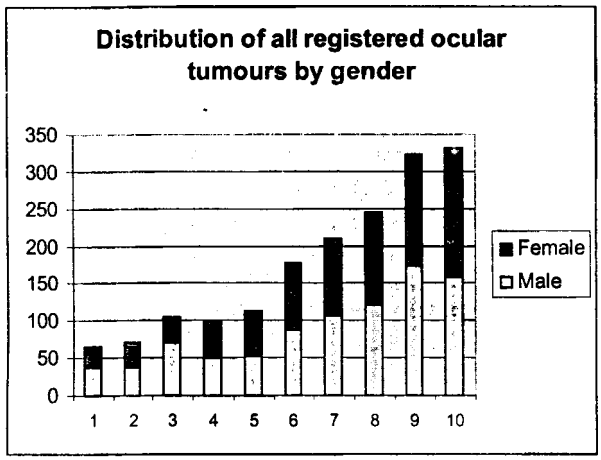
The age-adjusted incidence rate for registered squamous cell carcinomas of the eye between 1990 and 1999 demonstrated a more than 10-fold increase (from 0.17 to 1.8 per 100 000 people respectively), whereas the retinoblastoma age-adjusted incidence rates for the same period showed a decrease of more than 50% (from 0.8 to 0.34 per 100 000 children below 10 years of age respectively).

The age-standardised annual incidence rates for all registered ocular tumours grouped together showed a positive upward linear trend (χ^2:362.78, with 9df and $p<0.001$). However, the age-standardised annual incidence rates for registered retinoblastomas showed

significant downward linear trend during the period under study(χ^2 : 8.404, with 9df and p value of 0.00374).

The distribution of all registered tumours by gender has been summarized in Figure III below.

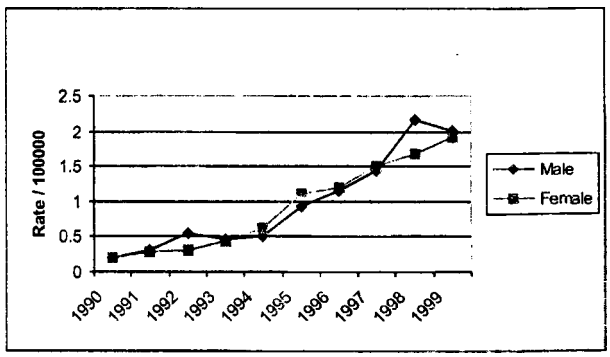
Figure III: Distribution of all registered ocular tumours by gender.



X axis in years from 1=1990 to 10=1999.

There were no significant gender differences on the age-adjusted incidence rates for both squamous cell carcinoma of the conjunctiva and retinoblastomas combined (χ^2 :17.29, with 9df and p value of (0.04) as represented in Figure III. Figure IV is a graphical illustration of age-adjusted incidence rates for squamous cell carcinoma of the conjunctiva by gender.

Figure: IV Age adjusted incidence rates of squamous cell carcinomas in Zimbabwe by gender.



Discussion

A number of studies have looked at the patterns and incidence of malignant ocular tumours in various African countries in the past.[8-11] Recent studies conducted in Congo Kinshasa[16] and Singapore[17] have shown that the leading ocular tumours differ from one country to another. In Congo Kinshasa, the leading ocular tumours were: epidermoid squamous cell carcinoma of the eye (34 %), retinoblastomas (32%) and metastatic tumours. In Singapore retinoblastomas (54%), melanoma of the eye (19%) and squamous cell carcinoma of the eye topped the list. These patterns are different from what is experienced in Zimbabwe where squamous cell carcinomas of the conjunctiva (70.3%), retinoblastomas (12.3%) and Kaposi's sarcoma (2.2%) are the leading ocular tumours. Factors contributing to the variation in ocular tumour types among different countries may include the following: race, ethnic origin, socio-cultural factors, disease patterns (HIV infections in particular), climatic conditions and availability of health services.

Traditionally, SCCA of the conjunctiva has a predilection for males and affects the older age group (late forties and above) and this has been supported by studies done in Uganda and Sudan before the advent of HIV infection, and recently in Australia.[6,8,9] However, this traditional way of presentation of SCCA of conjunctiva has not been observed in Zimbabwe where this disease was virtually unknown during the early 1980's but has now become the commonest registered ocular cancer affecting a younger age group and having no gender predilection.

Recent studies conducted locally have established that squamous cell carcinoma of the conjunctiva is the leading tumour necessitating enucleations and orbital exenterations at Sekuru Kaguvi Eye Unit (SKEU) in Zimbabwe.[18,19] The increase in the number of patients suffering from SCCA of the conjunctiva has been confirmed among Ugandans, Malawians and Tanzanians and has been attributed to the AIDS pandemic with the background of solar radiation.[20-22] Although squamous cell carcinoma of the conjunctiva is now recognised as an AIDS related cancer in sub-Saharan Africa[23] and South Africa,[24] further studies on the aetiology of these tumours are mandatory if appropriate preventive measures are to be instituted.

The age-adjusted annual incidence rate of all registered malignant ocular tumours in Zimbabwe has increased by more than three-fold from 0.69 to 2.56 cases per 100 000 people between 1990 and 1999 respectively. This increase has been largely due to an epidemic of squamous cell carcinoma of the conjunctiva. However, the age-adjusted incidence rate for retinoblastomas in Zimbabwe has dropped by more than 50% during the same period of study as illustrated in Figure II. These observations suggest the presence of some factor which increases the risk of developing SCCA of the conjunctiva among Zimbabweans, while it has no effect on the risk of developing retinoblastomas, thus eliminating the possibility of improved access to health facilities as an explanation for the apparent increases in incidence rates. The exposure to the factor could have been in the late 1980's and early nineties since SCCA of the conjunctiva had not been reported before then in Zimbabwe. This happens to coincide with the onset of the HIV and the AIDS epidemic here. Although the design of our study

did not accommodate HIV tests and CD4 cell counts the onset and observed increased incidence rates of SCCA of the conjunctiva in Zimbabwe parallel the HIV and AIDS pandemic being experienced here, thus implicating HIV infection in the aetiology of this condition.

It is important to note that these incidence rates are conservative estimates since many patients still patronize non-conventional/traditional medicine. Some object to investigations and surgery, while others may not have been registered with the Cancer Registry for other reasons. The age group affected by SCCA of conjunctiva comprises the country's labour force. The increase in the incidence of this tumour coupled with the high mortality rate is causing loss of the much needed labour force, an increasing the number of orphans and over-stretching limited health resources in an attempt to provide these patients with some form of care.

This study has confirmed the changing patterns of SCCA of the conjunctiva from a tumour which usually affects elderly males who engaged in outdoor work[19] to a tumour which has no gender predilection, affects young people of child-bearing age, is highly malignant and is not associated with the nature of employment.[14,15,25]

These findings are of immense value since they will form baseline data for comparison in subsequent studies of a similar nature and pose challenges regarding the etiology of squamous cell carcinomas of the conjunctiva in Zimbabwe. It is important to note that the design of the study (secondary data analysis) narrowed the scope of data utilization. Irregularities like incomplete notification forms (address code, age, gender) could not be rectified and the incidence rates calculated are likely to be lower than true rates for reasons elaborated earlier on.

Conclusion

This study has shown that SCCA of the conjunctiva is now the commonest registered ocular tumour in Zimbabwe and its age-adjusted incidence rate is on the increase. Although the causative agent for SCCA of conjunctiva is still speculative, evidence gathered in this study cannot exonerate exposure to HIV infection on the basis of absent laboratory tests. The current magnitude of the problem as compared to the nineteen eighties warrants it being classified as a local epidemic and this may assist resource mobilisation geared towards appropriate interventions in this country.

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2. Zimbabwe National Cancer Registry, National Health Laboratories and Parirenyatwa Hospital for providing with data.

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