



Eye Cancer in Yemen

A.A. Bawazir¹, A.A. Bawazir^{2,3}, S.S. Basaleh⁴, A.B. Ba-Amer⁵, H. Basaleem²

¹Dept. of Ophthalmology, Faculty of Medicine, University of Hadhramout. ²Dept. of Community Medicine, Faculty of Medicine, University of Aden. ³Dept. of Community and Environmental Health, College of Public Health and Health Informatics, KSAU-HS, KSA. ⁴Dept. of Ophthalmology, Faculty of Medicine, University of Aden. ⁵Dept. of Community Medicine, Faculty of Medicine, University of Hadhramout

Abstract

Purpose:

Variation in types and incidence of ocular tumors are frequently seen from one region to another; however in Yemen, publication of eye cancer statistics were not available. This study aims to describe the socio-demographic characteristics and types of eye cancers in Yemen.

Methods:

Data were collected from two population cancer registries in Aden and Hadhramout regions (South-Eastern governorates of Yemen) from 1997 to 2008. All cancers related data were analyzed using CanReg4 computer program (IACR, Lyon, France).

Results:

A total of 92 eye cancer cases were reported with 51 male cases and 41 females and mean age of 40 years (SD±26.6). The calculated annual age-standardized incidence of eye cancers was 1.3 per million male populations and 1.15 per

million female populations in the studied areas in Yemen. Around one quarter of cases were reported with squamous cell carcinoma (26%), followed by retinoblastoma (25%). The last was seen dominant among children < 15 years of age (91%) with a mean age of 6.7 years.

Conclusion:

The low proportions of other types of eye cancer in Yemen are probably due to registration of cases with less accurate specification. Thus, under-reporting could be found for those cases living in remote areas where access to specialized health care center is difficult. The given trend of eye cancer will be helpful to provide ophthalmologists and decision makers in the health field with a foundation to monitor future disease patterns in Yemen. Moreover, these data could be utilized for comparison with other selected populations elsewhere.

Keywords:

eye cancer, Aden, Yemen, Retinoblastoma, Pattern

Introduction

The incidence of ocular tumors is relatively low and most of the studies show global variation and regional differences in the incidence of intraocular and orbital tumors ⁽¹⁾. For example, retinoblastoma is much more common than melanoma in Singapore while the melanoma is the most common tumor in New York ^(2,3). The

average annual incidence rate (new cases) in the U.S. is about 1/100,000 population and the estimated prevalence rate (total cases) is about 12/100,000 population. With few exceptions, eye cancer (C69) occurs more often in older than in younger people. The survival rate for persons with localized ocular tumors receiving early treatment is almost 80% ⁽²⁾.

The intraocular tumors pose an important challenge both to the clinician and pathologist in several ways mainly because it is the only ocular disease which directly threatens life^(4,5). Although retinoblastoma is the intraocular

Corresponding Author: Associate Professor Dr. Amen Ahmed Bawazir, College of Public Health and Health Informatics, King Saud bin Abdul Aziz University for Health Sciences, Riyadh, KSA. P.O. Box 22490. Zip code 11426. Telephone: +966-1142 Ext. 95422. Mobile: +966-559432263. Email: bawazir56@hotmail.com

cancer of childhood, its cure rate is high if treated adequately (6,7).

To our knowledge, no prior reports have described the common types of eye cancer in Yemen or in the neighbour countries. Therefore, the aim of this study was to identify the pattern of eye cancer in some selected sites in Yemen which will include the estimation of cancer incidence, distribution of the disease according to age, gender, type of cancer and residency of cases for the period 1997 to 2008.

Methodology

All registered primary malignant eye cancer was extracted from hospital registries and from two population cancer registries in Aden and Hadhramout regions (Southeastern governorates of Yemen) from 1997 to 2008. Retrieved data of intraocular, conjunctiva, and orbital cancers were analysed using CanReg4 computer program (IACR, Lyon, France). Variables were included such as age, sex, residency, site of the tumor, state of the patient and others. Age-adjusted incidence of malignant orbital tumors per million of population per year was also calculated. As the study used secondary data from cancer registries, ethical approval is not required from the Institutional Ethical Board in Yemen.

Results

Ninety-two cases of eye cancer were reported through the years 1997 to 2008. The annual range of reported cases was from 3 to 10 cases per year. Male cases were more than female (51 and 41, respectively) with male to female ratio of 1.2 : 1. The mean age of cases was 40 years within a standard deviation of ± 26.6 and inter-Quartile between 7 and 60 years of age. Most cases were from Aden followed by Abyan, Hadhramout and Lahej (37%, 20%, 19% and 14%, respectively), as shown in Table 1.

Topographic distribution of eye cancer showed that high number of cases were not specified (31.5%), followed by cancer in the retina (21%), conjunctiva (14.1%) and orbit (10.9%). Distribution of cancer in the different sites of the eye did not show difference between male and female. (See Table 2).

Around one quarter of the morphological malignancies reported was squamous cell carcinoma and other quarter is retinoblastoma. The other half distributed between orbital carcinoma, carcinoma, eyelid basal cell carcinoma and ciliary basal carcinoma, as shown in Table 3.

Variable	No of cases (92)	Percentages	95% C.I.
Age			
Mean age (\pm SD) [Inter Quartile]	40.2 (± 26.6) [7.3-60]		
≤ 14 years	26	28.3	19.6 - 38.8
15-44 years	16	17.4	10.6 - 27.0
≥ 45 years	50	54.3	43.7 - 64.7
Sex			
Male	51	55.4	44.7 – 65.7
Female	41	44.6	34.3 – 55.3
Residency of cases (Governorates)			
Aden	34	37.0	27.3 – 47.7
Abyan	18	19.6	12.3 – 29.4
Hadhramout	17	18.5	11.4 – 28.2
Lahej	13	14.1	8.0- 23.3
Others *	10	10.9	5.6 – 19.5

Table 1. Socio-demographic characteristics of the reported eye cancer cases 1997-2009

* Others include (4 cases from Shabwa, 3 AIDhale, and one case from Ibb, Taiz and Hodeida)

Topography	Male		Female		Total	
	No.	%	No.	%	No.	%
EYE (NS)	16	55.2	13	44.8	29	31.5
Retina	10	50.0	10	50.0	20	21.7
Conjunctiva	9	69.2	4	30.8	13	14.1
Orbit	3	30.0	7	70.0	10	10.9
Eyelid	5	62.5	3	37.5	8	8.7
Cilliary Basal	2	40.0	3	60.0	5	5.4
Lacrimal Gland	3	100.0	0	.0	3	3.3
Other	3	75.0	1	25.0	4	4.3
Total	51	55.4	41	44.6	92	100.0

Table 2. Topographic distribution of eye cancer by SEX

Morphology	Male		Female		Total	
	No.	%	No.	%	No.	%
Squamous cell carcinoma	16	66.7	8	33.3	24	26.1
Retinoblastoma	12	52.2	11	47.8	23	25
Orbital Carcinoma	3	33.3	6	66.7	9	9.8
Carcinoma, NOS	4	50.0	4	50.0	8	8.7
Eyelid basal cell	5	62.5	3	37.5	8	8.7
Neoplasm, malignant	5	71.4	2	28.6	7	7.6
Cilliary B. Carcinoma	2	50.0	2	50.0	4	4.3
Optic nerve neoplasm	0	.0	3	100.0	3	3.3
Rahpdomysarcoma,	1	33.3	2	66.7	3	3.3
Lacrimal Gl. Adenocarcinoma	2	100.0	0	.0	2	2.2
Choroid Malignant	1	100.0	0	.0	1	1.1
Total	51	55.4	41	44.6	92	100.0

Table 3. Morphological distribution of eye cancer by sex

Morphology	<15 y	15-44 y	45-59 y	≥ 60 y	Total	Mean (±SD)
	N (%)	N (%)	N (%)	N (%)		
squamous cell carcinoma	2 (6.3)	3 (9.4)	11 (34.4)	16 (50.0)	32 (34.8)	57.3 (±19)
retinoblastoma	21 (91.3)	1 (4.3)	1 (4.3)	0 (0.0)	23 (25.0)	6.7 (±11.6)
carcinoma &orbital	0 (0.0)	8 (33.3)	7 (29.2)	9 (37.5)	24 (26.1)	49.5 (±15)
others	3 (23.1)	4 (30.8)	1 (7.7)	5 (38.5)	13 (14.1)	40 (±25.6)
Total	26 (28.3)	16 (17.4)	20 (21.7)	30 (32.6)	92 (100.0)	

Table 4. Morphological distribution of top three eye cancer by Age.

Occurrences of eye cancer have seen mostly in old age group mainly for orbital carcinoma (26.1%) and squamous cell cancer (34.8%) with the mean age of 56.7 years and 51.9 years for men

and women, respectively. For retinoblastoma it was seen dominant (91%) among children < 15 years of age with a mean age of 6.7 years, as seen in Table 4.

Discussion

This paper presented the epidemiological characteristics of eye cancers in South-Eastern governorates of Yemen (Aden and Hadhramout areas), using data from the local Cancer Registries in both sites which encompasses the population of Aden and adjacent governorates and also Hadhramout and nearby areas. There was no available previous study in this field in Yemen describing the pattern of eye cancer.

Male cases with eye cancer were reported more than females; similar to what has been found in Singapore,⁽³⁾ Iran,⁽⁴⁾ and Taiwan⁽²⁾. Half of the eye cancer cases were above 45 years old and over one third of the cases were from Aden, followed by Abyan, Hadhramout and Lahej. The population covered by the two cancer registries in Aden and Mukalla were about 2.8 million inhabitants. Thus the calculated annual age-standardized incidence of eye cancers was 1.3 per million male populations and 1.15 per million female populations in the studied areas in Yemen (Aden Cancer registry and Mukalla Cancer Registry). This is lower to the rate reported in Singapore and Taiwan (2.57, 1.89 for males and 2.33, 1.81 for females per million populations, respectively)^(2,3), but was very low than those rates reported from the USA or Canada (7.5, 8.1 for males and 5.4, 6.0 for females per million populations, respectively)^(8,9). The low incidence of eye cancer in Yemen is probably due to under registration of cases where some cases could be treated in other country or even not seeking care from the tertiary level, particularly those living in remote area and with difficult access to specialized health care center. In addition, the actual frequency of eye tumors could not be evaluated precisely due to lack of autopsy data.

The top three eye cancers in this study were squamous cell carcinoma (34.8%), orbital carcinoma (26.1%) and retinoblastoma (25%). The category named orbital carcinoma is probably not accurate and it includes mixed types. Unfortunately, some of the eye specialists and or pathologist were not precisely writing the complete diagnostic information for the specific site or morphology as indicated in the ICD-10 and ICD-O guideline. Therefore this reported

category in our study was not consistent with other studies elsewhere. For example, in Taiwan, the commonest reported eye malignancies were retinoblastoma, melanoma, and lymphoma (35.3%, 17.9%, 13.8%, respectively)⁽²⁾ which were different from data reported from Singapore where 53.6% of retinoblastoma, 19.2% of melanoma, and 11.2% of squamous cell carcinoma,⁽³⁾ or of data from the cancer registry in Tehran that showed 64.6% of cases were retinoblastoma, 19.8% of melanoma, and 3.7% were squamous cell carcinoma⁽¹⁰⁾; however, higher rates were reported from New York State 70.4% of melanoma, 9.8% of retinoblastoma, and 9.2% of squamous cell carcinoma⁽⁹⁾. Huaman et al, (1991) has reported retinoblastoma, squamous cell carcinoma of the conjunctiva, basal cell carcinoma of the eyelid, and malignant melanoma as the more frequent eye cancer in Saudi Arabia⁽¹¹⁾.

These variations in rates and in ranks were predicted by some authors when they have mentioned that eye tumors are different in frequency and types. For example noticeable differences as mentioned above between Asian countries and Western countries. Some authors have also proposed that melanoma is more frequently occurring among whites after sun exposure as they are in high risk because of the low level of ocular pigmentation⁽¹²⁻¹⁵⁾.

Globally, the incidence of retinoblastoma ranges from 1/15,000 to 1/20,000 live births with an annual incidence in children younger than 5 years of 10.9/million⁽¹⁶⁾. Retinoblastoma is classically a disease of infancy and young children. In this study, 91.3% of the patients with retinoblastoma were younger than 10 years old and with mean ages of 6.7 years. This mean age in our studied children was higher than that of children reported with retinoblastoma in Tehran or in Singapore (3.2 and 2 years, respectively)^(3,4). The incidence rate of 2.2 and 1.6 per million for boys and girls <15 years with retinoblastoma in this study was closer to the findings in Singapore but very low with incidence reported in the United States for the same type of cancer^(3,17). In a recent report from Jordan, the mean age-adjusted incidence of retinoblastoma was 9.32

cases per million children per year for children aged 0–5 years⁽¹⁸⁾. In contrast, the majority of the cancers in those 15 years of age or above in this study are carcinoma of the orbit and squamous cell carcinoma with a mean age of 56.7 years and 51.9 years for men and women, respectively which was closer to findings from Singapore (54.5 and 50 years, respectively)⁽³⁾.

Reliability of population-based cancer incidence data depends on the quality of health services, census figures, and especially the cancer registry system. High rate of not specified histopathology readings create a big challenge for those people involved in the diagnosis and treatment of eye cancer. Eye specialists or pathologists are sometimes not keen to write the precise diagnosis and staging of the disease. Therefore, it complicates the work and quality of cancer registry and makes it more difficult to look for data retrospectively for some years back. This is probably one of the main challenges of cancer registries in developing countries and particularly in countries where the health system are not fully in charge and aware of the importance of cancer registry and the importance of completing data. For example in this study, no explanation could be given for the undefined cases of melanoma which are highly reported in western countries but also fairly shown in many Asian cancer registry findings. However, Aden Cancer Registry is believed to be working better in recent years on collecting more accurate data from the different sources,

but still the gap exists. More work is required to be undertaken by those concerned in reporting eye cancer cases (eye specialists, pathologists and cancer registrars) to provide complete data and information to improve the accuracy of the registry in order to obtain reliable information on eye cancer in the country.

In summary, using data from the Aden Cancer registry and Hadhramout Cancer registry, the pattern of eye cancer in the southern and eastern regions of Yemen was developed. The present study showed that the incidence of eye cancers among the population in these regions were lower than that reported from Asia and Western populations^(2, 3, 9). Squamous cell carcinoma and retinoblastoma were identified as the main eye cancers in this population. Further investigation is probably needed to include the northern parts of Yemen.

These expanded epidemiological characteristics will provide ophthalmologists and epidemiologists with a foundation to monitor future disease patterns in Yemen and provide a basis for comparison with other selected populations elsewhere.

Acknowledgement

The authors would like to thank the personnel working in cancer registry of Aden and Hadhramout, Yemen, for their help in entering the data and facilitating the release of these data.

References

- Ohtsuka K, Hashimoto M, Suzuki Y. A review of 244 orbital tumors in Japanese patients during a 21-year period: origins and locations. *Jpn J Ophthalmol* 2005, 49(1):49-55.
- Cheng CY, Hsu WM. Incidence of eye cancer in Taiwan: an 18-year review. *Eye (Lond)* 2004, 18(2):152-158.
- Lee SB, Au Eong KG, Saw SM, Chan TK, Lee HP. Eye cancer incidence in Singapore. *Br J Ophthalmol* 2000, 84(7):767-770.
- Ahmadi SA, Asadi Amoli F, K GM. Ocular Tumors In Iran: A 10-Year Histopathological Study On 384 Cases Of Enucleation. *Iranian Journal of Pathology (IJP)* 2008, 3(3):151-156.
- Tomblin ER, Michael J. Lewis. Cancer Incidence in West Virginia, 1993-2008 In: 2009 Provisional Data Edited by Report WVCRA; 2011.
- Naseripour M, Nazari H, Bakhtiari P, Modarres-zadeh M, Vosough P, Ausari M. Retinoblastoma in Iran: outcomes in terms of patients' survival and globe survival. *Br J Ophthalmol* 2009, 93(1):28-32.
- A Salehi , N Owji, L Malekmakan , M Eghtedari, Imanieh M. Epidemiologic Features of Retinoblastoma in Shiraz, Southern Iran *Iran Red Crescent Med J* 2011, 13(7):452-457.
- Ayiomamitis A. Epidemiologic features of cancer of the eye, orbit and related adnexa in Canada. *Can J Ophthalmol* 1989, 24(6):269-274.

9. Mahoney MC, Burnett WS, Majerovics A, Tanenbaum H. The epidemiology of ophthalmic malignancies in New York State. *Ophthalmology* 1990, 97(9):1143-1147.
10. Ahmadi SA, Asadi Amoli F., GM. K. Ocular Tumors In Iran: A 10-Year Histopathological Study On 384 Cases Of Enucleation. *Iranian Journal of Pathology (IJP)* 2008, 3(3):151-156.
11. Huaman A, Cavender JC. Tumors of the eye in Saudi Arabia. *Ann Saudi Med* 1991, 11(6):675-680.
12. Seddon JM, Gragoudas ES, Glynn RJ, Egan KM, Albert DM, Blitzer PH. Host factors, UV radiation, and risk of uveal melanoma. A case-control study. *Arch Ophthalmol* 1990, 108(9):1274-1280.
13. Holly EA, Aston DA, Char DH, Kristiansen JJ, Ahn DK. Uveal melanoma in relation to ultraviolet light exposure and host factors. *Cancer Res* 1990, 50(18):5773-5777.
14. Walter SD, King WD, Marrett LD. Association of cutaneous malignant melanoma with intermittent exposure to ultraviolet radiation: results of a case-control study in Ontario, Canada. *Int J Epidemiol* 1999, 28(3):418-427.
15. Wang SQ, Setlow R, Berwick M, Polsky D, Marghoob AA, Kopf AW, Bart RS. Ultraviolet A and melanoma: a review. *J Am Acad Dermatol* 2001, 44(5):837-846.
16. Othman I, Alkatan H. *Retinoblastoma*. Amsterdam: Kugler Publications; 2009.
17. Nasution R, Sutjipto A. Childhood retinoblastoma. *Paediatr Indones* 1991, 31(3-4):117-122.
18. Jaradat I, Yousef YA, Mehyar M, Sultan I, Khurma S, Al-Rawashded K, Wilson M, Qaddoumi I, Salem A, Alnawaiseh I. Retinoblastoma in Jordan: an epidemiological study (2006-2010). *Hematol Oncol Stem Cell Ther* 2011, 4(3):126-131.