Pattern of Ocular Malignant Tumors in Bhairahwa, Nepal
R Kumar, R Adhikari, M Sharma, D Pokharel, N Gautam

Citation

Abstract
The pattern of ocular malignant tumors in institutes of western Nepal was analyzed by a retrospective study of 277 ocular cases from 2000 to 2007 carried out through clinical examinations and histopathological confirmations. The cases other than ocular malignancy were excluded. A total of 59 ocular malignant tumors were encountered. Male and female cases were 45.8% and 54.2% respectively. Squamous cell carcinoma was diagnosed as the most common (66.1%), followed by basal cell carcinoma (10.2%), meibomian gland carcinoma (10.2%), retinoblastoma (7%), malignant melanoma (5.1%) and 1.7% lacrimal gland adenocarcinoma. Squamous cell carcinoma was found to be the most common tumor (65%) among the elderly persons (>40 years of age) with females presenting at relatively earlier average age to males. Among the cases below 15 years of age, retinoblastoma was the commonest tumor (57%) followed by squamous cell carcinoma (43%).

INTRODUCTION
Various tissues of visual system contribute to lesions from inflammation to different types of neoplastic conditions. Ocular malignant tumors are relatively rare compared to other eye lesions, require immediate diagnosis and management. But ignorant care due to unawareness of persons can result into debility, loss of vision, and occasionally life is jeopardized. Malignant tumors of eyelid, conjunctiva, retina and orbit in both adults and children have been reported. However, there exists a variation in pattern and frequency on the basis of geographical location. Retinoblastoma in children and basal cell carcinoma in adults were the commonest findings in a study conducted in eastern Nepal. Many patients visit the Lumbini Eye Institute, and Universal College of Medical Sciences Teaching Hospital (UCMSTH), Bhairahwa, Nepal, for their treatment of ocular complaints. However, ocular malignant tumors have not been reported so far from this part of Nepal. During literature survey, we found only one such report from this country. Hence, we designed a retrospective study to analyze the above on the basis of histopathological diagnosis by retrieving the hospital based data of the patients.

MATERIALS & METHODS
The patients with ocular complaints consulted the ophthalmologist at hospitals where all history taking, clinical examination, investigations and surgical interventions were done. The biopsy specimens of eye and adnexa were submitted to the Pathology Laboratory of UCMSTH from 2000 to 2007. The specimens were fixed, processed and stained with hematoxylin & eosin, and special stains were used as and when required. The diagnosis was confirmed with the help of light microscope. There were altogether 277 ocular cases registered in the Department of Pathology, the slides of which were reviewed with the help of hospital data and malignant cases were selected. All other cases including benign neoplasm, tumor-like lesions and inflammatory conditions, on the basis of history, clinical examination and histology findings, were excluded during study. Malignant tumors of various histological types were included for the study and these cases were analyzed on the basis of gender, age group, and location of lesion, and thereafter results designed in the form of tables, figures and text seen over a period of 8 years.

RESULTS
In this retrospective study of 277 cases, 59 were diagnosed of malignant tumor (21.3%) with 27 males (45.8%) and 32 females (54.2%), (Table-I).
There was a bimodal age distribution with one peak in younger age group at about 15 years and another at about 55 years in the age group of 41-70 years, (Figure-1).

The average age of presentation was 47 years. There were 27 left eyes/adnexae (45.8%) and 32 right eyes/adnexae (54.2%) involvements. None of the case had bilateral involvement. The locations of lesion and detection of malignancy are presented in Table-2.

The pattern of malignant neoplasm is shown in Table 3.

The diagnosis of squamous cell carcinoma was the most common (66.1%), involving 19 males (48.7%) and 20 females (51.3%). There were 26 cases (66.7%) above 40 years of age and 13 cases (33.3%) below it including 3 cases of lower than 15 years. M/F ratio was 1:1. The average age of presentation (48 years) for males was 55 years and 41 years for females. It was affecting conjunctiva in 29 cases (74%), cornea in 2 cases (5%) and eyelids were involved in 8 cases (21%). Poorly differentiated type was detected in 5 cases involving conjunctiva (2), cornea (1) and eyelids (2).

Basal cell carcinoma was affecting 6 cases of one male
Pattern of Ocular Malignant Tumors in Bhairahwa, Nepal

(16.7%) and 5 females (83.3%) with M/F ratio of 1:5. All the 6 cases were involving above 40 years of age. The average age of presentation was 62 years. Lower eyelid was affected in 4 cases (66.7%), and upper eyelid in 2 cases (33.3%). It includes one case of basosquamous carcinoma with ulcerative lesion.

The Sebaceous carcinoma was affecting 6 cases with equal gender involvement. There were 5 cases of above 40 years, and one case of 35 years. The average age of presentation was 52 years. Upper eyelids were affected in 4 cases including one had ulcerative nodule for 1 1/2 years. One case was involving lower eyelid and another one to lateral canthus.

There were total 4 cases of retinoblastoma affecting 3 males and one female. Of these 3 cases were of less than or 5 years and one case of 10 years male. Eyeballs were enucleated in all the cases. None of the case had bilateral or optic nerve involvement.

Malignant melanoma was affecting 3 cases of one male and 2 female. There were 2 cases of above 40 years of age and one case was of 28 years. The average age of presentation was 47 years. Each one case of conjunctiva, upper eyelid and choroid were affected. In one case enucleation was done.

In this study, there was only one case of lacrimal gland adenocarcinoma. It was involving upper eyelid of a 70 years female.

In cases older than 15 years of age squamous cell carcinoma was found to be the commonest tumor (69.2%), followed by basal cell carcinoma (11.5%), sebaceous carcinoma (11.5%), malignant melanoma (5%) and lacrimal gland adenocarcinoma (2.5%). Among the cases below 15 years, retinoblastoma was the most common (57%) followed by squamous cell carcinoma (43%) (Table 4).

The present study has the high specificity of histological biopsy test of 98.93% for non-malignant cases and sensitivity of 64.04% for malignant cases. Calculated $\chi^2$ test with Yate’s correction is more than the theoretical value of $\chi^2$ 0.0001 at 1 degree of freedom (Table 5).

**Figure 7**
Table 5: Calculation of sensitivity and specificity of malignancy in the study (2x2 Contingency Table)

<table>
<thead>
<tr>
<th>Cases</th>
<th>No. of patients with % sensitivity</th>
<th>No. of patients with % specificity</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of patients with malignancy</td>
<td>57</td>
<td>32</td>
<td>89</td>
</tr>
<tr>
<td>No. of patients without malignancy</td>
<td>2</td>
<td>185</td>
<td>187</td>
</tr>
<tr>
<td>Total</td>
<td>59</td>
<td>218</td>
<td>277</td>
</tr>
</tbody>
</table>

Hence it shows significant dependence ($\chi^2$, p<0.0001) of histological biopsy performance with respect to the diagnosis of malignancy.

**DISCUSSION**

The present work revealed 45.8% males and 54.2% females. This was similar to the findings of 48.8% and 51.2% respectively in eastern Nepal and closer to 53.6% and 46.4% respectively in Singapore. The study expressed bimodal age distribution with one peak around 15 years and another around 55 years similar to other reports.

The most common malignancy in this study was squamous cell carcinoma (66.1%), supported by a study in Sudan which showed it as the commonest tumor with 50.4% cases. Poso M.Y. et al also reported it as the commonest tumor in their study with 33.5% cases. In the present study it was affecting conjunctiva most commonly (74.3%) and cornea (5.1%). Among the tumors of conjunctiva and cornea, Sunderraj revealed 55.1% in his study. Other scientists also reported conjunctiva as the commonest site. In our series, out of 21 eyelid involvement, 8 were of squamous cell
carcinoma (38.1%). Sunderraj reported 34% whereas other authors observed 22.4% and 22.2% respectively among eyelid tumors in neighboring India\textsuperscript{6,11}. Ultraviolet spectrum could be a factor for high incidence of this tumor, as large no. of persons work in the open sun, especially farmers and workers are exposed to it.

Basal cell carcinoma was by far most frequent neoplasm arising from cutaneous surface of eyelids involving 10.2% all above 40 years with average age of 62 years in our study. Reports from Sudan and Papua New Guinea revealed 6.1%, and 9.1% respectively with average age of 54 years\textsuperscript{9,15}. In our study, it was involving 4 lower and 2 upper eyelids out of total 21 eyelid cases (28.6%) including one case affecting medial canthus and another one to conjunctiva also. It was reported 33.3% and 37.6% respectively among eyelid tumors in some of the studies\textsuperscript{13,14}. In our series, lower eyelids were affected in 66.7% cases. It was reported 55% involvement in a study\textsuperscript{1}.

Sebaceous carcinoma was observed 1.7% and 31.7% respectively in studies in Papua New Guinea and Shanghai (China)\textsuperscript{14}. It was reported 12.1% of all ocular malignant tumors in a study in Korea, similar to our result of 10.2%\textsuperscript{15}. This variation may account for the geographical factors in the study involved. Out of 21 eyelid cases in our study, 6 were affected by this carcinoma (28.6%). Studies in Korea and India found 21.2% and 33% respectively\textsuperscript{13,16}. However, according to Kass et al, it accounts for 1-5.5% of all eyelid malignancies in the USA\textsuperscript{1}.

Retinoblastoma in our series revealed 6.7%. It varies greatly from some reports of 32%, and 31.7%\textsuperscript{6,8}. Other studies reported 20.8% & 19.8% respectively\textsuperscript{9,11}. It may be due to less number of cases in our study as enucleation started recently in the institutes. Retinoblastoma cases in our study were 75% in or below 5 years which was similar to the findings in Nepal who found 88.2% cases\textsuperscript{2}. Marshall observed it as the most common ocular malignancy in children\textsuperscript{4}.

Malignant melanoma was reported 4.6% and 4.5% respectively in the studies\textsuperscript{9,13}. There was 5.1% melanoma in the present study including a case affecting eyeball so much, that enucleation was to be done. The study conducted in Eastern Nepal and Nigeria reported 9.5% and 7.7% respectively of all ocular malignancies\textsuperscript{23}.

The lacrimal gland carcinoma was found to be 1.7% in this series, similar to the findings of Sunderraj and Verma et al who found least number of 3% and 3.4% cases respectively in their studies\textsuperscript{8,13}.

This retrospective study of malignant tumors of eye and adnexa has shown squamous cell carcinoma as the most common tumor (65%) with females presenting relatively at earlier average age (of 41 years) to males (55 years), followed by basal cell carcinoma (15%), and sebaceous carcinoma (12.5%) involving cases older than 40 years (Figure 2).

It will help ophthalmologist in shaping the strategy for diagnosis and management of malignant neoplasm in this region and compare from other parts of the globe...

ACKNOWLEDGMENTS

Authors are thankful to the Directors of the Universal College of Medical Sciences & Teaching Hospital, and Lumbini Eye Institute, Bhairahwa, Nepal for proper guidance, and their laboratory staff for co-operation in analyzing the data.

CORRESPONDENCE TO

Dr Rajendra Kumar, Department of Pathology, Universal College of Medical Sciences, Paklihawa Campus, P.O. Box 53, Bhairahwa, Nepal Phone No.: +977-71-522896(Office), 526384(Residence) Fax No.: +977-71-522921 Email: neerukumar@rediffmail.com

References

Author Information

Rajendra Kumar, MD
Department of Pathology, Universal College of Medical Sciences and Teaching Hospital

Rishi K. Adhikari, MS
Department of Oculoplasty, Lumbini Eye Institute

Manoj K. Sharma, MD
Department of Cornea & Ocular Surface, Lumbini Eye Institute

Daya R. Pokharel, PhD
Department of Biochemistry, Universal College of Medical Sciences and Teaching Hospital

Narayan Gautam, MSc
Department of Biochemistry, Universal College of Medical Sciences and Teaching Hospital