

REPORTING HIGH RISK HISTOPATHOLOGICAL FEATURES IN OPHTHALMIC PATHOLOGY

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Abstract

Background And Objectives: There can be a wide variety of space-occupying lesions in and around the orbit. These include congenital lesions, benign vascular lesions, inflammatory and infectious diseases and malignant neoplasms. In surgical pathology, the idea of a critical diagnosis in ophthalmic pathology entails a determination of the gravity of an anatomic finding and whether or not it was clinically predicted. If pertinent clinical information is included with the specimen before it is sent to the lab, pathologists are less likely to wrongly label a diagnosis as unexpected. The aim of this study was to determine critical diagnosis in different neoplastic and non-neoplastic lesions in ophthalmic pathology.

Methods: From January 2021 to March 2023, this cross-sectional descriptive study was carried out at the pathology department of a tertiary care hospital. Eighty-six cases of different lesions in the orbit were collected from Mayo Hospital, Lahore. All of the ocular specimens submitted to anatomical pathology were subjected to non-probability, convenient sampling to gather data. While the study did not include samples submitted for frozen sectioning or cytological examination.

Results: In 76% of instances, the histological diagnosis matched the clinical diagnosis. For 29 benign lesions, the ages of the patients ranged from 1-60 years with a mean of 31.48 years \pm 14.43 SD. Cystic lesions were most common benign lesions. There were 27 malignant lesions of orbit. Basal cell carcinoma and squamous cell carcinoma were the most frequent malignancies in adults whereas retinoblastoma was the most common tumor of children. Age ranged from 3-82 with a mean of 51.54 years \pm 24.58 SD. The lesions were more frequent in females.

Conclusion: In this study of 86 cases of lesions in orbit, it was concluded that non-neoplastic cystic lesions including epidermal inclusion cyst and dermoid cysts were most common. Among the malignant tumors, basal cell carcinoma is the most common malignant tumor followed by squamous cell carcinoma.

Key words: high risk, Histopathological, Ophthalmic, Pathology

How to cite: Hameed S, Anwar S, Rehman F. Reporting High Risk Histopathological Features in Ophthalmic Pathology. JAIMC 2023; 21(3): 217-222

The orbit and its surroundings can contain a wide range of space-occupying lesions. These include congenital lesions, vascular lesions, inflammatory conditions, infections, benign and malignant neoplasms, and more.¹ The globe, the muscle cone, and the intra-conal and extraconal gaps make up the orbit. The retina,

uvea, and sclera make up the globe. The sclera is connected with the dura mater posteriorly and the cornea anteriorly. The optic nerve continues from the retina in the back.^{2,3}

Space-occupying lesions in and around the orbit can take many different forms. These include vascular lesions, inflammatory conditions, infections, benign and malignant neoplasms, congenital lesions, and vascular lesions.¹ The globe, the muscle cone, as well as the intra- and extra-conal spaces, are the different parts of the orbit. Sclera, uvea, and retina make up the globe. The sclera is connected to the dura mater posteriorly and the cornea anteriorly in both directions. The optic

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Submission Date: 07-09-2023
1st Revision Date: 15-09-2023
Acceptance Date: 22-09-2023

nerve continues along the retina's posterior portion.⁴

Prompt communication of important laboratory results can have a significant impact on patient outcomes.⁵ Critical results, also known as panic values or critical values, often make up less than 2% of all laboratory results. Seventy-five percent of physicians note critical outcomes in the medical record, and two-thirds of critical results result in some modification of therapy.⁶

A comprehensive literature review was conducted by an expert panel, which reached the following conclusions: (1) each institution ought to develop its own guidelines for crucial, substantial and unexpected diagnoses; (2) guidelines for anatomic critical diagnoses should be kept apart from panic values in laboratory medicine; and (3) while an urgent and significant unexpected anatomic diagnosis ought to be dealt with as quickly as possible.²

There has not been any discussion of crucial ocular pathology diagnostics. Ocular pathology labs are very different from anatomic pathology labs in hospitals since they frequently get samples from remote sites. Some of the contrasts include the inability to efficiently contact medical service providers in far-off places and the inaccessibility of patient medical records.

The healthcare practitioner who orders a laboratory test is in charge of ensuring that the results are reviewed and the proper course of action is implemented. But when a crucial result turns up, lab staff are alerted to a potential medical concern before the seeking practitioner is informed of the seriousness of the issue. For patient safety in this situation, an efficient communication system is crucial.⁷

In older individuals, lymphoproliferative lesions are the most prevalent primary orbital tumors. These lesions include lymphoid hyperplasia, and lymphoma.^{2,8,9} When histopathologists work with cancer specimens, their reports should contain typical and pertinent data points, also referred to as a dataset. Histopathologists in the UK make use of datasets created by the Royal College of Pathologists. Every two years, data items are evaluated and compared to the international tumor,

node, and metastasis (TNM) classification.

The most prevalent cancer in worldwide is basal cell carcinoma (BCC). BCCs are most prevalent in the head and neck area, where they affect the eyelids 20% of the time. Nearly ninety percent of malignant eyelid tumors are BCC, with a slight male predominance. The age of tumor emergence is typically 60–80 years.^{11,12,13} Across the globe, squamous cell carcinoma is the second most frequent type of eyelid cancer. SCC is an aggressive malignancy that carries a high risk of rapid spread, severe morbidity, and mortality.^{14,15}

Several fungi can cause infections in the orbits. Orbital fungal infections can be vision-threatening. They can also be associated with high mortality. The most common orbital fungal infections are Mucormycosis and aspergillosis.^{16,17}

Tuberculosis of the orbit is rare. The disease is usually unilateral. The common presentations are proptosis, nontender or mildly painful orbital swelling and sinus formation. Tuberculosis should always be kept in mind in the differential diagnosis of orbital masses.¹⁸

OBJECTIVES

The aim of this study was to determine critical diagnosis in different neoplastic and non-neoplastic lesions in ophthalmic pathology.

METHODS

From January 2021 to March 2023, this cross-sectional descriptive study was carried out at the pathology department of a tertiary care hospital. This study has received permission from the internal review board. Using a 5% margin of error, a 95% confidence level, and an expected error percentage of 7.6%, a sample size of 86 instances was computed.⁷ All of the ocular specimens submitted to anatomical pathology were subjected to non-probability, convenient sampling to gather data. While the study did not include samples submitted for frozen sectioning or cytological examination. All researchers were required to follow procedures, and these procedures complied with the 1975 Helsinki Declaration (updated in 1983) and the ethical

guidelines of the relevant institutional or regional committee on human testing. The institutional review board of our institute gave the study its approval. The Institutional Review Board declared our study to be of "minimal risk," and informed permission was not required because we used preexisting tissue that had been collected from human subjects for clinical purposes.

In 10% formalin solution, 86 samples of various orbital lesions from both out-patients and in-patients at the Lahore General Hospital and Mayo Hospital's ophthalmology department were analyzed. Each patient's comprehensive clinical history was acquired using a proforma.

Additional ancillary investigations were used as needed after the tissues were fixed, processed, and stained with haematoxylin and eosin (H&E). For a certain diagnosis in challenging and uncommon scenarios, immunohistochemistry (IHC) and specialized stains like Perodiac acid-Schiff (PAS) and silver stains were used. According to epidemiological and clinicopathological data, a histomorphological diagnosis was made and assessed. SPSS 26.0 was used to analyze the data. The quantitative variables were presented as mean + standard deviation.

The following four categories were employed for categorizing crucial diagnoses.

- (1) A potentially unrecognized extrascleral extension of an uveal melanoma;
- (2) A possible unrecognized intraocular tumor;
- (3) A potentially unrecognized intraocular infection; and
- (4) A potentially important associated systemic medical condition

RESULTS

The study was conducted from January, 2021 to March, 2023 in histopathology department, Lahore General Hospital, Lahore. Out of 86 cases of orbital lesions, 28 were benign and 19 were malignant. For benign lesions, the ages of the patients ranged from 1-60 years with a mean of 31.48 years \pm 14.43 SD. Male to female ratio was 1:1.51 (47.67%, 52.32%)

respectively.

In 76% of instances, the histological diagnosis matched the clinical diagnosis. The cases where a malignant diagnosis was made showed the highest correlation. The incidence of clinical misdiagnosis of neoplastic lesions was least in situations of infectious aetiology, such as mucormycosis and inflammatory pseudotumors. The majority of the lesions (61.1%) were non-neoplastic. An estimated 27.2% of non-neoplastic lesions were caused by fungus, particularly mucormycosis.

Twenty percent of the neoplastic tumors were benign, while eighty percent were malignant. Angiomatous lesions, followed by intradermal nevi, were the most prevalent benign ophthalmic lesions, accounting for 63.2% of all cases [Table 1]. Retinoblastoma, sebaceous carcinoma, malignant melanoma, lymphoma, and SCC were the three most prevalent tumors among malignant ocular lesions, making up 69.7% of all malignant ophthalmic tumours. The pediatric age group (20 years) has a high prevalence of retinoblastoma. Sebaceous carcinoma, however, was the most prevalent among people over the age of 40, followed by SCC (21%) in frequency. (Table 2)

Out of benign tumors there were 4 cases of epidermal inclusion cyst (21.1%), 3 cases of dermoid cyst (15.7%) and squamous papilloma each. There were 2 cases of reactive lymphoid hyperplasia, one each of angiolymphatic hyperplasia and inflamed granulation tissue. There was one case each of epidermal nevus, compound nevus, hemangioma, leiomyoma, peripheral giant cell granuloma, chalazion, chondroid metaplasia and inflammatory myofibroblastic tumor. (Figure 1)

There were four cases of chronic granulomatous inflammation due to tuberculosis. Among the fungal infections, aspergillosis, mucormycosis and candidiasis were more common.

There were 19 malignant lesions of orbit. Age ranged from 3-82 with a mean of 51.54 years \pm 24.58 SD. There were 9 cases of basal cell carcinoma which is the most common malignant lesion (37.03%), followed by squamous cell carcinoma (33.3%). Two cases of squamous cell carcinoma were seen in patients with

xeroderma pigmentosum. Patient's ages were 20 and 26 years respectively. (Figure 2)

There were 3 cases of sebaceous carcinoma, all seen in males, with ages ranging from 65-80 years. There was 1 case each of adenocarcinoma and malignant peripheral nerve sheath tumor seen in males of ages 72 and 14 years respectively. Retinoblastoma was seen in 3 females with ages ranging from 3-5 years.

Table 1: Frequencies and Percent of Various Ophthalmic Lesions

| Gender | No. of cases | Percent |
|--------------------|--------------|---------|
| Male | 41 | 47.67 |
| Females | 45 | 52.32 |
| Side of lesion | No. of cases | Percent |
| Right | 40 | 46.51 |
| Left | 36 | 41.86 |
| Bilateral | 5 | 5.81 |
| Location of lesion | No. Of cases | Percent |
| Eyelid | 46 | 54% |
| Intra-Ocular | 23 | 27% |
| Orbit | 6 | 7% |
| Lacrimal Sac | 4 | 5% |
| Conjunctiva | 3 | 3% |
| Retina | 3 | 3% |
| Lacrimal Gland | 1 | 1% |
| Types of lesions | No. Of cases | Percent |
| Non-neoplastic | 39 | 45.34 |
| Neoplastic | 47 | 54.65 |
| Benign | 28 | 32.55 |
| Malignant | 19 | 22.09 |

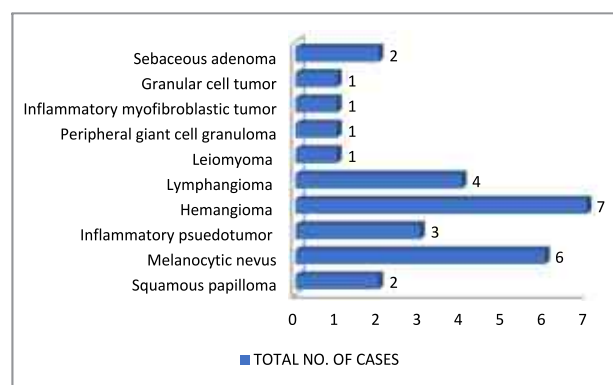


Figure 1: Frequency Of Benign Ophthalmic Lesions

Table 2: Frequency of Non-neoplastic Ophthalmic Lesions

| Sr. No. | Type of non-neoplastic lesion | Total no. of cases |
|---------|--|--------------------|
| 1. | Inflamed granulation tissue | 6 |
| 2. | Reactive lymphoid hyperplasia | 2 |
| 3. | Angiolymphoid hyperplasia with eosinophilia | 1 |
| 4. | Chronic granulomatous inflammation (Tuberculosis) | 2 |
| 5. | Chronic granulomatous inflammation (Fungal infections) | 9 |
| | a) Candidiasis | 5 |
| | b) Aspergillosis | 2 |
| | c) Mucormycosis | |
| 6. | Non-neoplastic cystic lesions | 13 |
| 7. | Chlazon | 5 |
| 8. | Hamartomatous lesion—chondroid metaplasia | 1 |

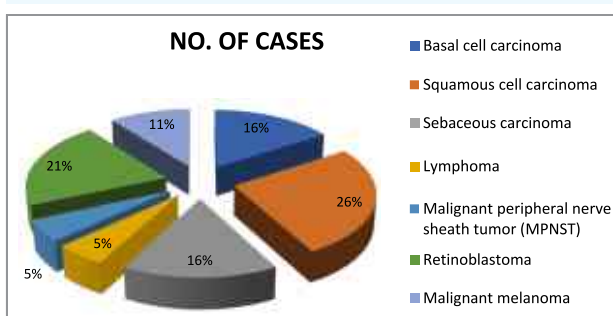


Figure 2: Frequency of Malignant Ophthalmic Lesions

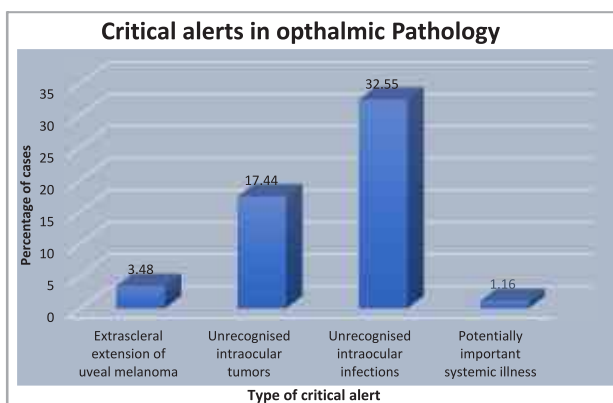


Figure 3: Critical Alerts in Ophthalmic Pathology

DISCUSSION

As the histopathology section of the Department of Pathology, receives biopsy specimens from the whole region, urban as well as rural nevertheless, it might be viewed as a reliable indicator of regional trends

in the distribution of ocular lesions and as representative of this region of the country. The experience with these instances of surgically removed eyes was examined in order to gain a better understanding of the major diagnoses in ocular pathology and the frequency of their occurrence. For the sake of this discussion, a "critical anatomic diagnosis" is a serious, unexpected diagnosis that necessitates quick verbal communication between the pathologist and the surgeon or other appropriate medical specialist.

Ophthalmic lesions were found to be most prevalent (23.6%) in the 0–9 year age group in the present research project. However, the majority of cases were recorded in the 31–40 year age category in the study by Chauhan SC et al.³. This might be because retinoblastoma and rhinosporidiosis are more common in this area.

It is crucial to identify high-risk characteristics during a histopathological evaluation. This is due to the effects that these elements may have on both the likelihood of systemic metastasis and overall survival. Additionally, the presence of these elements necessitates the implementation of systemic chemotherapy after enucleation to increase survival rates and reduce the danger of metastases.

In 76% of instances, the clinical and histological diagnoses were in agreement. Chauhan SC et al.'s series has poor accuracy (39%).³ Other research indicated that it was closer to 84%. 91.5% and 96%. 5–7 Eyelid lesions had the worst clinico-pathological connection (38%) and enucleation specimens had the best correlation (82%). This was consistent with what other studies¹⁵ had shown.

Location-wise, the eyelid (33.6%) was the most often affected site; comparable results were noted by Chauhan SC et al.,³. The least frequently affected region in our analysis was the lacrimal gland (2.9%), whereas the least frequently affected site in Chauhan SC et al.'s study was the lacrimal sac (2%).^{3,10} In our investigation, the most frequent kind of persistent granulomatous inflammation was caused by a fungus that involved the orbit. In our study, non-neoplastic lesions were more common than neoplastic lesions, in contrast to other

studies.¹⁵ Due to the hot and humid climate, rhinosporidiosis is prevalent in some regions of India, including Central India, where it primarily affects agricultural laborers with poor socioeconomic level. Malignant lesions were more frequent (80%) among the neoplastic lesions. This was comparable to what Ud-Din N et al.^{18,19} observed in his study. This might be as a result of the high retinoblastoma incidence in both sets of data. Other research, however, found the contrary to be true.

Due to retinoblastoma, which made up 40.1% of all malignant ophthalmic lesions; a substantial number of malignant ocular lesions have been reported in children. Our results were more in line with those of prior studies, which reported 31.7% and 32%, respectively^{16,22}. Therefore, just like in other research, retinoblastoma was the most prevalent cancer in children in the current study. The diagnosis, staging, and prediction of prognostic variables and metastatic risk are all greatly aided by histopathological study of RB patients. When analyzing the four block sections supplied, more care should be taken to find high-risk characteristics that point to the administration of adjuvant chemotherapy, which lowers the rate of metastatic disease and raises survival rates. Retrolaminar optic nerve invasion, choroidal invasion, anterior chamber involvement, and extraocular or extra-scleral dissemination are among the high-risk characteristics.²⁴

A broad spectrum of ocular abnormalities and dearth of thorough histological investigations from this region that have been published to date prevent us from conducting a sufficient evaluation of the data and drawing firm conclusions.

CONCLUSION

The eye is a crucial organ for visual perception in the body. The need of prompt identification and therapy of its diseases is increased by its physical proximity to other crucial head and neck structures. Pathologists must be aware that a clinically relevant anatomic finding may be missed in a lengthy report because different diseases are frequently connected to surgically removed eyes. As long as critical (i.e., urgent alert) anatomic

diagnoses are necessary for laboratory certification, the certification requirements should be connected with ongoing training of surgeons and operating room staff about the significance of including a pertinent clinical history with any specimen submitted to the lab.

Conflict of Interest *None*

Funding Source *None*

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