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Original Article

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A Kaleidoscopic Spectrum of Orbito-ocular Lesions

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Abstract

Background: Ophthalmic lesions comprise a wide range of disorders ranging from benign and precancerous to malignant lesions. The rarity of orbito-ocular lesion, further complicates the recognition of their fine and subtle presentations. This can pose a huge diagnostic dilemma to the ophthalmologist and pathologist. This study was undertaken with an intention to study the demographic details, site, clinical presentation and histopathological findings of orbito-ocular lesions to arrive at a definitive diagnosis and for further patient management. ***Aim***: To determine the spectrum of histopathological diagnosis of orbito-ocular lesions. ***Objectives***: 1. To categorize the orbito-ocular lesions into six groups, viz., I-Non-neoplastic (A-Inflammatory, B- Infectious, C- Degenerative, D-Cysts, E-End stage condition, F- Autoimmune disease), II- Precursor lesions, III-Benign, IV- Malignant, V-Metastatic and VI-Syndromic based on the clinical and final histopathological diagnosis.2. To study the frequency distribution of cases according to age, sex, location and clinical presentation of the lesions. 3. To list out the spectrum of orbito-ocular lesions in each category. ***Materials and Methods:*** The present study was a retrospective descriptive study conducted for a period of 7 years (2018-2024). Paraffin embedded blocks, slides (including special stains and IHC slides) and previous reports were retrieved and reviewed. Data was collated and analyzed using MS Excel and SPSS software. ***Results***: A total of 348 cases were included in the study. Majority of the cases were in the age group of 51-60 years. Male to female ratio was 1.1:1. Eyelid was the commonest location of lesions constituting 40% (n=139) of the total number of cases. The most common clinical presentation of the lesions was mass (53%, n=186). Non-neoplastic lesions (44.5%, n=155) constituted the majority of cases among all the categories followed by benign lesions (29%, n=102). Among the non-neoplastic lesions, cystic lesions (ID) were predominant constituting 42.5% (n=66) of the total cases. ***Conclusion***: All the ophthalmic biopsies and specimens should be subjected for histopathological examination as the knowledge of spectrum of orbito-ocular lesions will prove to be helpful to the ophthalmologists in shaping the strategy for diagnosis and management of lesions.

Keywords: ***Autoimmune, Eyelid, Malignant, Metastatic, Orbito-ocular lesions, Primary mucinous adenocarcinoma, Syndromic, Thyroid eye disease***

Introduction

Ophthalmic lesions comprise a wide range of disorders ranging from benign and precancerous to malignant lesions.[1] The complete spectrum of orbito-ocular surgical biopsies reported in literature is few.[2] The rarity in which orbito-ocular lesions occur, further complicates the recognition of their fine and subtle presentations.[3] This can pose a huge diagnostic dilemma to the ophthalmologist and pathologist, more so that clinical signs and symptoms of ocular malignancies had been reported to mimic more commonly occurring benign conditions.[4]

A histopathological examination of the excised or incised orbital or ocular lesions are absolutely mandatory for each case to arrive at a definitive diagnosis and for further patient management. [2]

Aims and Objectives

Aim: To determine the spectrum of histopathological diagnosis of orbito-ocular lesions.

Objectives

1. To categorize the orbito-ocular lesions, viz., I-Non-neoplastic (A-Inflammatory, B- Infectious, C-Degenerative, D-Cysts, E-End stage condition, F-Autoimmune disease), II- Precursor lesions, III- Benign, IV- Malignant, V-Metastatic and VI-Syndromic based on the clinical and final histopathological diagnosis.
2. To study the frequency distribution of cases according to age, sex, location and clinical presentation of the lesions.
3. To list out the spectrum of orbito-ocular lesions in each category.

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Materials and Methods

This was a retrospective study conducted in the histopathology department of our institutional central laboratory for a period of seven years during 2018 to 2024. A total of 348 cases of orbito-ocular surgical specimens received for histopathological examination during the period were included. Histopathology slides [including special stains and Immunohistochemistry (IHC) stains] and reports were retrieved and reviewed. A detailed clinical history of each patient regarding age, sex, chief presenting complaints, location of lesions and other relevant findings were extracted from the histopathology request forms and case sheets.

Statistical analysis: The data collected was entered in excel sheet and was analyzed using Microsoft Excel and software Statistical Package for Social Sciences (SPSS) program version 22.

Results

Out of 348 cases of orbito-ocular lesions, majority of the cases were in the age group of 51-60 years **(Table 1).** The male to female ratio was 1.1:1 **(Table 2).** Eyelid was the commonest location of lesions constituting 40% (n=139) of the total number of cases followed by orbit (32%, n=110) and conjunctiva (13%, n=44) (Figure 1). The most common clinical presentation of the lesions was mass (53%, n=186) followed by cyst (19%, n=67) and nodule (7%, n=23) **(Figure 2).**

A varied spectrum of lesions was reported under each category **(Table 3).** Non-neoplastic lesions (44.5%, n=155) constituted the majority of cases among all the categories followed by benign lesions (29%, n=102) (**Figure 3**). Among the non-neoplastic lesions, cystic lesions (ID) were predominant constituting 42.5% (n=66) of total cases (n=155) **(Figure 4).** Intradermal nevus constituted the majority of cases (19.6%, n=20) followed by squamous papilloma (13.7%, n=14) in our study among the benign lesions. Basal cell carcinoma (BCC) [28.6%, n=14] constituted the majority of cases followed by sebaceous cell carcinoma (20.4%, n=10) and squamous cell carcinoma (18.36%, n=9) among the malignant lesions (n=49). Basal cell carcinoma variants included pigmented, adenoid cystic and baso-squamous BCC.

Table 1: Distribution of cases according to age groups

Age At Presentation	No. of Cases	Percentage
1 to 10	22	6.3
11 to 20	27	7.8
21 to 30	44	12.6
31 to 40	41	11.8
41 to 50	51	14.7
51 to 60	66	19
61 to 70	61	17.5
71 to 80	22	6.3
81 to 90	14	4
Total	**348**	**100**

Table 2: Sex distribution of cases

Sex	No. Of Cases	Percentage
Male	181	52
Female	167	48
Total	**348**	**100**

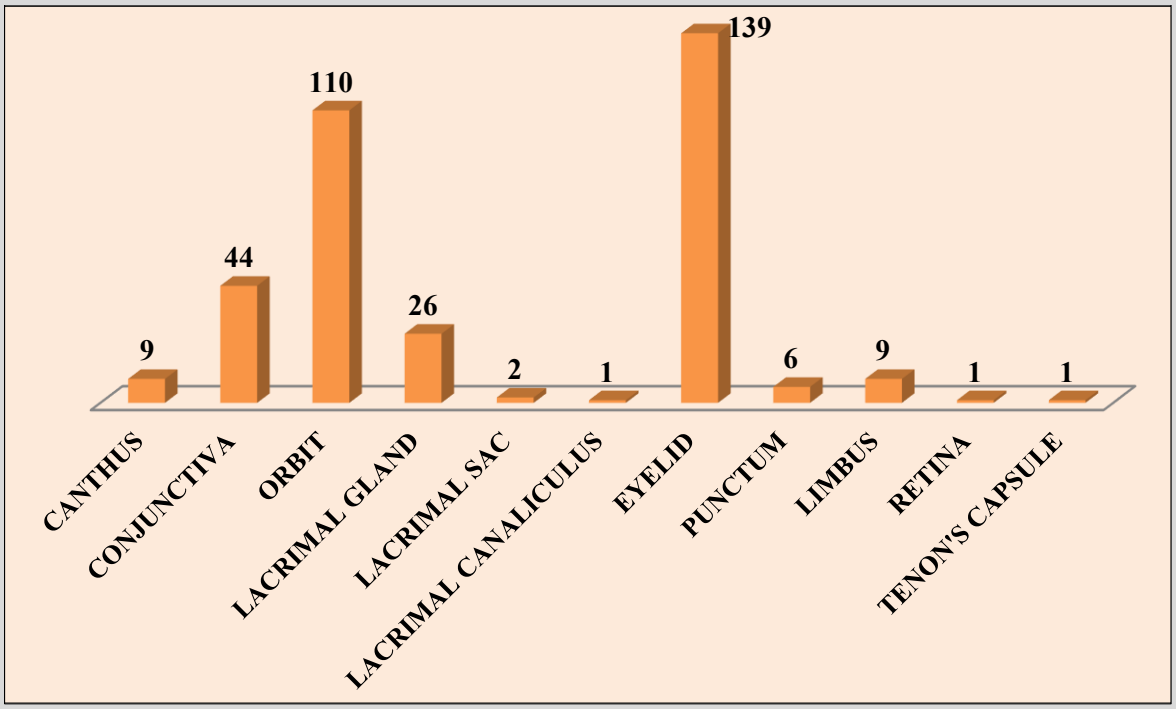

Figure 1: Location wise distribution of cases

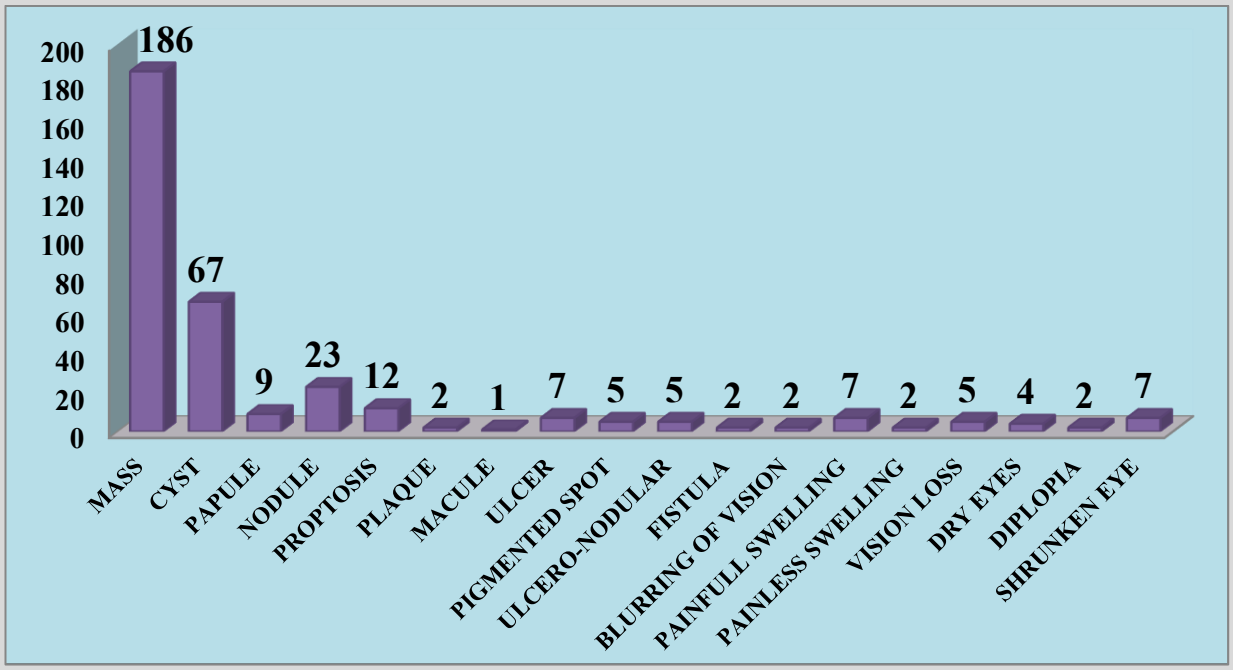

Figure 2: Distribution of cases according to Clinical presentation

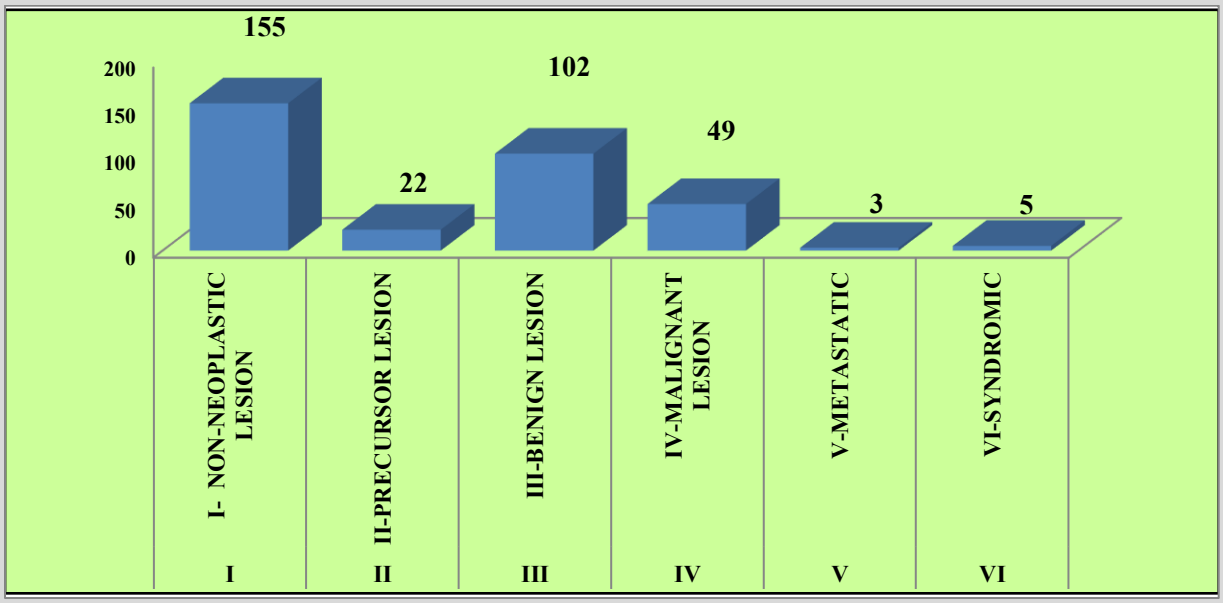

Figure 3: Categorization of the lesions

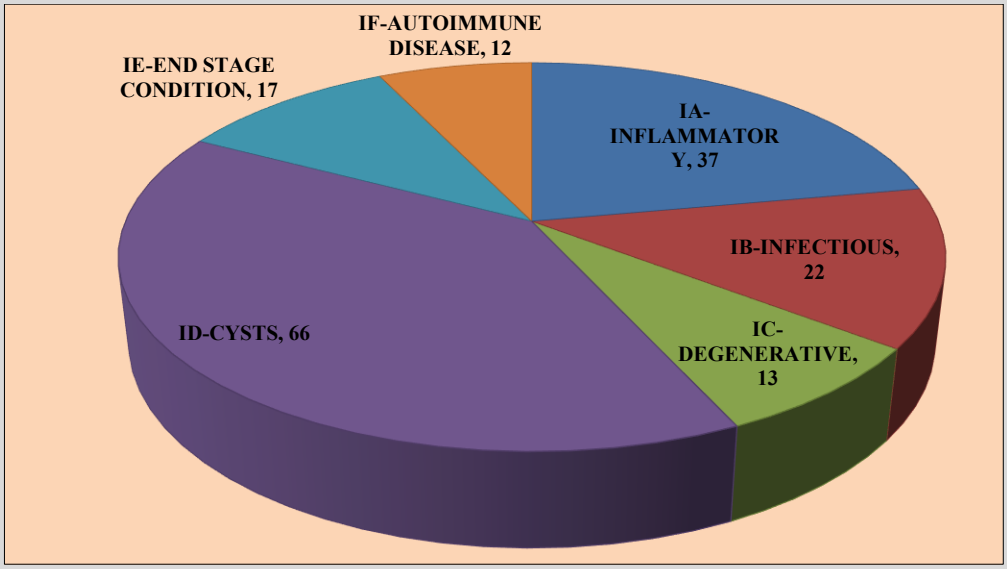

Figure 4: Sub-categorization of the Non-neoplastic cases

Table 3: Spectrum of lesions under each category

Sl. No	Category	Spectrum of Lesions	
1.	I- Non-Neoplastic Lesions	IA- Inflammatory	Chalazion, Igg4 Related Disease, Xanthogranulomatous Reaction, Chronic Granulomatous Reaction, Dacryocystitis, Inflamed Lacrimal Fistula, Panophthalmitis, Foreign Body Granuloma, Lipogranulomatous Inflammation, Abscess
		IB- Infective	Fungal Infection, Mucormycosis, Aspergillosis, Cysticercosis, Parasitic Lesion, Tuberculosis, Molluscum Contagiosum, Bacterial Osteomyelitis, Actinomycosis
		IC- Degenerative	Pterygium, Pinguecula
		ID- Cyst	Epidermal Inclusion Cyst, Conjunctival Inclusion Cyst, Eccrine Cyst, Dermoid Cyst, Moll's Gland Cyst, Dacryops, Sebaceous Cyst, Cyst Of Zeiss, Tenon's Cyst
		IE- End Stage Condition	Phthisis Bulbi
		IF- Autoimmune	Thyroid Eye Disease
2.	II-Precursor Lesions	Ocular Surface Squamous Neoplasia (OSSN) **(Figure 5C),** Conjunctival Carcinoma In-Situ, Pterygium with Dysplasia (OSSN), Pinguecula with Dysplasia (OSSN)	
3.	III- Benign Lesions	Arterio-Venous Malformations, Lymphovenous Malformation, Venous Malformation, Capillary Hemangioma, Cavernous Hemangioma **(Figure 5A),** Intradermal Nevus, Squamous Papilloma, Dermolipoma, Pyogenic Granuloma, Neurofibroma, Choristoma, Hemangiopericytoma, Syringocytadenoma Papilliferum, Calcinosis Cutis, Rosai-Dorfman Disease, Reactive Lymphoid Hyperplasia, Plexiform Neurofibroma, Steatocystoma Multiplex, Pleomorphic Adenoma **(Figure 5B),**Schwannoma**(Figure 5D),** Seborrheic Keratosis, Xanthoma, Xanthelasma, Castleman's Disease, Eccrine Spiradenoma, Sebaceous Gland Hyperplasia, Ectopic Lacrimal Gland, Fibrous Histiocytoma, Fibroepithelial Polyp	
4.	IV- Malignant Lesions	Squamous Cell Carcinoma (SCC), Baso-Squamous Carcinoma, Basal Cell Carcinoma (BCC), Pigmented BCC, Adenoid Cystic Bcc, Sebaceous Cell Carcinoma, Adenocarcinoma, Primary Mucinous Adenocarcinoma (PMA) **(Figure 6A),** Non-Hodgkin's Lymphoma (NHL)-Maltoma, NHL Marginal Zone Lymphoma, NHL- Follicular Lymphoma, NHL- Burkitt's Lymphoma, Epithelioid Sarcoma, Rhabdomyosarcoma, Plasmacytoma, Retinoblastoma	
5.	V- Metastatic Lesions	Metastatic Gastrointestinal Stromal Tumour (GIST), Metastatic Hepatocellular Carcinoma (HCC) **(Figure 6B)**	
6.	VI-Syndromic	Goldenhar Syndrome (Conjunctival Complex Epibulbar Choristoma, Lipodermoid), Plexiform Neurofibroma (Multiple Neurofibromas), Carney Complex or Myxoma Syndrome (Conjunctival Myxoma), Brooke-Spiegler Syndrome (Multiple Trichoepitheliomas and Cylindromas)	

Table 4: Demographic comparison with other studies

Sl. No	Study	Duration of Study	Total No. Of Cases	Predominant Age Group	Male to Female Ratio
1.	**Present Study**	**7 Years**	**348**	**51-60 (19%)**	**1.1:1**
2.	Ebrahim H *et al.*[1]	**4 Years**	**209**	**21-30 (49%)**	**1.7:1**
3.	Bastola P *et al.*[2]	**5 Years**	**100**	**31-40 (18%)**	**1:1**
4.	Kayoma DH *et al.*[5]	**15 Years**	**236**	**0-9 (27%)**	**1:1.01**
5.	Rajharsh D *et al.*[6]	**5 Years**	**116**	**31-40 (18%)**	**1.1:1**
6.	Gupta Y *et al.*[7]	**6 Years 10 Months**	**488**	**0-9 (23.6%)**	**1:1**
7.	Kafle, S. U *et al.*[8]	**1 Year**	**185**	**11-20 (49%)**	**1.1:1**
8.	Paul S *et al.*[9]	**4 Years**	**855**	**Mean Age 60.1 Years**	**0.8:1**
9.	Coroi Mc *et al.*[10]	**8 Years**	**471**	**6th Decade**	**1.2:1**

Table 5: Comparison of the commonest location, clinical presentation, common category and the leading ophthalmic lesions with other studies

Sl. No	Study	Most Common Location	Clinical Presentation	Most Common Category	Leading Ophthalmic Lesion
1.	Present Study	Eyelid (40%)	Nodules (36%)	Non-Neoplastic (41%)	Cystic Lesions (42.5%) And Inflammatory Lesions (24%)
2.	Ebrahim H *et al.*,[1]	Conjunctiva (61.2%)	Mass (72.7%)	Malignant (56.5%)	SCC (49.15%)
3.	Bastola P *et al.*,[2]	Eyelid (57%)	NA	Benign (79%)	Pyogenic Granuloma (22.5%)
4.	Kayoma DH *et al.*,[5]	Conjunctiva (58%)	NA	Malignant (36%)	Squamous Cell Carcinoma (45.9%)
5.	Rajharsh D *et al.*,[6]	Eyelid (52.6%)	NA	Benign (43%)	Nevus (15.5%)
6.	Gupta Y *et al.*,[7]	Eyelid (33.6%)	NA	Non-Neoplastic (61.1%)	Inflammatory Lesions (40.6%)
7.	Kafle, S. U *et al.*,[8]	Corneo-Conjunctiva (61.2%)	NA	Non-Neoplastic (36.8%)	Inflammatory Lesions (51.5%)

*NA-Not applicable

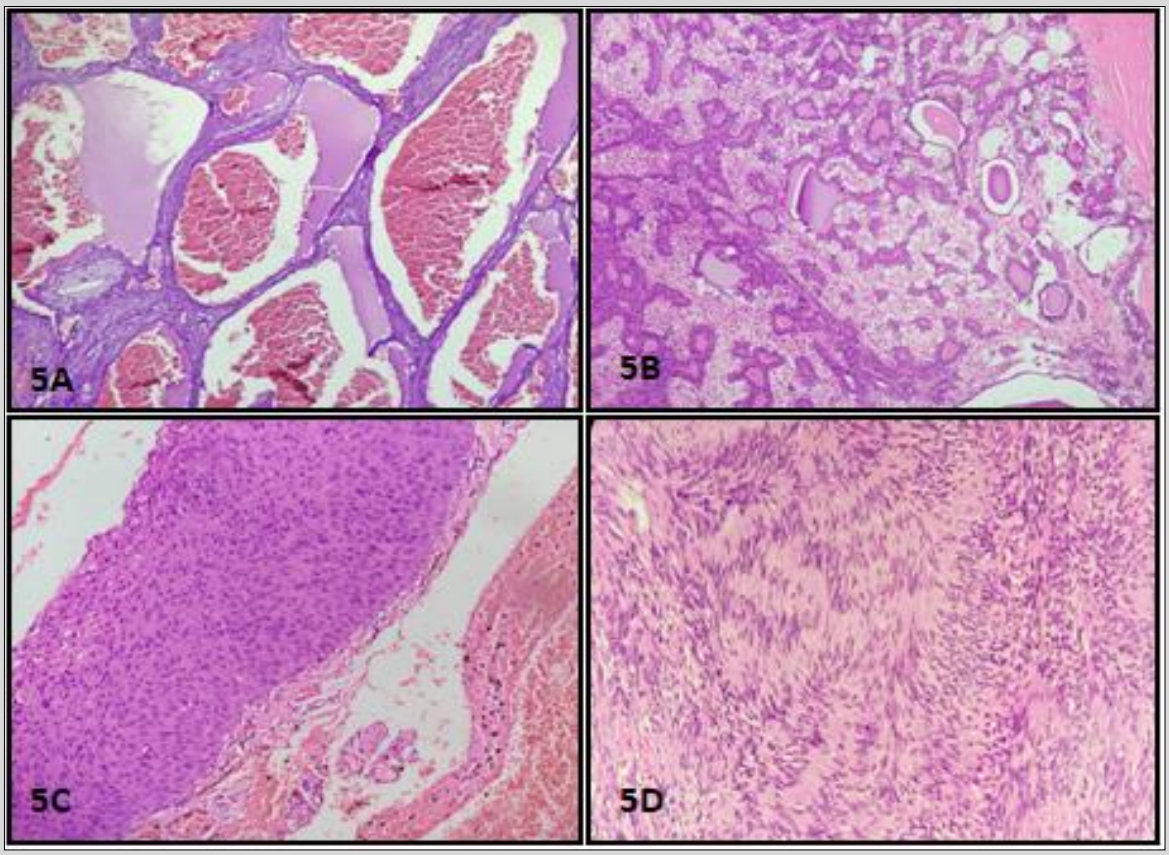

Figure 5A: Microscopy of Cavernous hemangioma; 5B: Pleomorphic adenoma; 5C: Ocular surface squamous neoplasia; 5D: Schwannoma [x100, Hematoxylin & Eosin]

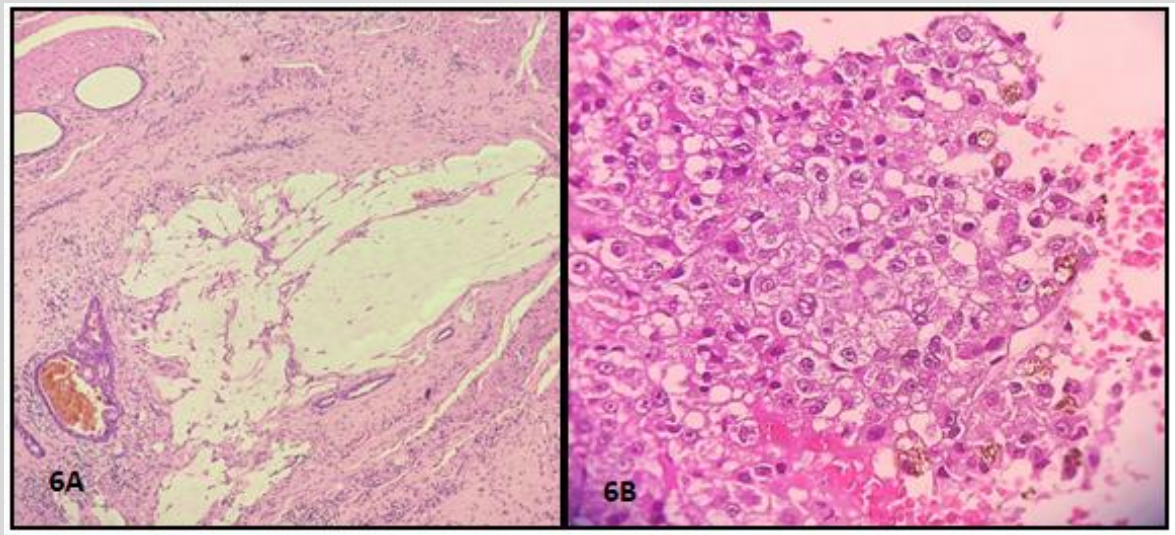

Figure 6A: Microscopy of Primary mucinous adenocarcinoma; 6B: Metastatic Hepatocellular carcinoma [x100, Hematoxylin & Eosin]

Discussion

The results of the present study were comparable with various other similar studies. In the study of Paul S *et al.*,[9] and Coroi MC *et al.*,[10], most affected the age range was the sixth decade similar to our study **(Table 4).** However, in a study by Kayoma DH *et al.*, [5], the orbito-ocular lesions were highest in 0-9 year age group. Gender wise there was not much difference as the lesions were found to have a slight male preponderance in most of the studies. Contradictory to these findings, in the study by Paul S *et al.*,[9], females were more affected than males (53 % vs. 47%).

We found eyelid lesions being the most common (40%) similar to other studies [2,6,7]. Literature reveals sparse studies on the clinical presentation of orbito-ocular lesions. However, in a study done by Ebrahim H *et al.*,[1], the most common clinical presentation of lesions was mass (72.7%) similar to our study (53%, n=186). Non-neoplastic lesions constituted the majority of lesions among all the categories similar to other studies by Gupta Y *et al.*,[7] and Kafle SU *et al.*,[8]. Among the non-neoplastic lesions, inflammatory lesions predominated in these studies whereas in our study cystic lesions predominated (42.5%) followed by inflammatory lesions (24%) **(Table 5).** Thyroid eye disorders (7.7%) were reported under the autoimmune (IF) category with the mean age of presentation being 48.5 years. There is a lack of studies on thyroid eye diseases among the spectrum of orbito-ocular lesions in literature.

Among the benign lesions (29.3%, n=102), intradermal nevus constituted the majority of cases (19.6%, n=20) followed by squamous papilloma (13.7%, n=14) in our study. This was similar

to the study by Rajharsh D *et al.*[6] in which nevus (15.5%) predominated among the benign lesions.

Basal cell carcinoma (28.6%, n=14) constituted the majority of cases among the malignant lesions similar to the studies by Paul S *et al.*, [9], Coroi MC *et al.*, [10], Kapurdov A *et al.*,[11] and Srikanth S *et al.*[12] Six cases (12%) of Non-Hodgkin's lymphoma were reported. Two cases among them were Mucosa-Associated Lymphoid Tissue lymphomas (MALTOMAs), one case of Burkitt's lymphoma (IHC markers: PAX5 +, CD 20+, CD 10+, BCL2-, CD2-, CD3-) in a 5 year old immunocompromised male child, one case of Marginal zone lymphoma (IHC markers: CD19+, CD20+, BCL2 +, CD3-, CD5-, CD10-) and two cases of Follicular lymphoma. Three cases of adenocarcinoma were reported among which two were primary mucinous adenocarcinomas **(Figure 6A).** Only one case of Retinoblastoma (2%) was reported in our study in a 3 year old male child and the frequency was very less as compared to other studies [5,13,14]. One case of rhabdomyosarcoma (2%, n=49) was reported which was less compared to a study by Bastola *et al.* [2] in which two cases (6%, n=30) were reported.

Three cases of metastatic tumours (0.8%) were reported which included one case of metastatic gastrointestinal stromal tumour (GIST) presenting as proptosis and two cases of metastatic hepatocellular carcinomas (HCC) **(Figure 6B)** presenting as masses. We also reported five cases (1.4%) of orbito-ocular lesions associated with syndromes. One case of Goldenhar syndrome was reported in a 17 year old female patient who presented with hemifacial microsomia, conjunctival complex epibulbar choristoma and lipodermoid. Two cases of Plexiform neurofibromatosis were reported. One case of Myxoma syndrome or Carney complex was reported in a 26 year old female who presented with atrial myxoma and multiple myxomas in the eyelid. One case of Brooke-Spiegler syndrome was reported in a 39 year old male patient who presented with multiple trichoepitheliomas and cylindromas. We did not find any studies in literature with a mention about the metastatic tumors to orbit or about the orbito-ocular lesions in association with syndromes.

Conclusion

This study showed a wide spectrum of orbito-ocular lesions. There was slight male preponderance. Majority of the cases were in the 6th decade of life. Eyelid was the commonest site of lesions. Majority of the lesions clinically presented as a mass. Non-neoplastic (I) lesions constituted the majority among all the orbito-ocular lesions and cystic lesions (ID) were predominant in this category. Literature reveals very few studies on the spectrum of orbito-ocular lesions especially with regards to its distribution according to the clinical presentation and location. There are sparse studies on orbito-ocular lesions associated with syndromes. Present study will definitely add on to the existing literature. All the ophthalmic biopsies and specimens should be subjected for histopathological examination as the knowledge of spectrum of orbito-ocular lesions will prove to be helpful to the ophthalmologists in shaping the strategy for diagnosis and management of lesions.

Declarations

Ethical Clearance

Taken

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Nil

Conflict of Interest

All the authors declare that they have no conflict of interest of any sort pertaining to the article.

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