A cross sectional study to evaluate orbital tumors requiring surgical intervention in a tertiary care centre

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Abstract :

Introduction: Orbital mass lesions have various underlying pathological processes that may fall under the expertise of different medical specialties, each with their own management biases. There have been number of published reviews related to the incidence of various orbital tumors and space occupying lesions. We have conducted this study to evaluate orbital space occupying lesions which required surgical intervention. **Methods:** The medical records of all patients with histopathologically proven diagnosis of orbital tumors operated by a same surgeon at a tertiary eye care were reviewed retrospectively. Patients of all age groups were included in this study. Thyroid related orbitopathy, infective lesions and inflammatory lesions managed medically were excluded from the study. For each patient medical record was reviewed for various parameters. **Results:** There were 134 patients in our study. 74 (55.2%) were males and 60 (44.8%) were females, 96 (71.6%) were >16 years old and 38 (28.4%) were children (< 16 years). Most common symptom was swelling seen in 60 cases (44.78%). Fundus examination showed Choroidal folds in 15 cases (11.19%) and Swollen Disc in 11 cases (8.20%). Mostly lesions were extraconal in 98 cases (73.13%) followed by intraconal in 28 cases (20.90%). Majority lesions were primary tumors in 119 cases (88.81%) followed by secondary in 15 cases (11.19%). There were 102 benign tumors (76.11%), 30 malignant cases (22.39%) and 2 cases converted from benign to malignant (1.49%). Most common intervention done was Biopsy excision in 109 cases (81.34%) followed by Biopsy – Incision in 9 cases (6.72%), Biopsy –Debulking in 6 cases (4.48%) and Enucleation was done in 4 cases (2.99%). **Conclusion:** Orbital tumors differ amongst various age groups. The clinician should be able to arrive at a fairly accurate diagnosis in most cases allowing the clinician to provide better care to the patient.

Key Words: Orbital Space Occupying Lesions, Orbital Tumors, Surgical Intervention, Benign, Malignant

Introduction:

Orbital tumors comprise a diverse group of neoplasms, infiltrations, and malformations.[1] There have been number of published reviews related to the incidence of various orbital tumors and space occupying lesions.[2-4] The reported incidence of such tumors varies considerably from series to series depending upon the differences in local referral patterns, the method of classification, a source of material studied, age groups, geographic areas and the special interests of the investigators. There are marked differences in reports from paediatric hospitals, pathology referral centers neurological departments & otolaryngology practice.[5]

Some reviews have included only tumors that occur in young patients & some have included only patients from certain geographic areas, particularly tropical countries which may not reflect what is seen worldwide.[6] As a result of those many variables, it is difficult to attain an accurate perspective of true incidence of space occupying orbital lesions. Attempts to correlate clinical features of orbital tumors with specific diagnosis by analyzing signs, symptoms, and imaging characteristics have been made in the past. Although narrow categorization of this heterogeneous group is difficult, these correlations have yielded general classification guidelines for orbital tumors.[7]

Orbital mass lesions have various underlying pathological processes that may fall under the expertise of different medical specialties, each with their own management biases.

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The purpose of this study was to describe the clinical manifestations, diagnosis, and treatment outcomes of orbital mass lesions in all age groups which underwent excision by a single Oculoplastic surgeon at a tertiary eye care center in Western India. In this retrospective, non-comparative study, we reviewed cases of orbital tumors with respect to distribution, clinical characteristic, tumor origin, location, histopathology, management & treatment outcomes. The frequency of various orbital tumors, trends over time, indication of surgery and various surgical approaches are discussed.

Methodology:

The medical records of all patients with histopathologically proven diagnosis of orbital tumors operated by a same surgeon at a tertiary eye care centre in Western India were reviewed retrospectively. Patients of all age groups were included in this study. Thyroid related orbitopathy, infective lesions and inflammatory lesions managed medically were excluded from the study. Detailed history, clinical examination, investigations, Explorative Orbitotomy, histopathology and if required Immunohistopathology was done.

Study Design – Cross Sectional study

Study duration – 2 years from July 2018 till July 2020

Study Site – DVVPF's Medical College & Hospital, Ahmednagar. A tertiary care hospital and a teaching institute in a Metropolitan city in Western Maharashtra.

Sample size- we got total 134 cases satisfying our study inclusion criteria.

Sampling Technique: Convenience sampling.

Study population - Patients with orbital tumors - space occupying lesions admitted in the department of ophthalmology of DVVPF's Medical College & Hospital, Ahmednagar which is a tertiary care hospital and a teaching institute in a Metropolitan city in Western Maharashtra.

Results:

We got total of 134 cases in our hospital who underwent surgery for orbital tumors in our hospital records.

Out of 134 patients, 74 (55.2%) were males and 60 (44.8%) were females, 96 (71.6%) were >16 years old and 38 (28.4%) were children (< 16 years). The right orbit was involved in 69 (51.5%) patients and left orbit was involved in 65 (48.5%) patients. Most of the patients (123/134) had no treatment for orbital tumor before examination at our institute.

Most common symptom was swelling seen in 60 cases (44.78%), followed by protrusion in 36 cases (26.87%) and mass in 15 cases (11.19%). Fundus examination was normal in 80 cases (59.70%), Choroidal folds in 15 cases (11.19%) and Swollen Disc in 11 cases (8.20%). Mostly lesions were extraconal in 98 cases (73.13%) followed by intraconal in 28 cases (20.90%).

Table 1: Distribution of 134 orbital space occupying lesions:

Orbital Lesions		No.	%
Location	Intraconal	28	20.90
	Extraconal	98	73.13
	Intra + Extra conal	08	5.97
Primary Vs secondary	Primary	119	88.81
	Secondary	15	11.19
Benign Vs malignant	Benign	102	76.11
	Malignant	30	22.39
	Benign to malignant transformation	02	1.49

In this study, the most common surgical procedure performed was excision biopsy in 109 (81.34%) patients by anterior orbitotomy in 73 (54.48%) cases by superior approach in 54 (42.54%), medial approach in 13 (9.7%), inferomedial in 3 patients, and by lateral orbitotomy in 36 (26.87%), followed by incision biopsy in 9 (6.72%), debulking in 6 (4.48%), exentration in 5 (3.73%) patients primarily and in 6 (4.48%) patients secondarily and enucleation in 4 (2.99%) patients. Post-operatively, patients were followed up regularly. Maximum duration of follow up was 96 months.

The modified Shields classification[5] was used to categorize the 134 space occupying lesions according to pathologic diagnosis.

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Majority lesions were primary tumors in 119 cases (88.81%) followed by secondary in 15 cases (11.19%). Of the 134 lesions, 76.1% (102) were benign, 22.4% (27) were malignant and 1.5% (2) lesions showed malignant transformation which were initially benign. Cystic lesions accounted for 48 cases (35.8%), vasculogenic lesions for 25 cases (18.66%), lacrimal fossa lesions for 16 cases (11.94%), secondary orbital malignancies for 12 cases (8.96%), lipocytic and myxoid lesions for 9 cases (6.72%), lymphoid tumors and leukemia for 6 cases (4.48%), and inflammatory lesions simulating tumors for 5 cases(3.73%). The other conditions accounted for 13 cases (9.7%).

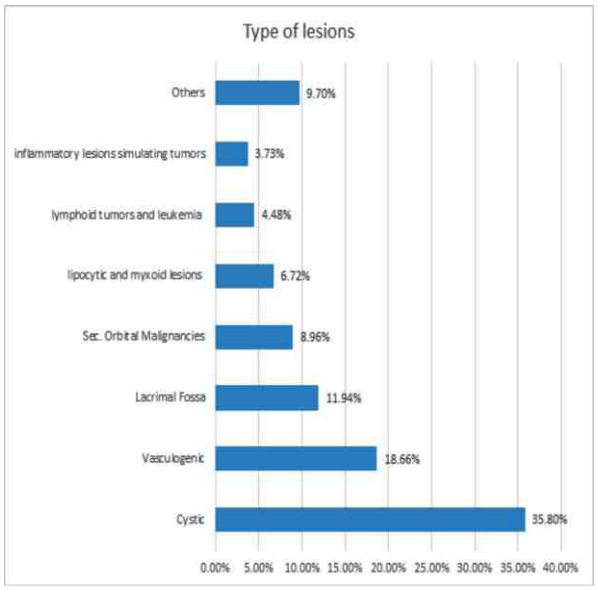

Fig 1: Type of lesions

Most common intervention done was Biopsy excision in 109 cases (81.34%) followed by Biopsy – Incision in 9 cases (6.72%), Biopsy –Debulking in 6 cases (4.48%) and Enucleation was done in 4 cases (2.99%).

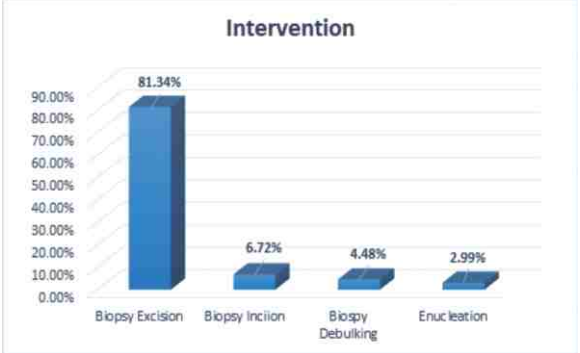

Fig 2: intervention done

Discussion:

The present report is a retrospective study of patients at a tertiary care centre in western India. The great majority of patients were of suspected orbital neoplasm. Hence, this series may reflect more accurately the true incidence of orbital space-occupying lesions that are seen in a general ophthalmic practice that prompt suspicion of an orbital tumor in Western India.

Patient age must be kept in mind when evaluating a patient with a possible orbital malignancy.[4,6] The tendency to classify tumors according to an age range such as childhood, adolescence, the elderly, middle age and adults is subject to the variable of defining a maximum or minimal age for each group. In our study 23(17.16%) cases of orbital tumors presented to us in first decade, 28(20.9%) in second, 20(14.92%) in third, 19(14.18%) in fourth, 24(17.91%) in fifth and sixth decade and 11(8.21%) cases were in age group of more than 60 years.

According to **Simon et al**[7] the most common presenting signs and symptoms in order of frequency were pain (27%), followed by proptosis and swelling (30%), inflammation (20%) and diplopia (15%). **Rootman et al.**[2] found swelling (28%) as a main presenting complaint followed by protrusion of eye (21%), diplopia (21%), pain (20%) and diminution of visual acuity in 18.5%. In our study, we found swelling (44.78%; 60 cases) as the most common symptom followed by protrusion of eye (26.87%; 36), mass (11.19%; 15), diminution of visual acuity (8.96%; 12), redness and pain (2.99%; 4) and diplopia (2.29%; 4).

In study by **Simon et al**[7] the most common surgical intervention was biopsy-debulking (156 cases; 43.3%), followed by biopsy excision (72 cases; 19.5%), exentration (11 cases; 3.0%), drainage (7 cases; 1.9%), fistula blockage and optic nerve decompression (each 3 cases; 0.8%), and fine needle aspiration biopsy (2cases; 0.5%). In this study, the most common surgical procedure performed was excision biopsy in 109 (81.34%) patients by anterior orbitotomy in 73 (54.48%) by superior approach in 54 (42.54%) cases, medial approach in 13 (9.7%) and inferomedial approach in 3 patients,

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Table 2: Subgroup analysis of the orbital tumors according to age and gender, histological types

Type of lesions	Subclass	Total No.	Percentage (%)	Male	Female	<16 yrs M	<16 yrs F	>16 yrs M	>16 yrs F	od	os
Cystic	Dermoids	24	17.91	15	09	07	04	08	05	14	10
	Epidermoids	09	6.72	07	02	04	01	03	01	06	03
	Conjunctival cyst	01	0.75	00	01	00	00	00	01	00	01
	Epithelial cyst	03	2.23	00	03	00	00	00	03	03	00
	Microphthalmos with cyst	03	2.23	01	02	00	01	01	01	02	01
	Mucoceles	03	2.23	00	03	00	00	00	03	01	02
	Keratin cyst	01	0.75	01	00	00	00	01	00	00	01
	Haematic cyst	01	0.75	01	00	01	00	00	00	01	00
Parasitic	Hyadatid cyst	01	0.75	00	01	00	00	00	01	00	01
	Cysticercus	02	1.49	01	01	01	01	00	00	02	00
		48	**35.82**	**26**	**22**	**13**	**07**	**13**	**15**	**29**	**19**
Adipose tissue	Lipomas	02	1.49	01	01	00	01	01	00	01	01
	Lipodermoids	07	5.22	02	05	00	02	02	03	03	04
		09	**6.72**	**03**	**06**	**00**	**03**	**03**	**03**	**04**	**05**
Vasculogenic	Cavernous hemangiomas	15	11.15	09	06	01	00	08	06	10	05
	Capillary hemngiomas	01	0.75	01	00	00	00	01	00	00	01
	Hemangiopericytomas	03	2.23	02	01	00	00	02	01	02	01
	Lymphangiomas	06	4.46	04	02	03	00	01	02	02	04
		25	**18.66**	**16**	**09**	**04**	**00**	**12**	**09**	**14**	**11**
Lacrimal gland tumors		**16**	**11.94**	**12**	**04**	**00**	**00**	**12**	**04**	**06**	**10**
Epithelial	Pleomorphic adenoma	04	2.99	02	02	00	00	02	02	01	03
	Serous epithelial cyst	02	1.49	01	01	00	00	01	01	01	01
	Adenoid cystic carcinoma	02	1.49	02	00	00	00	02	00	01	01
	Adenocarcinoma	01	0.75	01	00	00	00	01	00	01	00
	Sclerosing fibrous tumor	01	0.75	01	00	00	00	01	00	00	01
	Sebaceous carcinoma	01	0.75	01	00	00	00	01	00	00	01
		11	8.20	08	03	00	00	08	03	04	07
Nonepithelial	Dacryoadenitis	01	0.75	00	01	00	00	00	01	00	01
	Lymphomas (NHL)	04	2.99	04	00	00	00	04	00	02	02
		05	3.73	04	01	00	00	04	01	02	03
Lymphomas	Orbit	04	2.99	02	02	00	00	02	02	02	02
Leukemia	Granulocytic sarcoma	02	1.49	01	01	01	00	00	01	01	01
		06	**4.48**	**03**	**03**	**01**	**00**	**02**	**03**	**03**	**03**
Fibrocytic tumors	Benign fibrous histiocytomas	04	2.99	02	02	01	00	01	02	02	02
	Fibroma orbit	01	0.75	00	01	00	00	00	01	00	01
	Solitary fibrous tumor	01	0.75	00	01	00	00	00	01	00	01
		06	**4.48**	**02**	**04**	**01**	**00**	**01**	**04**	**02**	**04**
Mesenchymal lesions	Rhabdomyosarcomas	**03**	**2.29**	**01**	**02**	**01**	**02**	**00**	**00**	**01**	**02**
Inflammatory	Chronic non-caseating granulomatous lesions	**05**	**3.73**	**03**	**02**	**01**	**01**	**02**	**01**	**03**	**02**
Miscellaneous		**04**	**2.99**	**02**	**02**	**01**	**00**	**01**	**02**	**02**	**02**
Fibro-osseous	Fibrous dysplasia	01	0.75	00	01	00	00	00	01	01	00
Optic nerve lesions	Meningiomas	01	0.75	00	01	00	00	00	01	00	01
Peripheral nerve lesions	Neurofibroma	01	0.75	01	00	00	00	01	00	00	01
Melanocytic	Primary orbital melanoma	01	0.75	01	00	01	00	00	00	01	00
Secondaries		**12**	**8.96**	**06**	**06**	**02**	**01**	**04**	**05**	**05**	**07**
Lids	Sebaceous carcinoma	01	0.75	01	00	00	00	01	00	01	00
	Basal cell carcinoma	02	0.75	01	01	00	00	01	01	02	00
Conjunctiva, limbus	Mucoepidermoid carcinoma	01	0.75	01	00	00	00	01	00	00	01
	Squamous cell carcinoma – lid	04	2.99	01	03	00	00	01	03	01	03
Lacrimal sac	Transitional cell Ca	01	0.75	00	01	00	00	00	01	00	01
Intraocular	Retinoblastoma	03	2.23	02	01	02	01	00	00	01	02
Total		**134**	**100**	**74**	**60**	**24**	**14**	**50**	**46**	**69**	**65**

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and lateral orbitotomy in 36 (26.87%), followed by incision biopsy in 9(6.72%), debulking in 6 (4.48%), exentration in 5 (3.73%) patients primarily and in 6 (4.48%) patients secondarily and enucleation in 4(2.99%) patients.

Dermoid Cysts accounted for 1.9% of all orbital space occupying lesions in the study by **Rootman et al**[2] 24% in **Shields et al**[5], 2.3% in **Henderson et al**[4] 9% in **Kennedy et al**[8], 20.9% in **Simon et al**[7], and 17.9% in the current study. Similar to all these studies dermoid cyst was the most common cystic lesion in our study.

Colobomatous cysts accounted for <1% of all orbital space occupying lesions in the study by **Rootman et al.**[2], **Shields et al**[5], and **Henderson et al**[4], 0.3% in **Seregard et al**[9] and 2.23% (3 cases) in the current study. Cavernous hemangiomas accounted for 1.3% all orbital space occupying lesions in the study by **Rootman et al**[2], 6% in **Shields et al**[5], 4.3% in **Henderson et al**[4], 9% in **Seregard et al**[9] and 1.46% in **Kennedy et al.**[8]

Capillary hemangiomas accounted for 0.9% all orbital space occupying lesions in the study by **Rootman et al**[2], 3% in **Shields et al**[5], 1.9% in **Henderson et al**[4], 0.7% in **Seregard et al**[9], and 2.7% in **Kennedy et al.**[8]

Lymphangiomas accounted for <1% all orbital space occupying lesions in the study by **Shields et al**[5], 1.5% in **Henderson et al**[4], 3.79% in **Seregard et al**[9], & 4.46% (6 cases, 24% amongst vascular lesions) in our study. Our study showed slightly higher incidence of Lymphangiomas as compared to other studies.

Lipomatous lesions accounted for 0.7% of all orbital space occupying lesions in the study by **Rootman et al**[2], 5 % in **Shields et al**[5], 0.4 % in **Henderson et al.**[4], 5.4% in **Seregard et al**[9], and 6.27 % (2 lipomas and 7 dermolipomas) in current study.

Rootman et al[2] reported 8.2%, **Shields et al**[5] 10%, **Henderson et al**[4] 8.1%, **Seregard et al**9 12.7%, **Johansen et al**[10] 13.4%, **Kennedy et al**[8] 14%, **Simon et al**[7] 12.6% and the current study reported 4.48% (6 cases-**Table 6**) cases of Lymphoid and leukemic tumors excluding those located in the lacrimal gland.

Rootman et al[2] reported 5% optic nerve and meningeal lesions in his series, **Simon et al**[7] reported 6.3% lesions. We found that it is very difficult to debulk the tumor completely by lateral orbitotomy and these tumors should be better excised by roof approach by a neurosurgeon.

There was one case of neurofibroma in our study. **Rootman et al**[2]. reported 3.4% peripheral tumors, **Shields et al**[5] 14cases (2%) of peripheral nerve tumors (neurofibroma - 5cases), **Simon et al**[7] 4.1% (4 cases).

Rhabdomyosarcomas was the commonest primary malignant tumour in the study by **Portfield et al**[11], accounting for 26.2%, **Crowford et al**[12] 9.2% and **Shields et al**[5] 40%. **Rootman et al**[2] reported 0.4% cases of rhabdomyosarcomas, **Henderson et al**[4] 2.7%, **Kennedy et al**[8] 1%, **Simon et al**[7] 1.3% of all orbital lesions. These accounted for 2.99 % of all orbital space occupying in current study.

In our series the most common nonepithelial lesion was lymphoma & the second one was dacryoadenitis. **Rootman et al**[2] reported 2.4% cases, **Shields et al**[5] 10%, **Kennedy et al**[8] 5%, **Simon et al**[7] 7% cases in this category.

Many other studies gave the importance of orbital space occupying lesions and tumors, their classification for better suspicion, diagnosis and prompt treatment.13-16

Conclusion:

Orbital tumors encompass a heterogeneous variety of lesions, they differ amongst various age groups. Good clinical examination combined with improved imaging modalities like Ultrasonography, Computed tomography and Magnetic Resonance Imaging; the clinician should be able to arrive at a fairly accurate diagnosis in most cases allowing the clinician to provide better care to the patient.

Conflict of interest: None

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References:

1. Shields JA. Diagnosis and Management of Orbital Tumors. Philadelphia: Saunders; 1989:89-388.

2. Rootman J: Disease of the orbit. Philadelphia, J.B. Lippincott, 1988; 119-139.
3. Youssefi B. Orbital tumors in children: A clinical study of 62 cases. J Pediatr Ophthalmol 1969;6:177-81.
4. Henderson JW, Campbell RJ, Farrow GM, Garrity JA. The tumor survey. In: Henderson JW, Campbell RJ, Farrow GM, Garrity JA, eds. Orbital Tumors. 4th ed. New York: mayo Foundation for Medical Educatin and Research; 2007:1-392.
5. Shields JA, Bakewell B, Augsburger JJ, Flanga11 JC. Classification and incidence of space-occupying leions of the orbit. A survey of 645 biopsies. Arch Ophthalmol 1984;102:1606-11.
6. Hari Mohan, A.N. Gupta: Proptosis - A clinical analysis of 141 cases, J. All India Ophthalmol. Soc. Jun. 1968; 16(2): 9-17.
7. Simon GJ, Yoon MK, Jane A, Nakra T, McCann JD, Goldberg RA. Clinical manifestations of orbital mass lesions at the Jules Stein Eye Institute, 1999-2003. Ophthalmic Surgery, Lasers and Imaging Retina. 2006 Jan 1;37(1):25-32.
8. Kennedy RE. An evaluation of 820 orbital cases. Transactions of the American Ophthalmological Society. 1984;82:134.
9. Seregard S, Sahlin S. Panorama of orbital space occypying lesions: the 24 year experience of a referral centre. Acta Ophthalmol Scand.1999;77:91-98.
10. Johansen S, Heegaard S, Bogeskov L, Prause JU. Orbital space-occupying lesions in Denmark 1974-1997. Acta Ophthalmol Scand 2000;78:547-52.
11. Porterfield JF. Orbital Tumors in children. A report on 214 - cases. Int Ophthalmol Cl in 1962;2:319-35.
12. Crawford JS. Diseases of the orbit. In: Crawford JS, Morin JD, eds. The eye in childhood. Grune & Stratton, 1983:361.
13. Demirci H, Shields CL, Shields JA, Honavar SG, Mercado GJ, Tovilla JC. Orbital tumors in the older adult population. Ophthalmology. 2002 Feb 1;109(2):243-8.
14. Honavar SG, Manjandavida FP. Recent advances in orbital tumors—a review of publications from 2014-2016. The Asia-Pacific Journal of Ophthalmology. 2017 Mar 1;6(2):153-8.
15. Montano N, Lauretti L, D'Alessandris QG, Rigante M, Pignotti F, Olivi A, Paludetti G, Pallini R, Fernandez E. Orbital tumors: report of 70 surgically treated cases. World neurosurgery. 2018 Nov 1;119:e449-58.
16. Colletti G, Saibene AM, Pessina F, Duvina M, Allevi F, Felisati G, Biglioli F. A shift in the orbit: immediate endoscopic reconstruction after transnasal orbital tumors resection. Journal of Craniofacial Surgery. 2017 Nov 1;28(8):2027-9.