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Research Article

Etiological Prevalence of Proptosis: A Prospective Study

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Abstract
Introduction: *Proptosis is the clinical manifestation of pathology that results in anterior displacement of the eyeball beyond the orbital margin. It is a common manifestation of wide variety of diseases of the structures in and around the orbit and in some systemic diseases.*
Objective: *The main objective of the study was to analyse the various causes for proptosis.*
Material & Methods: *50 consecutive cases presenting in ophthalmology OPD with provisional diagnosis of proptosis, over a period of two years from May 2015 to April 2017, were included.Detailed ocular and systemic history, examination and relevant investigations were done in necessary cases. Also other related specialties opinion obtained whenever indicated for diagnosis.*
Results: *Males were more commonly affected. The age distribution showed clustering in 40-60 years age group. Inflammatory etiologies were the most common cause for proptosis accounting for 34% of cases, followed by neoplasm accounting for 32% of cases and infectious etiologies accounting for 16% of cases. 6% cases of proptosis had vascular etiology. Trauma constituted for 8% of cases. 4% of cases had Hydatid Disease.*
Conclusion: *Orbital lesions have diverse etiology and pathogenesis. This necessitates a spectrum of investigations for early and timely diagnosis of these cases. Delay in diagnosis of correct etiologic factors resulting in proptosis may cause threat to life and vision. Further studies with larger sample size are recommended.*
Keywords: *Proptosis, Etiology, Exophthalmos, Orbit.*

Introduction

Proptosis is the passive protrusion of eyeball anteriorly out of orbit due to filling of orbital spaces which pushes the eye forwards. No matter what the etiology may be, globular protrusion is secondary to the increase in volume within the fixed bony orbital confines. The communication of orbital contents and the surrounding regions is by superior and inferior orbital foramen and optic canal[1]. Proptosis is the clinical manifestation of

pathology that results in anterior displacement of the eyeball beyond the orbital margin[2,3]. It is a common manifestation of wide variety of diseases of the structures in and around the orbit and in some systemic diseases.

A lesion in the intraconal region produces axial proptosis, whereas lesion in the extraconal region produces eccentric proptosis. Eccentric proptosis may be due to lesion within the orbit itself or due to the lesion in the neighbouring structures like cranial cavity, paranasal structures etc.

Most of the cases are unilateral. Unilateral proptosis results mainly due local pathology, whereas bilateral proptosis usually have an underlying systemic disease as the causative factor.

Studies have shown widely varying incidence, age distribution and gender ratio of proptosis in various populations from differing geographical areas[4,5,6].

The etiological basis of proptosis can include inflammatory, vascular, infectious, cystic, neoplastic (both benign and malignant, metastatic disease), and traumatic factors. Thyroid associated ophthalmopathy is a common etiology associated with unilateral/bilateral proptosis in adults. In children infection i.e, orbital cellulitis is the common cause for unilateral proptosis.

A proptotic eye not adequately protected by the lids, as with lagophthalmos, can develop exposure punctuate keratopathy. Such disruption of the finely orchestrated homeostatic mechanism to protect the eye will result in corneal compromise, epithelial death, ulceration, and possible corneal perforation in severe cases. Proptosis secondary to a space-occupying process can result in a compressive optic neuropathy. Impeded optic nerve blood flow results in irreversible neuronal death and diminished optic nerve function. Such manifestations as depression of visual and color acuities, pupillary dysfunction, and constriction of visual field can occur. Proptosis due to any cause can compromise visual function and the integrity of the eye.

Therefore it is important to have adequate understanding of various etiological factors causing proptosis, so as to establish an early diagnosis and start treatment accordingly to reduce the morbidity associated with proptosis.

Materials and Methods

The present study was conducted in the department of ophthalmology at a tertiary care hospital of central India. 50 consecutive cases presenting with provisional diagnosis of proptosis, over a period of two years from May 2015 to April 2017, were included. Routine ophthalmological examination was carriedout for all the cases after obtaining institution's ethical committee approval.

Inclusion criteria: All cases of proptosis where diagnosis was established.

Exclusion criteria: Patients of proptosis where diagnosis could not be established.

After taking a thorough history, patients underwent detailed general, systemic, and ocular examination along with necessary investigations for confirmation of diagnosis. Basic haematological, radiological, pathological and ophthalmological investigations were carried out. Demographic details and ophthalmologic data i.e. clinical presentation, investigation details and treatment details were noted and analysed statistically. Evaluation of proptosis included Hertel's exophthalmometry, ocular motility, cover test, visual acuity, colour vision, intraocular pressure, differential tonometry, fundus examination and cycloplegic refraction. Vertical and horizontal displacements were taken in case of eccentric proptosis. Associated anterior segment signs were noted. Radiological investigations included a CT scan, MRI when indicated, Orbital ultrasonography, Bone scans, chest x-ray and Ultra sound abdomen, when indicated were performed to confirm the diagnosis and to ascertain the aetiology for proptosis. The distribution of causative aetiology was noted. The direction and laterality of the protrusion of eyeball were recorded. The patient's data and findings

were evaluated for epidemiology and aetiology of proptosis. The case details were recorded and classified based on aetiology as inflammatory, infectious, vascular, traumatic, neoplastic and others. The percentage incidence was calculated and compared within the categories. Descriptive analysis was done.

Results

We analysed a total of 50 cases with proptosis between May 2015 to April 2017. All cases with proptosis were included in this study. Cases were included regardless of the age and back ground.

Out of 50 cases, 30were males and 20 females (Table:1). In our study proptosis was more common among males as compared to females with a male to female ratio of 3:2.

Table: 1 Incidence of proptosis according to gender

Gender	Number of cases	Percentage of cases
Males	30	60%
Females	20	40%
Total	50	100%

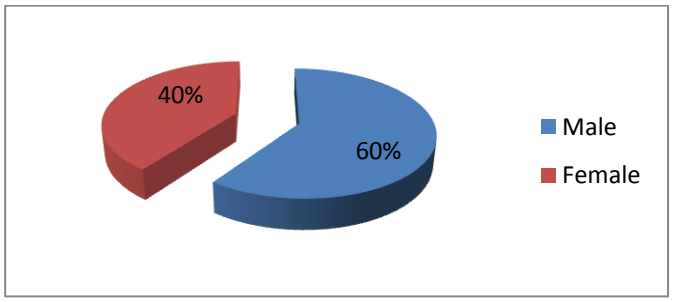
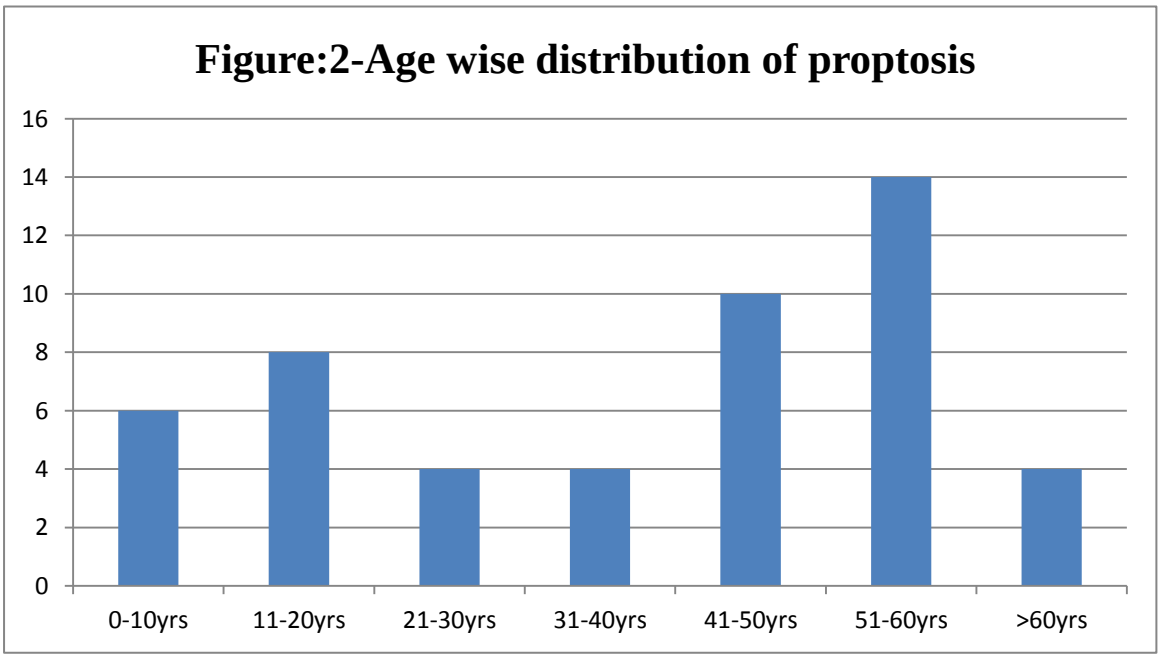


Figure: 1 Pie Chart showing incidence of proptosis according to gender.

Table: 2 Age wise incidence of proptosis:

S.No.	AGE (YEARS)	MALE	FEMALE	PERCENTAGE (%)
1	0-10	3	3	12%
2	11-20	5	3	16%
3	21-30	3	1	8%
4	31-40	2	2	8%
5	41-50	6	4	20%
6	51-60	9	5	28%
7	>60	2	2	8%
TOTAL		30	20	100%



In our study maximum incidence of proptosis was found in 51-60 yrs age group patients, followed by 41-50yrs age group, Where as there were only 2 cases above 60yrs of age.

Incidennce of Proptosis Based on Etiology

Table: 3 Incidence according to etiology

S.No.	ETIOLOGY	NUMBER	PERCENTAGE (%)
1	**Inflammatory**	**17**	**34%**
	a.Grave's Disease	10	20%
	b. Pseudotumor	7	14%
2	**Infectious**	**8**	**16%**
	a.Orbital cellulitis	6	12%
	b. Cavernous sinus thrombosis	2	4%
3	**Tumors**	**16**	**32%**
	a. Lymphoma	3	6%
	b. Optic nerve tumors	2	4%
	c.Rhabdomyosarcoma	4	8%
	d. Meningioma	2	4%
	e. Retinoblastoma	3	6%
	f. Metastasis	1	2%
	g. Maxillary Carcinoma	1	2%
4	**Vascular**	**3**	**6%**
	a. Capillary Haemangioma	1	2%
	b. Cavernous Haemangioma	2	4%
5	**Trauma**	**4**	**8%**
6	**Others(hydatid cyst)**	**2**	**4%**
7	**Total**	**50**	**100%**

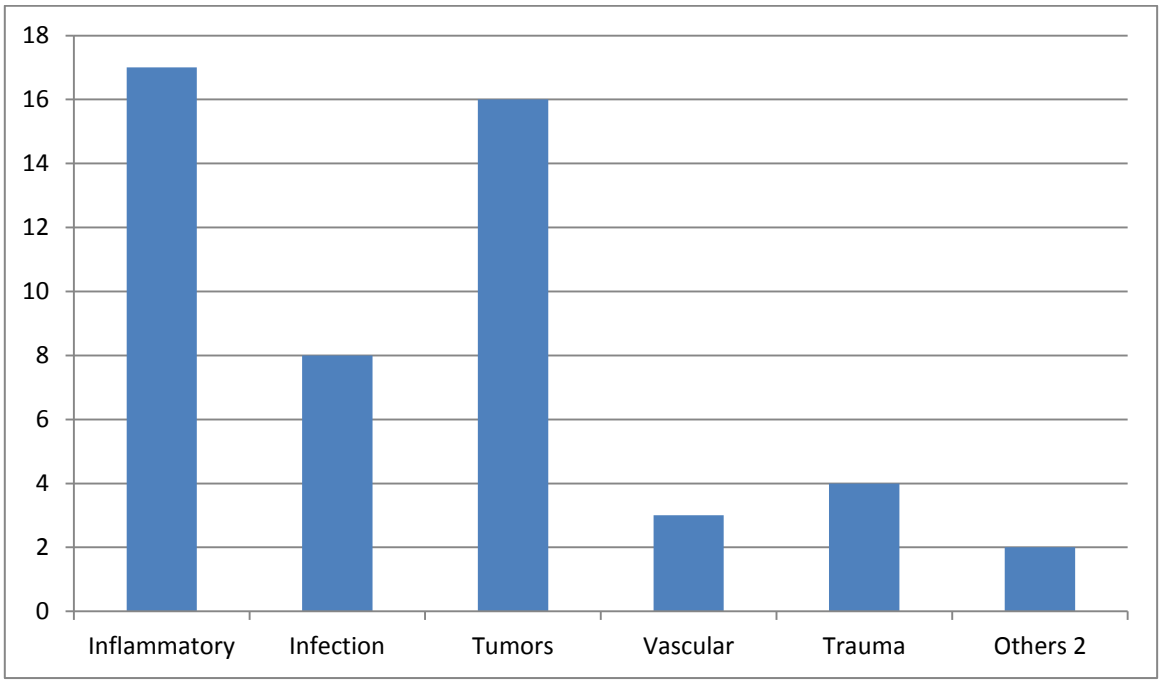


Figure: 3 Bar Diagram showing distribution according to etiology

In our study 34% of patients had Thyroid associated ophthalmopathy which was the most common etiology causing proptosis. 32% of the patients had various tumors as the cause of proptosis, out of which retinoblastoma was the most common tumor causing proptosis. 8 out of 50 (16%) patients had infection of the eye or the orbit leading to proptosis. Trauma as a cause of proptosis constituted 8% of total sample size. 2 out of 50 (4%) patients had cavernous hemangioma and only 1 patient had capillary hemangioma. 2 out of 50 (4%) patients had hyatid cyst of orbit leading to proptosis.

Figure 4a: Case of Grave's Disease with bilateral proptosis.

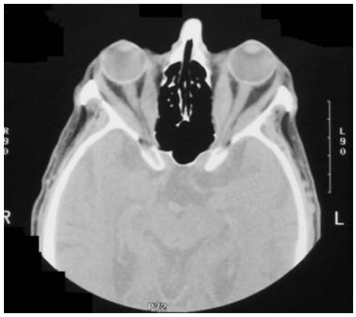


Figure 4b: CT Orbit Axial view showing Enlarged bellies of EOM without Involvement of tendinous insertion.

Figure 4c: MRI Orbit Axial view showing Enlarged bellies of EOM without Involvement of tendinous insertion.

Figure 5a: Case of AV Malformation with unilateral outward & downward proptosis, lidedema & ecchymosis

Figure 5b: CT Orbit showing 20*13mm Hypoechogenic mass in right orbit causing outward & downward proptosis with normal left orbit.

Figure 6a: Case of Retinoblastoma with lid edema & left eye proptosis.

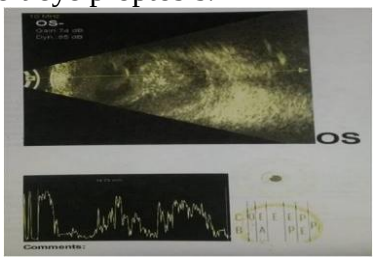


Figure 6b: B scan image showing heterogenous hyperechoic shadow with calcification.

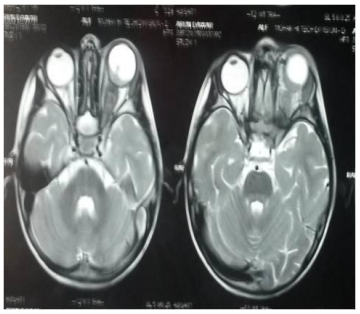


Figure 6c: MRI scan orbit Axial view showing heterogenous & irregular thickening of left side intraorbital optic nerve.

Incidence of type of proptosis

Table: 4- Incidence of type of proptosis

S.No.	Type	Percentage (%)
1.	Axial Proptosis	31(62%)
2.	Eccentric Proptosis	19 (38%)
	Total	50 (100%)

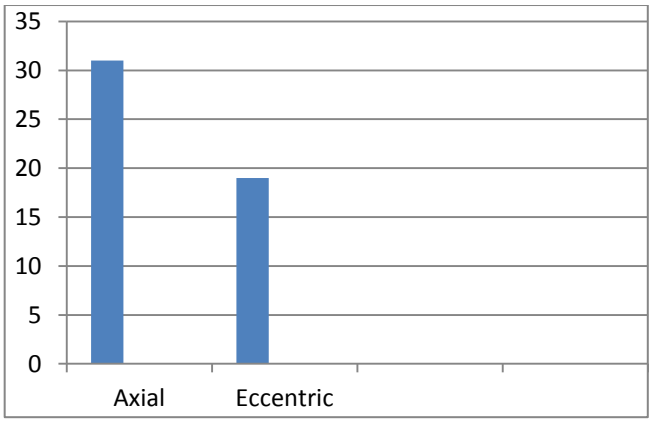


Figure: 7 Bar Diagram representing type of proptosis

Discussion

Proptosis is a common manifestation of wide variety of diseases of the structures in and around the orbit and in some systemic diseases. As the bony walls of the orbit are firm, any situation, which reduces the space within the bony orbit, will result in proptosis. Etiology of proptosis ranges from orbital problems to infiltrative conditions either from adjacent structures, intracranial pathologies or in the form of distant metastasis. Even though orbital lesions have diverse etiology and pathogenesis, they usually present with similar clinical picture, hence it may lead to delay in correct diagnosis and treatment. Several studies carried out to determine demographic details of proptosis in different geographic areas showed varied incidence, age and sex[5,6].

We found a male preponderance with 30 (60%) cases and 20 females (40%). Our findings are in accordance with Loganathanet.al[7], who found 60 % males and 40 % females. Similar male predominance was also seen in studies by Khan et al[5], Amudhavadivu[8] and Masud et al[9]. Whereas Zaidi et.al.[10] found female predominance and Naiduet.al.[4] and Kishor et.al[11]. found equal distribution.

In our study inflammatory lesions were the most common causes of proptosis accounting for 34% of cases. Grave's disease and pseudotumor were the two most common inflammatory etiologies. Grave's disease was more common as compared to pseudotumor. 20% patients had Grave's disease and 14% had pseudotumor. Pseudotumor was diagnosed based on the non specific radiological findings after excluding other potential causes. All of our patients with pseudotumor presented as unilateral disease, whereas all the patients with Grave's disease had bilateral involvement. These finding are in contrast to studies by Masud MZ et.al[9], and Sabharwalet.al[12], where neoplasm was the most common etiology causing proptosis. Our observations were similar to study by Sharma. P. et.al[13].These variations could be explained on the basis of small sample size and variation in prevalance of thyroid disorders based on geographical distribution.

In our study Tumors were the second most common etiology causing proptosis accounting for 32% of cases overall, whereas studies by Masud MZ et.al[9]&Sabharwalet.al.[12] reported neoplasms as the most common cause with 33% & 46% of patients having one of the various tumors respectively. Rhabomyosarcoma (8%) was the most common tumor associated with proptosis in our study followed by lymphoma and retinoblastoma, each accounting for 6% of the cases. Margo CE et al[14] reported lymphoma as the most common malignant orbital tumor. Similar to this, Sabharwal KK et al[12] reported lymphoma as the most common cause of proptosis. Optic nervetumors and meningioma each accounted for 4% of cases in our study. Sabharwal KK et al[12], reported maxillary carcinoma as the most common paraorbitaltumor invading the orbit. In our study 1 (2%) patient had maxillary carcinoma.

In our study 16% of cases had infectious etiology which is comparable to observations made by Sabharwalet.al[12] (28%), Masud MZ et.al.[9] (20%) and Rauniyaret.al.[6] (22%). 2(4%) patients were found to have hydatid disease of the eye in our study.

Table 5: Comparison of etiology of proptosis in various studies

S.No.	Name of Study	No. of cases	Inflammation	Infection	Vascular	Trauma	Neoplasm
1	Sharma.P.et.al[13]	30	14(47%)	1(3%)	1(3%)	1(3%)	13(43%)
2	Sabharwal et.al[12]	50	9(18%)	14(28%)	1(2%)	3(6%)	23(46%)
3	Masud MZ et.al[9]	60	14(23%)	12(20%)	4(7%)	3(5%)	20(33%)
4	Rauniyar et.al[6]	143	30(21%)	32(22%)	-	11(8%)	52(36%)
5	Loganathan et.al[7]	50	19(38%)	-	8(16%)	4(8%)	15(30%)
6	Present Study	50	17(34%)	8(16%)	3(6%)	4(8%)	16(32%)

The diverse etiological spectrum of proptosis observed between various studies could be due to the strata occupied by the place of study in healthcare hierarchy, method of study, age group studied and study duration.

Conclusion

Proptosis is a common clinical feature of various local and systemic diseases. Even though orbital lesions have diverse etiology and pathogenesis, they usually present with similar clinical picture. This necessitates a spectrum of investigations for early and timely diagnosis of these cases. Many of these proptosis cases management warrants multidisciplinary approach including Neurosurgeon, Otorhinolaryngologist, Dental surgeon and head & neck oncosurgeons. The finding of inflammatory etiologies and neoplasms as the most frequent causative pathology for proptosis in this study emphasizes the need for advanced imaging and biopsy for delineating the exact cause in cases of proptosis in addition to ophthalmological examination, in order toestablish an early diagnosis and start treatment accordingly to reduce the morbidity associated with proptosis. Delay in diagnosis of correct etiologic factors resulting in proptosis may cause threat to life and vision. Therefore were commend further such studies with larger sample size in order to determine the exact cause of proptosis so that we can take adequate measures to find out the age, sex and most common etiologic agent.

References

1. Moore, Keith L. Clinically Oriented Anatomy 6th Ed. Lippincott Williams & Wilkins. 2010ISBN 978-07817 7525-0.
2. Kumar V, Abbas AK, Fausto N. Robbins and Cotran Pathologic Basis of Disease. Seventh Edition. Philadelphia: Elsevier Saunders, 2005,1423.
3. Rootman J: Diseases of the orbit. Philadelphia, JB Lippincott, 1988, 1-162.
4. Naidu APR, Satya Srinivas V, Murali Krishna V, Madhuri P. Proptosis - A Clinical Profile. International Journal of scientific research and management. 2015; 3(3):2344-48.
5. Khan NH, Moin M, Khan MA, Azhar Hameed. Unilateral proptosis: a local experience. Biomedical. 2004;20:114-116.
6. Rauniyar RK, Thakur SD, Panda A, Sharma U. Radiological Evaluation of Orbit in cases of Proptosis in Eastern Nepal. NJR. 2011;1(1):8-14.
7. Loganathan M, Radhakrishnan M. An Etiological Analysis of Childhood Proptosis. Journal of Evolution of Medical and Dental Sciences 2014;3(22):6158-6162.
8. Amudhavadivu S, U. Vijaya Shanmugam. An Aetio-Epidemiological Inquiry of Proptosis. Int J Intg Med Sci. 2016; 3(10):439-442.
9. Masud MZ, Babar TF, Iqbal A, et al. Proptosis: Etiology and demographic patterns. J coll Physicians Surg Pak. 2006; 16(1): 38-41.
10. Zaidi S H et al. Unilateral proptosis in ENT practice. Journal Pakistan med. Assoc. 1991;41(10):248-250.
11. Kishor K Satpute, Chingsuingamba Y. A retrospective analysis of presentation and management outcome of proptosis in a tertiary care centre of North-East, India-a case series. IOSR Journal of Dental and Medical Sciences. 2013; 5(1):30-32.
12. Sabharwal KK, Chouhan AL, Jain S. CT evaluation of proptosis. Indian J Radiol Imaging 2006;16:683-8.
13. Sharma P, Tiwari PK, Ghimire PG, Ghimire P. NJMS. 2013;02(01):35-7.
14. Margo CE, Mulla ZD, Malignant tumors of the orbit. Ophthalmology 1998; 105: 185.