

Original Research Article

# An Aetio-Epidemiological Inquiry of Proptosis

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## ABSTRACT

**Introduction:** The protrusion of eyeball from its normal position within the rigid orbital cavity due to differing pathologies locally or systematically results in a condition called proptosis. The incidence, causes, presentation with respect to direction, laterality, age and gender shows numerous differences. And so this study was aimed at inquiring the aetio-epidemiological basis of proptosis.

**Materials and Methods:** Cases reported to department of ophthalmology at a tertiary care setup for a period of 9 months with a provisional diagnosis of proptosis were clinically, ophthalmologically examined and evaluated. The confirmed cases of proptosis were further studied for aetiology and detailed epidemiology.

**Results:** Among the reported cases 50 were confirmed to be cases of proptosis. The male: female ratio was 2.5:1. Unilateral proptosis and eccentrically oriented proptosis were observed in maximum number of cases studied. The age distribution showed clustering around >40 years range. The main causative factor for proptosis was observed to be neoplasm followed on by inflammation in this study.

**Conclusion:** Neoplasm as the primary aetiology warrants multi modal, multi-disciplinary approach in investigation and management of these cases of proptosis.

**KEY WORDS:** Proptosis, Aetiology, Epidemiology, Exophthalmos, orbit.

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## INTRODUCTION

The rigid non-expansile bony orbit with its contents forms a prominent feature of the human face. The eyeball with its coverings, muscles, vessels and nervous extension has bony walls limiting them on both sides and posteriorly, while a fibrous orbital septum forms the anterior limit. 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]. Due to the unyielding nature of the bony walls of the orbit, any pathology that diminishes the space within the bony orbit results in proptosis. Studies have shown widely varying incidence, age distribution and gender ratio of proptosis in various populations from differing geographical areas [4-6]. Proptosis can be bilateral or unilateral. Local pathology usually results in unilateral proptosis, whereas bilateral proptosis is often a manifestation of systemic disease

[4,5,7]. Based on the direction of proptosis, the proptosis may be eccentric or axial [8].

The aetiological reason for occurrence of proptosis presents a spectrum with varying incidence [4-12]. The most common cause of bilateral and uni-lateral exophthalmus among adults is Graves' disease. Unilateral exophthalmus, although frequently seen in connection with thyroid diseases, has a much larger differential diagnosis than bilateral exophthalmus. With unilateral presentation one should think of orbital pseudotumour, orbital cellulitis, cavernous sinus thrombosis, or intraorbital neoplasms.

As there happens to be a range of differences in presentation of proptosis, this study was carried out with the purpose of describing aetio-epidemiology of proptosis in a tertiary health care setup.

## MATERIALS AND METHODS

Patients attending a tertiary healthcare hospital in Tamilnadu were studied over a period of 9 months. Cases that reported to Department of Ophthalmology with a provisional diagnosis of proptosis were included in the study. The cases were subject to routine clinical and ophthalmological examination. Those cases with proptosis were selected and detailed evaluation was done. Necessary haematological, radiological, pathological and ophthalmological investigations 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 gender and age distribution of the cases were also observed. The patient's data and findings were evaluated for epidemiology and aetiology of proptosis. All other ophthalmological cases were excluded from this study. The case details were recorded and classified based on aetiology as inflammatory, vascular, traumatic, endocrine and neoplastic. The percentage incidence was calculated and compared within the categories. Descriptive analysis was done. The study was carried out after getting institution ethical committee approval.

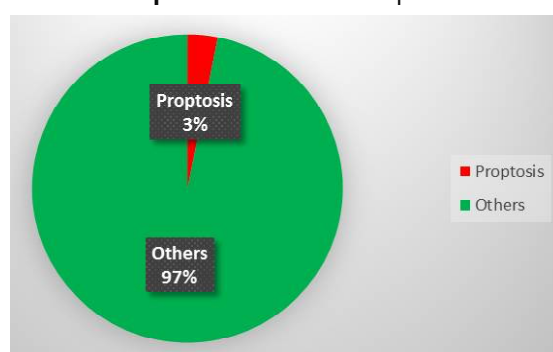
## OBSERVATIONS

Among the 1540 ophthalmic patients who reported to the OPD during the study period with a provisional diagnosis of proptosis, only 50 were found to be confirmed cases. (Graph: 1) The age of the patients was seen to be >40 years in 58% of the proptosis cases studied, with a mean age of 38 years. Paediatric patients constituted 10% of the study group and young adults formed 32% of the patient group with proptosis. The gender distribution was found to be in the ratio of Male: Female 2.5:1. Unilateral proptosis accounted for about 80% of the cases studied. (Graph: 2) Compared to the incidence of axial proptosis, eccentric proptosis was noticed in majority of the cases studied. (Graph: 3) The confirmed cases of proptosis were classified into inflammatory, vascular, endocrine, traumatic and neoplastic groups. (Table 1) Among the aetiologies that causes proptosis, neoplasm was noted to be the commonest cause followed by inflammation.

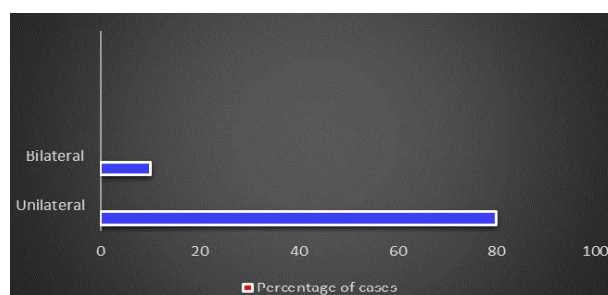
**Table 1:** Aetiology of proptosis.

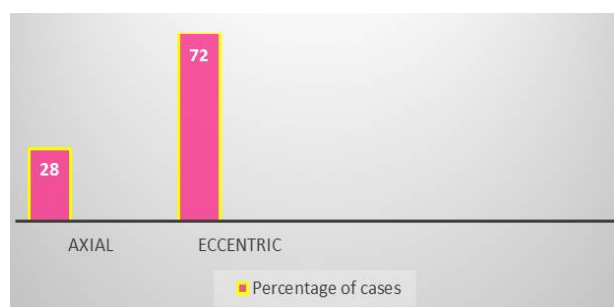
Aetiological cause	Number of cases observed	Percentage
Inflammation	18	36
Vascular	2	4
Endocrine	5	10
Trauma	2	4
Neoplasm	23	46

**Graph 1:** Incidence of Proptosis.



**Graph 2:** Laterality of Proptosis.



**Graph 3:** Direction of Proptosis.

## DISCUSSION

**Table 2:** Comparison of aetiology of proptosis between different studies.

Studies	Number of cases studied	Inflammation	Infection	Vascular	Endocrine	Trauma	Neoplasm	others
Naidu et al [4]		-	-	-	12	-	8	2
Rauniyar et al [6]	143	30	32	-	-	11	52	18
Kishore et al [9]	22	5	-	-	7	2	3	5
Loganathan et al [10]	50	19	-	8		4	15	4
Mohan et al [11]	141							6
Present study	50	18	-	2	5	2	23	-

The bulging of the eyeball anteriorly from its bony cavity by a distance of about 14-20 mm due to multi-various aetiologies results in proptosis [13-15]. The diverse incidence rate 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. On analysis of these criteria's, it is noted that the studies carried out in tertiary healthcare setup shows neoplasm as the commonest aetiology irrespective of the age group studied [6,11,12,16-23]. There are also few reports that claims endocrine pathology and inflammation as the commonest aetiology of proptosis in adults [4,9], paediatric age group [10] respectively. (Table 2)

The age of the proptosis cases in this study that ranged from 4years to 70years with a mean of 38 years coincides with observation of previous studies [4,5,9]. A couple of studies observed male predominance of distribution of proptosis cases as noted in the present study [5,10], contrary to other studies which found either female preponderance [7] or equal distribution [4,9].

The eccentric direction of proptosis noticed maximally in this study is contradicted by observation of another study that found more of axial proptosis [10]. This could be due to the

diversity of aetiology seen and the age group studied by both these studies. A couple of studies found unilateral presentation similar to this study [7,11,14] while few more noted bilateral presentation [4,9]. Analysis shows that the underlying cause for proptosis was found to influence the presentation of laterality of proptosis.

## CONCLUSION

Differing aetiologies, multimodal presentation of proptosis, necessitated a spectrum of investigations for confirmation of these cases. In many of these proptosis cases management warrants multidisciplinary approach too. The finding of neoplasms as the single most frequent causative pathology for proptosis in this study emphasizes the need for advanced imaging and biopsy for delineating the cause in cases of proptosis in addition to ophthalmological examination.

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