

## Cross sectional, observational study of proptosis in a tertiary multidisciplinary hospital

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### Abstract

Proptosis is a fairly common clinical condition we see in our ophthalmology clinics. Although it has similar manifestations the severity and aetiology can be varied. This study attempts to classify the profile of proptosis patients in terms of severity, location and aetiology. This will help us in understanding the causes in our ethnic population and geographical area and help tailor diagnostic investigations and help in timely management. Proptosis is a fairly common clinical condition we see in our ophthalmology clinics. Although it has similar manifestations the severity and aetiology can be varied. This study attempts to classify the profile of proptosis patients in terms of severity, location and aetiology this will help us in understanding the causes in our ethnic population and geographical area and help tailor diagnostic investigations and help in timely management.

**Keywords:** Proptosis, Axial, Non axial, Thyroid eye disease.

### Introduction

Proptosis is one of the most common clinical manifestations of orbital pathologies. This symptom reflects encroachment of the disease into the orbit by which orbital volume is increased. It is defined as forward displacement of eyeball beyond the orbital margin, with the patient looking forward. Any increase in the orbital content usually resulting from mass lesion, vascular anomaly, inflammatory process or endocrine lesion will result in axial displacement of globe.<sup>(1)</sup> Proptosis of a globe is the most dramatic orbital symptom, especially if it occurs abruptly. Often however, proptosis may be subtle or develop so slowly that a patient is unaware of it. On physical examination of the orbit, as with other eye problems, vision parameters are essential. Visual acuity, colour discrimination, visual fields and pupillary reactions may be altered by compromise of the optic nerve, by compression of the globe peripherally or posteriorly, or by impairment of the other cranial nerves.<sup>(1)</sup> Direction of proptosis is important and will indicate the site of lesion and early prompt correction of the offender prevent further damage to orbital content.<sup>(1)</sup> A positive approach to the problem of protrusion of eyeball started in 1583 by a bartish father of Germany as extirpation of eye.<sup>(2)</sup> It is comparable to modern sub-total orbital exenteration. In 1744 Thomas Hope of Scotland attempted removal of tumour without loss of eye. Heop's operation was notable because it was successful and because it preserved the eye. In 1888 Kronlein described new approach for removal of orbital tumours that is lateral orbital approach. In 1941 Waiter Dandy removed the retro-ocular mass on the nasalside of the orbital cavity by transcranial approach.<sup>(3)</sup>

### Aims and Objectives

1. To study the clinical profile of proptosis cases presenting to the ophthalmology department of a tertiary care hospital.
2. To identify the common etiology and clinical features of proptosis patients.

### Materials and Methods

A hospital based, observational, cross-sectional study was done in the Ophthalmology department of Amrita Institute of Medical Science and Research Center to evaluate the clinical profile of proptosis in multispeciality tertiary hospital. The study was conducted from March 2015 to march 2016.

**Inclusion Criteria:** All patients with proptosis aged between 1 to 81 years who came to the ophthalmology OPD were included in the study.

**Exclusion Criteria:** Patients who were unco-operative, were excluded from the study.

### Method of Examination

Proptosis measurements were taken using Hertls exophthalmometer in patients who had presented to our OPD from the month of March 2015 to march 2016. Patients were grouped according to age into 1-20 years, 20-40 years, 40-60 years, above 60 years. All proptosis patient had undergone an ophthalmic examination, which included visual acuity, anterior segment, fundus examination, proptosis measurement, visual field, diplopia charting, and computed tomography (CT) or magnetic resonance imaging (MRI) when required.

Visual acuity was determined by using Snellen's chart for patients above 5 years and symbol chart and Cardiff visual acuity chart for children below 5 years of age. Fixing and following light was evaluated for children below 6months of age. Objective refraction was performed by use of streak retinoscope. Proptosis

measurements were taken by Hertel's exophthalmometer. Accurate base reading recordings is important as exophthalmometry values change with the base reading. Once the base reading was recorded, subsequent readings were taken with the same base reading so the results are comparable. Based on Hertel's exophthalmometry proptosis was classified as mild, moderate, severe.

We distinguished whether the proptosis was axial or eccentric based on the measurements.

Anterior segment examination was done with slit lamp biomicroscopy. Posterior segment examination was performed using direct and indirect ophthalmoscope. Intraocular pressure (IOP) was checked with non-contact tonometer. Visual field was assessed using automated Humphrey's field analyser (HFA). Diplopia charting was done with help of diplopia goggles and streak retinoscope. Colour vision test was done with Ishihara's colour vision chart. Vision impairment was considered as vision less than 6/18.

Proptosis was classified in to 3 groups.

Unilateral: A difference of more than 2 mm between two eyes was considered significant.

1. Mild 17-21 mm
2. Moderate 22-26 mm
3. Severe above 26 mm

Bilateral: Both eyes more than 21 mm Hertel's exophthalmometer reading considered as bilateral

1. Mild 21-24 mm
2. Moderate 24-26 mm
3. Severe-Both eye above 27 mm

Patients were grouped by age into 1-20 years, 20-40 years, 40-60 years, above 60 years are:

1. Group A: 1-20 years
2. Group B: 20-40 years
3. Group C: 40-60 years
4. Group D: Above 60 years

**Results**

**Table: 1**

Causes	Unilateral	Bilateral	p value
	n (%)	n (%)	
Thyroid eye disease	18(36.0)	32(64.0)	0.003
Inflammatory	3(100.0)	0 ( 0)	.256
Trauma	1(100.0)	0 (0.0)	1
Tumour	19(90.5)	2 (9.5)	0.001
Vascular disorders	4(66.7)	2 (33.3)	.714
Syndrome associated	1(16.7)	5 (83.3)	.185
Others	0 (0.0)	3 (100.0)	.225

Our study included 91 patients who were grouped as; Group A: including patients age between 1-20 years,

Group B: including patients between 20-40 years of age, Group C: including 40-60 years of age, above 60 years of age including Group D.

Out of the 91 proptosis patients included in our study, 45 patients (49.45%) were males & 46 (50.54%) were females.

The most common ocular symptoms among the study population were bulging of eyes and pain (26.4%) and least common symptom was redness (12.1%).

The most common sign among our study population was prominent eyes followed by lid retraction.

Out of 91 patients, 83 (91.20%) had Axial proptosis, 8 (8.79%) had non-axial proptosis. Axial proptosis was more common in Thyroid associated cause (100.0%) while non-axial proptosis was common in syndrome associated proptosis.

In Thyroid eye disease, Out of 50 patients, 50 (100%) of them had axial proptosis. In the case of inflammatory proptosis, there were 3 patients and 3 (100%) of them had axial proptosis. In the case of trauma there was only one patient who had axial proptosis. Among vascular disorders 6 patients were noted, 83.3% were axial and 16.7% were non-axial. In the case of tumors, total number of patients were 22, and in it 86.4% had axial and 13.6% had non-axial proptosis. Among syndrome associated causes, total patients were 6. 33.3% were axial and 66.7% were non-axial proptosis. Thyroid associated cause and syndrome associated cause have statistically significant association towards axial and non-axial proptosis (p value of thyroid associated cause 0.004 and p value of syndrome associated 0.001) while others are statistically insignificant.

Out of 91 patients, 91.2% of them had axial proptosis and 8.8% of them had non-axial proptosis.

Out of 90 patients bilateral proptosis was more common in patients with Thyroid associated disease whereas unilateral proptosis was common among patients with tumours like orbital lymphoma, sphenoid wing meningioma, optic nerve glioma.

In Thyroid eye disease, bilateral proptosis was more common than unilateral proptosis. About 64% of bilateral proptosis and 36 % of unilateral proptosis cases were seen. In the case of inflammatory proptosis, there were 3 patients and 3 of them had unilateral proptosis in the case of trauma there was only one patient who had unilateral proptosis. Among syndrome associated causes total patients were 6, in these 16.7% had unilateral proptosis and 83.3% had bilateral proptosis. In the case of tumors, total number of patients were 22, and in it 90.5% were unilateral and 9.5% were bilateral proptosis.

Among vascular disorders 6 patients were noted, in these 66.7% of them had unilateral and 33.3% had bilateral proptosis. Thyroid eye disease and tumour causes have statistically significant association to the bilateral and unilateral proptosis p value of thyroid

associated and tumour causes are 0.001 while the others are statistically insignificant. (Table 1)

In Thyroid eye disease out of 50 patients, 60% had mild proptosis, 22% had moderate, 18% of them had severe proptosis. In the case of inflammatory proptosis, there were 3 patients, in this 66.7% of the patients had mild proptosis, 33.3% of them had severe proptosis. In the case of trauma there was only one patient who had severe proptosis. In the case of tumors 42.1% had mild, 36.8% showed moderate and 21.1% showed severe proptosis among syndrome associated causes total patients were 6, 66.7% had mild proptosis and 33.3% had severe proptosis. Among vascular disorders 6 patients were noted, 50.0% had mild proptosis, 33.3% had moderate and 16.7% had severe proptosis, but the relation of causes and types of proptosis (mild, moderate, severe) are statistically.

Insignificant ( $p = >0.05$ ) of the total, 66% proptosis were due to Thyroid associated cause and that belongs to the age group 40-60 years. Least number of proptosis among thyroid associated cause was seen in age group 1-20 years. So there was statistically significant association between thyroid associated cause and age group ( $p = 0.001$ ) There was no statistically significant association between any other cause of proptosis and their age groups. Out of 91 patients, 87.7% patients had normal vision while 13.3% patients have visual impairment.

## Discussion

Among 91 patients, 45 male patients and 46 female patients had proptosis in our study. Majority of patients belonged to 40-60 years of age group (52.7%). Out of 91 patients, 83 (91.20%) had axial proptosis, 8 (8.79%) had non axial proptosis. Most common symptom was bulging of eyes and pain. Out of 91 patients, 44 (48.88%) had bilateral proptosis and 47 (51.11%) had unilateral proptosis. We observed that Thyroid eye disease was the most common cause for bilateral and axial proptosis. Non-axial proptosis was common in syndrome associated proptosis. Unilateral proptosis was common among patients with tumours. Naidu et.al also found thyroid eye disease was the most common cause for proptosis and protrusion was the most common symptom. They observed that bilateral proptosis was most common in thyroid eye disease.<sup>(15)</sup> These findings are concordance with our study.

A study done by Kaup et al about the etiologies of proptosis. They observed that majority of patients were in 41-60 years of age group. They noticed that thyroid eye disease (42%), axial (76%) and unilateral proptosis (64%) were the most common. We also observed similar result. We found that thyroid eye disease and axial proptosis were most common. But there was not much difference between unilateral and bilateral proptosis.

These findings are corroborated by The studies conducted by Dallow et al.,<sup>(1)</sup> Rootman,<sup>(2)</sup> Henderson's

orbital series,<sup>(8)</sup> Wilson and Grossniklaus,<sup>(10)</sup> and Mallajosyula.<sup>(3)</sup> also reported that Thyroid eye disease was the most common etiology of proptosis.

## Conclusion

Thyroid eye disease was the commonest cause of proptosis across all age groups.

Thyroid related proptosis was commonly bilateral and axial while non-axial proptosis was generally tumours or syndromic.

Most patients presented to the OP before visual impairment occurred and prominent eyes was the most common symptom while lid retraction was the most common sign.

Clinical profile of proptosis patients in various age groups of our race, ethnicity and geographical area is important to order the minimum relevant diagnostic tests for diagnosis and management.

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