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Evaluation of Proptosis in Bundelkhand Region: Analytical Study

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Abstract: *Proptosis and their underlying causes require great attention in ophthalmology because of its impaction on vision and facial symmetry. Most of the cases Proptosis has poor prognosis in late stages which was frequently found in this region. Aetiology of Proptosis can be inflammatory, vascular, or infectious, neopalstic and traumatic. Total 43 patients of Bilateral/Unilateral Proptosis were included in this study, which was conducted at Department of Ophthalmology, MLB Medical College Jhansi, U.P, India, over a period of 6 month duration. The main aim of the study was, to evaluate the various causes of Proptosis in Bundelkhand region. Patients had history of any type of surgery for underlying cause of Proptosis was excluded from the study. History, examination and all necessary investigations were done. The male female ratio was 2.9:1. Proptosis was most commonly (44.19%) found 46-60 years of age group (19 out of 43 patients), followed by 31-45 years of age group (18.6%). Unilateral Proptosis was more common (65.12%) as compare to Bilateral Proptosis (34.88%). Inflammatory or infectious was most common underlying pathology of Proptosis in this study (51.18%), followed by tumor pathology (32.57%), rest 16.25% Proptosis patients had vascular, traumatic and other pathology. Leukemias (9.30%) were the most common neoplastic causes of Proptosis in this study, which was predominately found in pediatric age group. Thyroid Ophthalmopathy was most common cause of proptosis (23.26%), followed by orbital cellulitis (11.63%), leukemia (9.30%), cavernous sinus thrombosis (6.98%) and orbital wall fracture (6.98%)*

Keywords*: Cavernous Sinus Thrombosis, Leukemia, Orbital Cellulitis, Proptosis, Thyroid Ophthalmopathy*

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I. Introduction

The terms Exophthalmos and Proptosis can be used to describe eyes appearing to bulge out of the face (beyond the orbital margin) due to an increase in the volume of the tissue behind the eyes. Proptosis can describe any organ that is displaced forward, while Exophthalmos refers to only the eyes. [1]. Henderson reserves the use of the word exophthalmos for those cases of proptosis secondary to endocrinological dysfunction.[2] The aetiology of proptosis can be inflammatory, vascular, or infectious. Protrusion >18 mm from the interzygomatic line has been adopted as the definition of Proptosis in this study [3]

Causes of Proptosis (classification): the main causes of Proptosis are

Infectious/ Inflammatory causes • Graves' ophthalmopathy • Orbital cellulitis [4] • Orbital pseudotumor [4] • Cavernous sinus thrombosis • Mucormycosis	Tumors : • Leukemias • Meningioma, • Nasopharyngeal angiofibroma • Hemangioma, • Dermoid cyst • Optic nerve Glioma • Pleomorphic adenoma
Vascular causes: • Carotid-cavernous fistula • Aortic insufficiency • Capillary hemangioma	Others : • Orbital fracture: • Retrobulbar hemorrhage

Thyroid orbitopathy, also referred to as thyroid ophthalmopathy, is categorized as an inflammatory process that is autoimmune-mediated. [5]Noninflammatory thyroid orbitopathy has also been reported. [6]

II. Method and Material

This observational study was conducted at Department of Ophthalmology, MLB Medical College Jhansi, U.P, India, over a period of 6 month duration (Jan 2019 to June. 2019). Total 43 patients of Bilateral/Unilateral Proptosis were included in this study. The main aim of the study was, to evaluate the various causes of Proptosis in Bundelkhand region. The procedures followed were in accordance with the ethical standarded committee on human experimentation (institutional or regional) and with the Helsinki Declaration of 1975, as revised in 2000. The necessary permission from the Ethical and Research Committee was obtained for the study.

Inclusion criteria: All the patients with Bilateral/Unilateral Proptosis were included in this study, irrespective of age and sex.

Exclusion Criteria: Patients had history of any type of surgery for underlying cause of Proptosis.

Approach to evaluation of Proptosis: Firstly it started with

A). History:

- A complete history should be recorded. Then Evaluation of the patient with exophthalmos begins with a thorough ophthalmic and medical history.
- Time course of disease: acute (hours-days), subacute (weeks), chronic(months/years)
- Progression: The Proptosis may be progressive, static or waxing- waning and
- Medical & systemic history: asked for history of malignancy, weight loss, and smoking.
- Effects of disease: pain, swelling around the eye, diminished vision, watering, diplopia.

B).Ocular examination: It including Visual acuity (Snellen's chart), color vision (Ischihara's chart), pupillary reaction (Direct and indirect, RAPD), extra-ocular movements, intraocular pressure (IOP), slit-lamp biomicroscopy, and fundoscopy (Direct & Indirect).

Pseudoproptosis : Pseudoproptosis needs to be ruled out as false impression of proptosis which may be due to : -High myopia(unilateral enlargement of globe), Unilateral lid retraction, Enophthalmos of contralateral eye, Paralysis of extrinsic muscles.

C). Measurement of Proptosis: many ways to measure the degree to proptosis

1. Luedde's exophthalmometer : The amount of proptosis was measured using Luedde's exophthalmometer and was graded as mild (21–23 mm), moderate (24–27 mm), and severe (28 mm or more).[7]
2. Plastic Ruler Hertel's Exophthalmometer: Most commonly uses and also used for follow up also used in this study.
3. Naugle's Exophthalmometer
4. Hilal and Trokel method by using mid axial CT

D) Investigations: Blood investigation (CBC, ESR, TLC, T3, T4, TSH, General blood picture), B-scan, CT scan, MRI, and Histopathological evaluation.

III. Results

Demographical data of all 43 patient's, were tabled, under various headings, after all initial assessment including history, ocular and systemic examination and investigations.

Table 1: Male and Female patients in study (N=43)

	Male	Female
Number of patients	32	11
Percentage (%)	74.42%	25.58%

As table 1, 32 male (74.42%) and 11 female patients (25.58%) with Proptosis were included in this study, the male female ratio was 2.9:1

Table 2: Age Distribution of the patients (N=43)

Age Groups (In years)	Number of patients	Percentage (%)
0-15	06	13.95%
16-30	04	9.3%
31-45	08	18.6%
46-60	19	44.19%
Above 60 years	06	13.95%
Total	43	100%

Out of 43 patients with Proptosis, Maximum 19 (44.19%) patients were related to 46-60 years of age groups, followed by 31-45 years of age group (18.6%). Minimum incidence of proptosis was found in age group of 16-30 years (9.3%).

Table 3: Unilateral Vs Bilateral Proptosis in study patients (N=43)

	Unilateral		Bilateral
Number of patients	28		15
	Right sided	Left sided	
	13 (30.23%)	15 (34.88%)	
Percentage (%)	65.12%		34.88%

As, table 3, the Incidence of bilateral Proptosis was 34.88% unilateral Proptosis 65.12%. In unilateral, left sided Proptosis (34.88%) was more common as compare to right sided Proptosis (30.23%).

Table 4: Laterality of Proptosis in study (In males and females)

	Unilateral		Bilateral	
	Male	Female	Male	Female
Number of patients	25	03	07	08
Percentage (%)	58.14%	6.98%	16.28%	18.6%

In this study, incidence of bilateral Proptosis was more common in female patients (18.6%), while unilateral Proptosis more common in males (58.14%). Only 3 (6.98%) females had unilateral Proptosis.

Table 5: Various causes of Proptosis in study patients (N=43)

	Various causes of proptosis (Core Etiology)*	Number of patients	Percentage (%)
Inflammatory/ Infectious (51.18%)	Thyroid Ophthalmopathy	10	23.26%
	Orbital Cellutitis	05	11.63%
	Cavernous sinus thrombosis	03	6.98%
	Pseudotumor	02	4.65%
	Orbital Hydatid cyst	01	2.33%
	Frontoethamoidal Inflammation	01	2.33%
Tumors (32.57%)	Leukemia	04	9.30%
	Retinoblastoma	02	4.65%
	Optic nerve Glioma/	02	4.65%
	Parotid gland tumor	01	2.33%
	Neuroblastoma	01	2.33%
	Meningioma	01	2.33%
	Cavernous hemangioma	02	4.65%
	Nasopharyngeal Angiofibroma	01	2.33%
Vascular causes (2.33%)	Carotid-cavernous Fistuula	01	2.33%
Trauma & Others (13.96%)	Orbital Fracture	03	6.98%
	Retrobulbar hemorrhage	01	2.33%
	Others (even undiagnosed yet)	02	4.65%
Total		43	100%

According to Proptosis Classification (as table 5), the Inflammatory Proptosis was most common in this study followed by Tumors (32.57%), traumatic (9.31%), vascular (2.33%) and other causes (4.65%). Most of the cases had Thyroid Ophthalmopathy (23.26%). Leukemias (9.30%) were the most common neoplastic causes of Proptosis in this study, which was predominately found in pediatric age group. Stages of Retinoblastoma had also role in some degree of Proptosis (4.65%). One cases of Orbital Hydatid Cyst was also found during this study.

IV. Discussion

This study was conducted in 43 patients of Proptosis, the etiology of Proptosis mainly diagnosed by, Clinical and Radiological basis (Only few patients were selected for Histopathological evaluation), so, it might be possible that the some patients had different core etiology* as shown in table 5.

The male female ratio was 2.9:1. It means that the Proptosis was more commonly found in male (3 times more common in male as compare to female patients). Tertiary care center's visit of female patients was main confounding factors in this study.

In this study, Proptosis was most commonly (44.19%) found 46-60 years of age group (19 out of 43 patients), followed by 31-45 years of age group (18.6%). Similar results were found in Dallow *et al*.[8] Rootman,[9]

Henderson's orbital series,[10] Wilson and Grossniklaus,[11] and Mallajosyula.[12] Minimum incidence of Proptosis was found in 15-30 years of age group (9.3%).

Unilateral Proptosis was more common (65.12%) as compare to Bilateral Proptosis (34.88%). In case of Unilateral Proptosis, left sided Proptosis (34.88%) was more frequently observed in this study, while right sided Proptosis was found in 30.23% patients. Bilateral Proptosis was most commonly seen in female patients (18.6%) as compare to male patients (16.28%). Bilateral Proptosis was most commonly found in women and

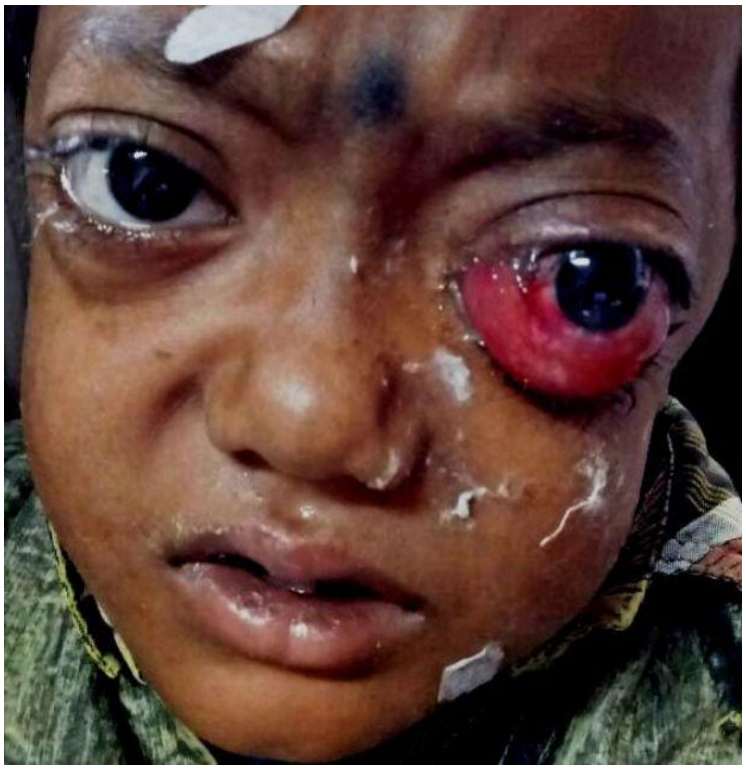
most of them had thyroid Ophthalmopathy. Thyroid eye disease causing Proptosis peaks in the middle age and has a female dominance.[5,7] While In case of Unilateral Proptosis the male patients predominantly involve (58.14%) as compare to female patients (6.98%). This may be due to small sample size and less number of females in the study.

Inflammatory or infectious was most common underlying pathology of Proptosis in this study (51.18%), followed by tumor pathology (32.57%), rest 16.25% Proptosis patients had vascular, traumatic and other pathology. Similar result was found in Sharma P et al study [13]. Thyroid Ophthalmopathy was most common cause of proptosis (23.26%), followed by orbital cellulitis (11.63%), leukemia (9.30%), cavernous sinus thrombosis (6.98%) and orbital wall fracture (6.98%). Leukemias (9.30%) were the most common neoplastic causes of Proptosis in this study, which was predominately found in pediatric age group.

V. Conclusion

Neoplastic causes of Proptosis had worst prognosis. Proptosis had almost equal intra-orbital as well as extra-orbital pathology, in both conditions; these are causes severe visual impairment. Initially the Proptosis had poor self attention (not realized) by patients in Bundelkhand region. The main complains were protusion of eyeball associated with pain, headache and loss /Diminution of vision. Post-surgical or Medical managements of the Proptosis cannot reverse the visual damage. So Proptosis had poor visual outcome in Bundelkhand region, and few neoplastic causes of Proptosis had poor prognosis as well as quality of life. So the visual impairment/loss and Proptosis can be used asa screening tool for the various diseases in this region and it improve the prognosis and quality of life.

A 35 year female present with Thyroid Ophthalmopathy,B/L



A 7 year male present with Acute Myloid Leukemia,U/L Proptosis

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