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Unilateral Proptosis in a Tertiary Care Centre in Bundelkhand region

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Abstract
Objectives: *Proptosis is defined as an abnormal protrusion of the globe. Present study aimed to describe the etiological profile and treatment outcomes of patients with unilateral proptosis coming to a tertiary care center in Bundelkhand region during a period of 2 years.*
Place and Duration of Study: *This study was conducted at Maharani Laxmi Bai Medical College, Jhansi, Uttar Pradesh, India from January 2019 to December 2020 for a period of two years.*
Materials and Methods: *Prospective study of all patients with proptosis coming to Ophthalmology out-patient department during the study period from January 2019 to December 2020 for a period of two years.*
Proptosis was defined by exopthalmometry (Luedde's exophthalmometer) value of >21mm or a difference of>2mm between both eyes. In all patients, a detailed history, proptometry, ophthalmological and systemic evaluation, relevant systemic investigations and CT or MRI or both were done.
Result: *In our study, 40 patients were included. Male: female ratio was 1.8:1. Age ranged from 05-70 years, most of the patients were in the age group of more than 50 years. Diagnosis was mainly done by clinical features and confirmed by radiological and histopathological features. Most of them were treated medically (12 cases, i.e., 30%) and the rest by surgery with a combination of radiotherapy/chemotherapy (16 cases, i.e., 40%).*
Conclusion: *In this study, the most common etiology for unilateral proptosis was of infectious origin, Clinicoradiologically, orbital cellulitis accounted for majority of the cases. CT scan was valuable in evaluating a case of proptosis, but histopathological examination provides a definitive diagnosis of the exact aetiology.*
Keywords: *proptosis, orbital cellulitis*

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I. Introduction

Proptosis is described as an abnormal protrusion of the eyeball [1], and in relation to the skull, proptosis is measured from the corneal apex to the outer orbital margin of the orbit, with the eye looking straight.[2]

The causes of proptosis are numerous and include neoplastic, vascular, traumatic, metabolic, infective and inflammatory etiology with endocrine ophthalmopathy being the commonest.

The causes of unilateral proptosis are innumerable. The eye is a major crossroad for all the structures around it which help in its support and functioning, which when affected extends into the orbit causing proptosis. It can be the most dramatic of the orbital symptoms, especially if it has an acute onset.

A clear knowledge of the etiologies will help the ophthalmologist to suspect, diagnose early, and provide treatment.

An attempt has been made to study the aetiology, clinical features, histopathology, and management of proptosis and its outcome.

II. Material And Methods

Prospective study of all patients with proptosis coming to Ophthalmology out-patient department during the study period from January 2019 to December 2020 for a period of two years. Proptosis was defined by exopthalmometry (Luedde's exophthalmometer) value of >21mm or a difference of>2mm between both eyes. In all patients, a detailed history, proptometry, ophthalmological and systemic evaluation, relevant systemic investigations and CT or MRI or both were done. Demographic details, clinical presentation, investigation details, and treatment details were noted. X-rays, B-scan, CT scan, and MRI orbit were performed to confirm the diagnosis. Presentation of proptosis was defined as acute (within hours to days), sub-acute (within weeks) and chronic (several months/years).

III. Results

In our study of 40 patients presenting with unilateral proptosis, the age of the patients were between 5 and 70 years, and most of them were in the age group of more than 50 years old (25%) as shown in Table 1.

26 were males (65%) and 14 were females (35%).

The minimum proptosis was 3 mm and the maximum was 18 mm above the normal. Most of the patients had a right-sided proptosis, that is, 24 cases (60%). It was axial in 28 cases and eccentric in 12 cases as in Table 2.

Table 1: Age distribution

Age in years	Number of cases	Percentage (%)
0-10	2	5
11-20	4	10
21-30	6	15
31-40	6	15
41-50	7	17.5
51-60	10	25
61-70	5	12.5

Table 2: Type of proptosis

Type of proptosis	Number of cases	Percentage (%)
Axial	28	70
Eccentric	12	30

Table 3: Presenting symptoms

Symptoms	No of patients N-40
Proptosis	40
Diminished vision	30
Diplopia	04
Diminished motility	08
Epiphora	03
Headache	35
Chemosis	22
Orbital mass	12
Eye pain	32
Ptosis	06

Headache and protrusion of eye were the commonest presented complains in these patients along with other complains like pain, defective vision, epiphora, and diplopia shown in Table 3.

Table 4: Cause of proptosis

Cause of proptosis	Number of cases	Percentage (%)
Inflammatory (a) Orbital cellulitis (b)Orbital apex syndrome (c) Frontal mucocele (d) Mucormycosis	**12** 09 01 01 01	**30** 22.5 2.5 2.5 2.5
Pleomorphic adenoma of lacrimal gland	01	2.5
Pseudotumor	01	2.5
Trauma (retrobulbar hemorrhage)	04	10
Dermoid	03	7.5
Retinoblastoma	02	5
Hodgkin's lymphoma	02	5
Squamous cell carcinoma	02	5
Lacrimal gland adenocarcinoma	02	5
Lymphangioma	02	5
Osteoblastoma	03	7.5
Meningioma	02	5
Hemangioma	03	7.5
Acoustic schwannoma	01	2.5

The most common etiology seen in our study was inflammation with 12 cases of acute onset (30%), then there were 9 cases of orbital cellulitis (22.5%), 1 case of mucormycosis (2.5%), 1 case of orbital apex syndrome (2.5%), and 1 case of frontal mucocele (2.5%). Other causes include one case of pseudotumor (2.5%), 04 cases of posttraumatic retrobulbar hemorrhage (10%) ,03 cases of dermoid (7.5%). In Malignant tumors there were 02 cases of retinoblastoma (5%), two cases of Hodgkin's lymphoma (5%), two cases of squamous cell

Carcinoma (5%), and 02 cases of adenocarcinoma of the lacrimal gland (5%), among benign tumors were one cases of pleomorphic adenoma of the lacrimal gland (2.5%), three cases of osteoblastoma (7.5%), two cases of lymphangioma (5%), one case of acoustic schwannoma (2.5%), two cases of meningioma (5%), and three cases of hemangioma (7.5%).

References to ENT, neurosurgery, and oncology were given for any associated conditions. Diagnosis was confirmed clinically and with the help of CT/MRI scans. Scans helped in localizing the lesions and gave an idea into the aetiology of the condition and in making a decision in the management of the patient. In tumors, histopathology reports after biopsy wherever possible confirmed the diagnosis.

Inflammations (12 cases) were medically managed with systemic antibiotics and steroids. 16 patients were surgically managed by orbitotomies or orbital exploration, depending on the site, out of which 5 cases were done by the neurosurgeon. Following surgery, 6 underwent radiotherapy and chemotherapy.

No complications were seen in follow-ups. 25 cases (62.50%) improved with no disease, 3 cases (7.5%) were with disease as stable, one case (2.5%) steadily deteriorated, and there was one (2.5%) mortality in the study period.

IV. Discussion

Orbital pathology usually presents as proptosis. Symptoms reflect the orbital volume increase. Direction indicates the site of lesion [4]. In comparison to other studies where neoplasms are seen to be more common, in our study, inflammations in the orbit were more common and contributed to most of the cases.

There are very few studies available about unilateral proptosis which include all lesions giving rise to unilateral proptosis.

The causes of adult unilateral proptosis may be a retrobulbar hematoma following trauma, inflammatory conditions like orbital cellulitis, an orbital abscess, usually following frontal or ethmoid sinusitis, a pseudotumor of the orbit due to a granuloma of unknown cause, an epidermoid or dermoid cyst, a mixed lacrimal tumor (lacrimal adenoma), or a hemangioma. Malignant tumors include malignant melanoma, carcinoma of the maxillary or ethmoidal sinuses invading the orbit, and meningioma of the sphenoid. Thyroid eye disease which is usually bilateral also can present as a unilateral proptosis in its initial stages [3,5]. Primary tumors of the orbit are usually mixed tumors of the lacrimal gland and dermoid cysts [2]. Anterior temporal lobe lesions into the orbit can lead to proptosis and blindness [6].

The causes of unilateral proptosis in a child include retinoblastoma in the first 5 years of life and infective orbital cellulitis [7].

The direction of exophthalmos may indicate the likely aetiology and site of lesion [1]. Axial proptosis is seen in tumors arising within the muscle cone like optic nerve glioma. The eyeball is displaced down and/or lateral in diseases of frontal or ethmoid sinuses. Lacrimal gland or temporal fossa tumors have a medial displacement [8].

To evaluate and treat the patient with unilateral proptosis, an ophthalmologist must work closely with the ENT surgeon, neurosurgeon, and radiologist to ensure a successful outcome in each case.

During the past few decades, advances in diagnostic instrumentation and surgical technique have helped to elevate the orbit to an anatomical area of great clinical interest. CT, MRI, and orbital echography have dramatically improved diagnostic accuracy and allowed a more careful therapeutic planning [9, 10]. Orbital surgery has become safer and more precise, and treatment results are significantly enhanced. The operating microscope, specialized orbital instruments, fibre optic illumination, endoscopy, and hypotensive anesthesia have allowed orbital surgeons to perform complex deep dissections more easily and with fewer complications.

As regards the management, inflammatory cases and benign orbital neoplasms were most amenable to satisfactory treatment, medical or surgical, while malignant primary tumors if detected early could be eradicated with fair chances of success. Surgically, results were more encouraging in cases of retinoblastoma and lacrimal gland tumors than in other highly malignant and infiltrative growths where deep X-ray therapy was the only possible recourse for palliative and temporary improvement.

Proptosis in many cases if undiagnosed and unexplained when deep in the orbit and left to fate is not advisable, so orbital exploration is necessary to clear the worry of the patient as well as the ophthalmologist [11]. Anterior orbitotomy with ethmoidectomy was the most satisfactory approach for anteriorly situated neoplasms, while trans frontal approach by neurosurgeons gave better accessibility for tumors situated medial to the optic nerve or extending intracranially. Palliative decompression of the orbit through this route was found most effective.

V. Conclusion

Unilateral proptosis is a multidisciplinary problem and requires collaboration of different specialties [4] of an ophthalmologist along with an otorhinolaryngologist, neurosurgeon, oncologist, and radiotherapist. A thorough ENT examination is mandatory in proptosis [2]. A small number of cases can never go noticed, but in

proptosis, however small the bulge, malignancy has to be ruled out. The commonest cause is malignancy in other studies; our study showed more of an inflammatory origin. CT scan was valuable in evaluating a case of proptosis, but histopathological examination provides a definitive diagnosis of the exact aetiology.

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