

Etiological Pattern, Clinical Presentation, and Management Challenges of Proptosis in a Tertiary Hospital in South West Nigeria

T. O. Otulana, O. A. Sogebi, H. A. Ajibode, O. T. Bodunde, O. O. Onabolu

Department of Surgery, Faculty of Clinical Sciences, Obafemi Awolowo College of Health Sciences, Olabisi Onabanjo University, Sagamu, Ogun State, Nigeria

Abstract

Background: The etiology of proptosis is diverse ranging from orbital problem to infiltrative disease and spread from contiguous sites including nasopharynx, paranasal sinuses, and sometimes distant structures. It can also be part of systemic illness affecting multiple tissues and organs. **Aim:** This study aims to determine the demographic pattern and etiology of proptosis in a tertiary health facility in South Western Nigeria and to discuss the management challenges. **Methods:** This is a clinic-based retrospective descriptive analysis of all patients that presented with proptosis at the Eye Clinic of Olabisi Onabanjo University Teaching Hospital Sagamu, Ogun state, Nigeria, over a 13-year period from 2000 to 2012. The hospital records of patients was used which was analyzed using Statistical package for Social sciences version 15. **Results:** A total of 175 cases of proptosis out of 15,266 new cases gave a hospital prevalence of 1.2%. The average age of the 138 patients analyzed was 37.8 years with a male to female ratio of 1:1. Children constituted 27.5%. Eighty-one (58.7%) patients presented within 1 month of onset of proptosis. Twenty-three (16.7%) had bilateral proptosis. Half of the studied population was secondary to orbital inflammation. The common causes of proptosis were infective 38.4%, mass/tumor 18.8%, noninfective inflammation 13%, and sinonasal diseases 10.9%. Eight (5.8%) were mucocoele of paranasal sinuses. Thyroid-related eye disease and proptosis of vascular etiology were common in females. Computerized tomographic scan of the orbit and/or sinus/cranium was done in 11.4% of the patients. Thirty-seven (26.8%) patients defaulted. **Conclusion:** Infective process is the most common cause of proptosis from orbital cellulitis. Majority were unilateral with no sex predilection. Proptosis due to thyroid eye disease and vascular abnormality were found mostly in females. The management challenges were poor record keeping and inadequate personnel. Despite the threat to life and vision posed by some etiology of proptosis, a large number of the patients were unable to fund investigation and treatment while others defaulted from the facility.

Key words: Challenges, etiology, presentation, proptosis, tertiary facility

INTRODUCTION

Proptosis is the protrusion or forward displacement of one or both eye balls^[1] from posterior pressure on the globe due to increased orbital volume either from intraorbital or intracranial space-occupying lesion. It presents as both clinical symptoms and signs of orbital disease.^[2] The etiology is diverse ranging from local orbital problem to infiltrative disease and spread from contiguous sites including the nasopharynx, paranasal sinuses, and sometimes distant structures. It can also be a part of systemic illness affecting multiple tissues and organs.^[3] The incidence of proptosis in Eluru in India is 0.037%.^[4]

Proptosis sometimes poses threat to vision^[5] from exposure keratopathy and can actually lead to blindness due to

compressive optic neuropathy. Proptosis can occasionally be a sign of life-threatening situations in some cases due to malignancies and orbital infection.

The etiology of proptosis is variable, and the treatment options are also varied. It is thus important that managing physicians and ophthalmologists are abreast with common causes of proptosis in their areas of practice in order to

Address for correspondence: Dr. Taibat Olusola Otulana,
Department of Surgery, Faculty of Clinical Sciences, Obafemi Awolowo
College of Health Sciences Olabisi Onabanjo University, Sagamu,
Ogun State, Nigeria.
E-mail: solyotulana@yahoo.com

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provide adequate treatment and also for health planning for the patients.

This study aims to determine the demographic pattern of patients with proptosis, document the etiologies, and to discuss the management challenges of proptosis in a tertiary health facility in South Western Nigeria.

METHODS

This is a hospital-based retrospective descriptive analysis of all patients that presented with proptosis at the Eye Clinic of Olabisi Onabanjo University Teaching Hospital Sagamu, Ogun state, Nigeria, over a 13-year period (from January 2000 to December 2012). It was conducted using the record of patients who attended the general eye section of the hospital during the study period. The eye clinic receives referred patients from different departments within the hospital and hospitals within the township of Sagamu and surrounding towns.

The eye clinic outpatient register was used to recover the file numbers of all patients presenting with proptosis, while the case notes were retrieved from the information management department of the hospital.

The information recorded included the patients' sociodemographic characteristics comprising the age, sex and occupation, duration of proptosis before presentation, the laterality of lesion, diagnosis, investigation, and treatment offered. For the purpose of this study, the age of 15 years and below was taken as pediatric age group in consonant with the practice of the hospital's pediatric surgical unit. Other researchers have also used this age limit for pediatrics.^[6,7] Results of different investigative studies including hematological, microbiological, radiological, and histopathological parameters of the patients were also recorded although diagnosis was mainly clinical in most cases.

Excluded from the study were patients whose case notes were not found and those with insufficient or loss of important vital information. Cases of retinoblastoma were also excluded from the study because majority did not present with proptosis and the few who did were among those with missing case notes and inadequate records.

The demographic pattern of the patients was presented in terms of distribution of age, (sub classified into age categories), sex, and occupation of the patients. The causes of proptosis and in order of frequency were noted. The management challenges were discussed regarding patients, hospital, and personnel-based factors.

Data were recorded in a spread sheet and analyzed using Statistical package for Social sciences version 15 (Chicago, IL). The information generated was presented in frequency tables and graphs.

RESULTS

A total of 175 patients with proptosis out of 15,266 new cases were seen in the eye clinic of the hospital during

the study period and 138 (78.9%) who met the inclusion criteria were included in the study. Prevalence of proptosis in the study population was 1.2%. Thirty-two (18.3%) case notes were missing, whereas 5 (2.9%) patients did not have adequate information in their case notes. Both sexes were equally represented with 69 patients each, thus male: female ratio was 1:1. The ages of the patients ranged from 1 day to 87 years with an average age of 37.8 years. There were 38 (27.5%) children and 100 (72.5%) adults. Among the unemployed were 18 (13.0%) students and 13 (9.4%) dependent elderly. Artisans were the most dominant occupation noted in the study. Others are as represented in Table 1. The demographic characteristics of the patients are also detailed in Table 1.

Eighty-two (59.4%) patients presented within 1 month of onset of proptosis, 53 (38.4%) of whom presented within the first 7 days of which 30 (64%) were due to orbital cellulitis. Twenty-seven (19.6%) patients presented between 1 month and 1 year, while 26 (18.8%) presented after 1 year. The general etiological profile for proptosis is shown in Table 2, with the distribution according to sex in Figure 1. Proptosis was due to orbital inflammation in more than half (51.5%) of

Table 1: Distribution according to age and occupation of the patient

Variable	Frequency (%)
Age category in years	
0-15	38 (27.5)
16-30	33 (23.9)
31-45	31 (22.5)
46-60	17 (12.3)
>60	19 (13.8)
Total	138 (100.0)
Children	38 (8.7)
Students	18 (13.0)
Retirees	13 (9.5)
Civil servant	12 (8.7)
Artisans	40 (29.0)
Others*	6 (4.4)
Missing*	11 (8.0)
Total	138 (100.0)

*Occupation not documented in case notes, *Others include Clergyman, bike riders, house keeper, etc.

Table 2: Causes of proptosis

Diseases	Frequency (%)
Infections	53 (38.4)
Orbital mass/malignancy	26 (18.8)
Noninfective inflammation	18 (13.0)
Sinonasal diseases	15 (10.9)
Proptosis of inconclusive origin	15 (10.9)
Orbital hemorrhage	5 (3.6)
Proptosis of vascular origin	4 (2.9)
Others*	2 (1.5)
Total	138 (100.0)

*Others included proptosis of intracranial origin and neurofibromatosis

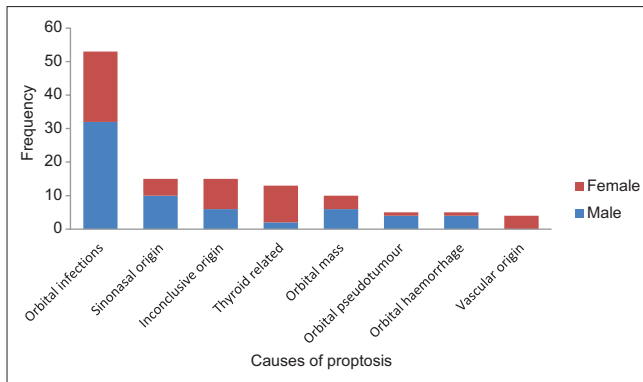


Figure 1: Causes of proptosis and sex predilection

the patients, among which 53 (38.4%) were infections. Table 3 represents the types of infections responsible for the proptosis. The prevalence of thyroid-related ophthalmopathy (TRO) in our study was 9.4%. Orbital tumors was the second most common cause of proptosis, half 13 (9.4%) of which were confirmed as malignancies (6 were squamous cell carcinoma, 4 were lymphomas, 3 were malignant melanoma). Among the sinonasal diseases, 8 (56.3%) were due to mucocoele, while 7 (43.7%) were due to malignant masses in the nose and paranasal sinuses. The etiology of proptosis was not conclusive in 15 (10.9%) of the patients. Proptosis of vascular origin included orbital varices and suspected arteriovenous malformation presenting as fornix and bulbar conjunctiva venous tortuosity, dilated vessels, and hyperemia. That due to intracranial origin was a case of suspected aneurysm of the cavernous sinus.

Among the 23 patients with bilateral proptosis, more than half (56.5%) had thyroid eye disease. Table 4 represents the different causes of bilateral proptosis. Table 5 represents the radiological investigations used to aid the diagnosis. Plain X-rays was the most common radiological investigation done in 29 (21.0%) of the patients, while computerized tomographic (CT) scan of the orbit and or sinus/cranium was done in 20 (11.4%) patients.

Altogether, 37 (26.8%) patients defaulted, 22 (15.9%) after the first consultation, whereas 13 (9.4%) patients were referred. Nineteen (13.8%) people lacked fund to carry out investigation and/or treatment.

Patients' treatment was multidisciplinary and included the ophthalmologist, internist, endocrinologist, pediatrician, ear nose and throat (ENT) surgeon, and other relevant specialists. Those with orbital cellulitis were treated with antibiotics, while those with thyroid eye disease were treated with carbimazole or systemic steroids and ocular lubricant.

DISCUSSION

In this study, a hospital prevalence of 1.2% seen over the 13 years period suggests that proptosis is relatively not common in our ophthalmology practice. However, it behooves all clinicians to be able to make accurate diagnosis

Table 3: Different causes of infections responsible for proptosis (n=53)

Cause of orbital infection	n (%)
Orbital cellulitis	48 (34.8)
Presume orbital loiasis	3 (2.2)
Orbital foreign body	1 (0.7)
Osteomyelitis	1 (0.7)
Total	53 (38.4)

Table 4: Causes of bilateral proptosis n=23 (100%)

Causes	n (%)
Thyroid eye disease	13 (56.5)
Orbital cellulitis	4 (17.4)
Orbital pseudotumor	3 (13)
Nasopharyngeal malignancy	2 (8.7)
Orbital hemorrhage	1 (4.4)
Total	23 (100)

Table 5: Radiological investigation done among 138 patients

Type of imaging studies	Number of patients (%)
Plain skull/orbit/sinus X-rays	29 (16.6)
Orbital ultrasound	21 (12.0)
Computerized tomographic scan	20 (11.4)
Magnetic resonance imaging	4 (2.3)

since the treatment depends on the etiology, and it may be multidisciplinary in approach.

There was no sex difference in the patients who presented with proptosis when both adult and children were considered together. Satpute and Chingsuingamba who also looked at proptosis in general found equal distribution among both sexes.^[8] A study in India on unilateral proptosis showed a male preponderance but the research was mainly on orbital tumor.^[9] This may however not be the same in bilateral proptosis. Our study combined all types of proptosis and did not reveal any sex preponderance, suggesting that either sex could be affected. Dysthyroid ophthalmopathy and proptosis of vascular origin were prevalent in females in this study. Lim *et al.* also reported a preponderance of female sex in their study^[10] on thyroid eye disease.

According to age category, proptosis had highest frequency among the age group 0–15 years in this study, Majekodunmi in Lagos found 47% of proptosis occurring in children <15 years.^[6] However, another study done in India found proptosis more prevalent in age group 31–45 years,^[4] but this formed the number three age group affected in our study. The Indian study looked at a relatively small sample size, which might be responsible for their findings. Half (51.4%) of the proptosis in our study were found in people aged 30 years and below, while that done by Ogbeide and Theophilus in Benin City, Nigeria,

also found 51.5% of proptosis in population <30 years.^[3] In Majekodunmi study, however, 87% of proptosis was found in patients 30 years and below. The reason for this major difference might be because her research was skewed toward children.

Bilateral proptosis was found in one-fifth of the patients. Bilateral proptosis most commonly suggests a systemic disease and it is particularly common as exophthalmos due to thyrotoxicosis. However, cases of bilateral eye diseases had been reported in two children with nasopharyngeal malignancy.^[11] Sharma *et al.*^[12] reported bilateral proptosis in 20% of his population studied although this figure is lower than that of Ahmed and Ahmed.^[2]

Half of the studied population (51.5%) had proptosis secondary to inflammatory orbital disease, especially orbital cellulitis and presented within 1 month of onset of the disease. This could be because orbital cellulitis is a painful and debilitating condition, that nonspecialists may likely refer which makes patients present earlier to the tertiary hospital. Sharma *et al.* reported that orbital pseudotumor was the most common cause of proptosis amongst the 47% that were due to orbital inflammation.^[12]

Orbital tumor formed the second most common cause of proptosis in this study. Orbital masses, malignancy, and proptosis of inconclusive etiology individually contributed to proptosis in the study. However, patients that had noninflammatory causes of proptosis tended to present late, because it is insidious in onset, painless, and it takes a longer time for the proptosis to become noticeable.^[13] Khan *et al.* in their study found orbital tumor as the cause of proptosis in two-thirds of their patients^[14] also Ogbeide and Theophilus in Benin city reported that tumor was the most common cause of proptosis.^[3]

It is important that proptosis should be taken serious no matter the antecedents because it may be a sign of a grievous disease. Health education of the populace on the importance of proptosis is required to prevent morbidity and mortality that may occur from this condition.

Orbital cellulitis was the most common cause of proptosis in this study; same was reported by other authors in Nigeria and outside.^[6,15,16] This contrasts with work done by Masud *et al.* in Peshawar where infection was the number three cause of proptosis.^[7] Noninfective orbital inflammatory conditions (thyroid-related orbitopathy and orbital pseudotumor) were the third leading cause of proptosis in this study. Thyroid eye disease was more prevalent of the two and it accounted for 9.4% of noninfective orbital inflammation, this is similar to the 10% reported by Sabharwal *et al.*,^[17] even though sometimes differentiating between the two conditions clinically may be difficult.^[18]

Bilateral proptosis was most common in patients with TRO in this study. In a report of study done by Sabharwal *et al.*,^[17] bilateral proptosis was found in four out of five patients with

TRO whereas Strianese *et al.*^[19] in their study showed that 14.6% had bilateral involvement.

Mucocele of the paranasal sinuses was responsible for over half of the cases of ENT-related proptosis. Venugopal and Sagesh found mucocele the second most common cause of ENT-related proptosis after malignancy of the nose and paranasal sinuses.^[20] Orbital extension from sinonasal tumors was the most common cause of ENT-related proptosis in other studies.^[20-23]

In our study, traumatic orbital injury presenting as orbital hemorrhage mostly from road traffic accident was an important finding. Ogbeide and Theophilus in Benin City, Nigeria,^[3] also found trauma as an important cause of proptosis.

CT scan, though noninvasive and a reliable diagnostic tool for the evaluation of proptosis,^[17] is expensive, and not readily available in most centers in developing country. It was accessed by only about one-tenth of the patients; probably due to nonavailability of the equipment in our facility or lack of funds since a large number of our patients were unemployed and were dependent on their relatives for provision of livelihood including health care. Patients who were referred for investigations outside the facility which is at least 65 km away from our center did not come back for reasons not answered by this retrospective research, thus making appropriate diagnosis a challenge in some cases. The most accessed radiological investigations were plain X-ray and ultrasonography which were much cheaper than CT scan but their findings may not be characteristic of any orbital disease.

The treatment of orbital disease is multidisciplinary and is usually tailored toward the cause. Early presentation and early institution of treatment, especially in proptosis of infective etiology is related to good outcome.

Proptoses of inconclusive etiology were those who either lacked funds to carry out investigation or defaulted after the first visit [Table 2]. The challenge of lack of funds in developing countries like ours in accessing health care has been discussed in previous literature.^[24] In this study, expectations were that patients and relatives would source fund for medical care in the presence of threat to vision and/or life but this was not the case, instead a large number defaulted and some who stayed did not even have funding for both investigations and treatment thereby putting the physicians and other care givers in a very difficult situations. Even though appropriate radiological investigation and histology are valuable in the diagnosis of proptosis, clinicians must remember that they complement a good history and a detailed and thorough physical examination.^[25] A large number of the patients' evaluation in this study depended on the latter.

Proptosis is an important presentation of orbital disease and it has a diverse etiology. A detailed history and thorough physical examination are important and will help to provide clues as to the primary etiology. Magnetic resonance imaging and CT scan are very valuable in confirming the diagnosis

even though histology of pathological specimen syntax the diagnosis in most cases.

Management of these patients had several challenges. The case notes of some of the patients could not be located while some that were found had incomplete or loss of vital information that were needed. This created a limitation to the validity of the findings of the study. Establishment of preferred practice pattern in our clinical department and complete computerization of the medical record system will ameliorate this challenge.

The best radiological investigation for the diagnoses of proptosis is CT scan, sometimes with angiographic studies in lesions with suspected vascular anomalies. The absence of some of these investigations in the center remains a challenge in making optimal diagnosis and properly characterizing proptosis in many patients. Moreover, the cost of CT scan and the inability of patients to provide funds for such investigations is another challenge concerning their optimal management. Provision of the appropriate radiologic diagnostic tools at subsidized costs is expedient in our center.

Some of the patients required multi-disciplinary management by specialists such as intervention radiologists, neurosurgeons, and ocular oncologists all of who are not available in our facility. There was no histological diagnosis in some of the patients. This contributed to suboptimal characterization and management of some orbital tumors. It is necessary to encourage ophthalmologist to obtain certified knowledge and skill in sub-specialization training in oculoplastic and ocular oncology.

There are also challenges relating to patients high default rate. This has led to inadequate and sometimes inappropriate diagnosis from follow-up assessments. This might have fueled the large number of inconclusive diagnosis of proptosis. Attending doctors should take pains to educate patients with proptosis the possible outcome of their condition because knowing this might reduce the default rate and also encourage them and their relatives to source for funds for their better management.

CONCLUSION

Proptosis is not a common eye lesion in our center. It occurs commonly in adults and presents mostly as unilateral disease except in those related to thyroid diseases. The most common etiology is orbital cellulitis. There were peculiar challenges related to the management that were discussed.

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Conflicts of interest

There are no conflicts of interest.

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