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Subacute post-traumatic proptosis with spontaneous resolution

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Abstract

Proptosis or exophthalmos is the forward protrusion of eye and maybe unilateral or bilateral, may occur spontaneously or after trauma and may be due to some underlying pathology or it could be isolated without systemic involvement. When proptosis occurs following trauma, it may be due to orbital hemorrhage, orbital edema or herniation of brain parenchyma as an encephalocoele through an orbital roof fracture; the latter condition having potential for emergent crisis requiring urgent surgery and can be life-threatening. Often encephalocoele (which requires surgery) and orbital hemorrhage (which can be managed conservatively) cannot be differentiated on CT, making the condition unpredictable and precarious. This case report is regarding a young male patient who developed subacute proptosis days after trauma, with subsequent resolution with conservative management.

Keywords: proptosis, exophthalmos, encephalocoele, orbital roof, thyroid ophthalmopathy

Introduction

Proptosis is the forward protrusion of the eyeball ^[1] beyond its usual limits within the orbit, and is caused due to disease process or pathology involving the orbit itself or its contained spaces ^[1]. The term *exophthalmos* is used interchangeably, although usually used to indicate associated thyroid disorder. The condition tends to occur with increased volume of the tissue behind the eye, as the orbit being a static space without potential to enlarge and accommodate the increased volume of contents displaces the eyeball. Forwards ophthalmopathy is the most common cause of both bilateral and unilateral proptosis ^[2]. Unilateral proptosis especially in children is alarming because it may occurring due to malignancy ^[3]. The dynamic nature of the disease process itself, the broad-range of potential differential diagnosis and the risks associated with entrapment of brain parenchyma within the orbit in the case of a post-traumatic encephalocoele make the condition treacherous.

Case Report

A 25-year-old male patient had presented following a head injury sustained in a vehicular accident. He had a brief period of loss of consciousness followed by disorientation, but no seizures or bleed from any apertures. He was drowsy but arousable, and his Glasgow Coma Scale was 11/15 (E2V4M5), however, he was unable to open his left eye. An ophthalmological examination showed severe chemosis of the left conjunctiva, peri-orbital ecchymosis and edema, and multiple partial-thickness corneal lacerations. Bilateral pupillary response was adequate but visual acuity could not be gauged in view of altered mental status. CT brain taken on presentation had shown a mild frontal contusion and few undisplaced facial fractures, and after discussion with the patient's attenders, a conservative approach was decided upon. Facio-maxillary and ophthalmology units also proceeded with conservative approaches. The patient was started on anti-epileptics, analgesics, anti-edema measures and topical antibiotic eye drops, as well as general supportive measures.

A repeat CT taken 24 hours after admission was unremarkable. The patient showed good improvement, and by 48 hours after admission his Glasgow Coma Scale had improved to 13, and with another 24 hours to 15/15. The edema around the left eye had reduced, visual acuity was normal but the prominence of the eyeball became apparent by the 4th to 5th day post-trauma, and then increased.

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Repeated imaging revealed extra-conal hemorrhage, organised orbital hematoma and frontal contusion, with displacement of the globe infero-laterally (figure 1).



Fig 1: CT showing organised orbital hematoma and proptosis of Left Eye

An MRI confirmed the absence of encephalocele. As the patient was neurologically well and did not have any visual complaints, a careful watch-and-wait policy was adopted after counselling the patient regarding the possibility of sudden deterioration and the potential need for emergency surgery. There was a mild increase in the degree of the proptosis over the next 2 days without any symptomatic changes. There was then a plateau for about 2-3 days, following which a reduction in the proptosis became apparent and by about the 20th-day post-trauma, there was near-complete resolution. There were no complications or complaints on follow-up.

Discussion

Proptosis, the forward displacement of the eyeball [1] can be unilateral or bilateral, and can occur in any direction. Among adults, Grave’s Disease is the most common cause of both bilateral and unilateral exophthalmos [2]. Unilateral proptosis may be caused by a variety of pathologies which have been summarized in Table 1 [1-6].

Table 1: Differential Diagnosis of Unilateral Proptosis

Vascular	Carotid-cavernous fistula Cavernous sinus thrombosis Arterio-venous malformations such as Hemangioma, Aneurysm or Varix
Trauma	Retrobulbar hemorrhage Post-traumatic mucocele Encephalocele (due to orbital roof fracture)
Endocrine	Thyroid associated ophthalmopathy Grave’s Disease
Infective	Orbital Cellulitis Mucormycosis Granuloma
Inflammatory	Orbital pseudotumor Myositis Granulomatous disease Sarcoidosis
Tumor	Primary like Schwannoma Lymphoma, optic nerve glioma Metastases from distant sites, commonly leukemia and sarcomas
Pseudoproptosis	Contralateral enophthalmos Contralateral globe rupture

Bilateral proptosis is less alarming due to the fear of malignancy being more in unilateral cases, however, other than Thyroid-associated disease, the potential differentials are rare, obscure and often difficult to diagnose, including infective conditions like neurocysticercosis, aspergillosis and mucormycosis; inflammatory conditions like Wegener’s granulomatosis; eosinophilic granulomas, congenital and genetic disease and rarely malignancy [7].

Following trauma, proptosis more often develops acutely rather than show the sub-acute mode of development as was seen in our patient. The main cause for acute-post traumatic proptosis is retrobulbar oedema [8], with other causes including retrobulbar haemorrhage, and rarely, fracture of the orbital roof with herniation of brain parenchyma and resultant displacement of the eyeball due to the encephalocele [9]. In case of encephalocele or vascular malformations, the proptosis may be pulsatile and a bruit may be heard on auscultation [10]. Trauma resulting in orbital roof fracture and subsequent encephalocele causing proptosis is rare, only around 15 cases have been reported [5]. Management in these cases is evacuation of the herniated brain parenchyma and reconstruction of the orbital roof, which today usually employs a titanium mesh [5].

Indications for emergency surgery in proptosis focuses on visual failure. (i) Progressive loss of vision, (ii) progressive proptosis and (iii) radiologically-demonstrated bony spicules impinging on the optic nerve are the main indications for decompression, where essentially an orbital compartment syndrome develops [5]. Apart from visual failure, the secondary insult brought about by

proptosis – stretching of the nerves supplying the extra-ocular muscles results in their paresis or palsy [5]. The complications of proptosis if left unchecked include exposure keratitis and corneal ulceration and conjunctivitis. In our patient, the progress of the degree of proptosis had ceased, and there was no evidence of visual failure, hence a conservative approach was adopted.

Sub-acute or delayed development of proptosis after trauma is unusual. Rarely, it may present up to one-month post-trauma with underlying bruit being audible on auscultation, and 4-vessel angiography would reveal vascular aberrations like carotid-cavernous fistula, which would require management with stents and embolisation [10].

Thyroid profile and antibodies should be sent for any patient with non-traumatic proptosis [10]. The characteristic feature of thyroid-related ophthalmopathy on computed tomography is muscular hypertrophy and sparing of the tendons [11]. In the case of thyroid ophthalmopathy, the proptosis tends to settle as the primary condition is controlled; corticosteroids and orbital radiotherapy are used in refractory cases. In case of trauma, severe thyroid ophthalmopathy, primary or secondary malignancy, or the presence of an intra-orbital space occupying lesion, surgery is the only modality to relieve the intra-orbital pressure and decompression by removing the orbital floor in case of compartment syndrome may be required [11]. About one-third of all proptosis cases will require surgical intervention [12].

Conclusion

Proptosis is a dynamic condition, with several causes ranging

from benign to life-threatening. It also shows variations with onset, such as being acute, subacute or delayed may be either static or and progressive. Thyroid ophthalmopathy is the most common cause of both bilateral and unilateral disease, although a wide-range of differentials exist. Malignancy is more often seen in unilateral cases. Proptosis following orbital trauma may be due to retro-orbital hematoma/collection or encephalocoele due to orbital roof fracture, the latter requires urgent surgery so differentiation between the two causes with the aid of radiology is important. In general, surgical intervention is indicated if there is visual failure, progression in the degree of proptosis or if there are bony spicules impinging on the optic nerve. In the absence of these features, mild to moderate proptosis which is not associated with any visual failure can be managed conservatively, with adequate observation and the provision for urgent surgery being available, should the need arise.

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