

Peeping Painless Proptosis

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From the Case Records of the Alpert Medical School of Brown University Residency in Emergency Medicine

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DR. XIAO CHI ZHANG: A 92-year-old woman with dementia was brought to the emergency department (ED) from a nursing home for headache and “left eye bulge” after falling backward, striking her head on the ground. While the review of systems was limited due to the patient’s baseline dementia, she only reported occipital headache, left knee pain and denied any eye pain, changes in her vision and stated: “my right eye is my bad eye.” Her past medical history was significant for bilateral glaucoma, right orbital reconstruction due to childhood trauma, and coronary artery disease. Current medications included aspirin/extended-release dipyridamole (Aggrenox®), timolol, and latanoprost eye drops.

On arrival to the ED, the patient’s blood pressure was 154/66 mm Hg, pulse rate 63 beats/min, respiratory rate 20 breaths/min, temperature 36.5°C (97.7°F), and SaO₂ 96% on room air. She was in no acute distress without any obvious signs of external trauma. She was alert and oriented to her name, perseverated on her headache, and had reproducible left knee discomfort with active range of motion. Her external ocular exam was significant for a left proptotic eye, with a 3mm pupil that was reactive to light and a normal appearing right eye with a surgical, 3mm pupil; there were no signs of irritation or hyphema on either eye (**Figure 1**).

Her left extraocular motion (EOM) was intact, but her right eye movement was restricted on superior temporal, inferior temporal, superior nasal, and inferior nasal motions. She was able to see fingers through her left proptotic eye, but unable to perceive light on her right eye. The patient denied diplopia and there was no appreciable afferent pupillary defect. The remainder of her physical exam and trauma evaluation was negative for any major deformities, contusions, ecchymosis, hematomas, lacerations or step-offs.

Initial blood work was unremarkable for acute metabolic or hematologic abnormalities. Imaging revealed a normal chest x-ray. A computed tomography (CT) scan of the brain, face, and neck revealed a soft-tissue mass within the left orbital space without any obvious evidence of acute infarct, hemorrhage, mass or mass effect in the brain or facial fractures (**Figure 2**). The differential diagnosis for this mass included a retrobulbar hematoma, given the patient’s history of trauma while on an antiplatelet agent.

DR. NADINE HIMMELFARB: What were your immediate concerns when you recognized the proptosis in the setting of head trauma?

DR. SARAH JOSEPH: One of the most concerning pathologies when confronted with a proptotic eye after head trauma is retrobulbar hematoma, especially in the setting of anti-platelet medication use. Retrobulbar hematoma is considered a true ophthalmologic emergency and a vision threatening condition as it can rapidly lead to orbital compartment syndrome (OCS), where the optic nerve experiences rapidly

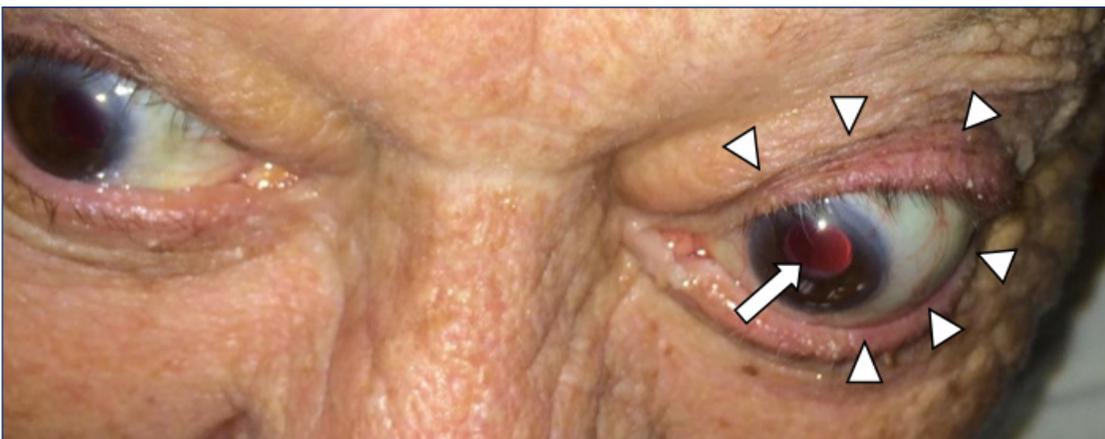


Figure 1. Patient has a left proptotic eye (white arrowheads) with intact corneal red reflexes (white arrow), without visual acuity or range of motion deficits after a traumatic head injury.

Figure 2. Non-Contrast CT Brain and Face after trauma. Frontal (top) and coronal (bottom) views demonstrating proptosis of the left orbit (white arrowheads) with a lobulated hyperdense soft tissue mass (white arrow) within the left orbit, initially concerning for retrobulbar hematoma in the setting of head trauma.

elevated intraorbital pressure, resulting in nerve ischemia and permanent blindness.¹

DR. MICHELLE LIPPMANN: What are some of the common clinical findings associated with retrobulbar hematoma? What are some of the other potentially traumatic vision threatening pathologies that warrant an emergent ophthalmology consult?

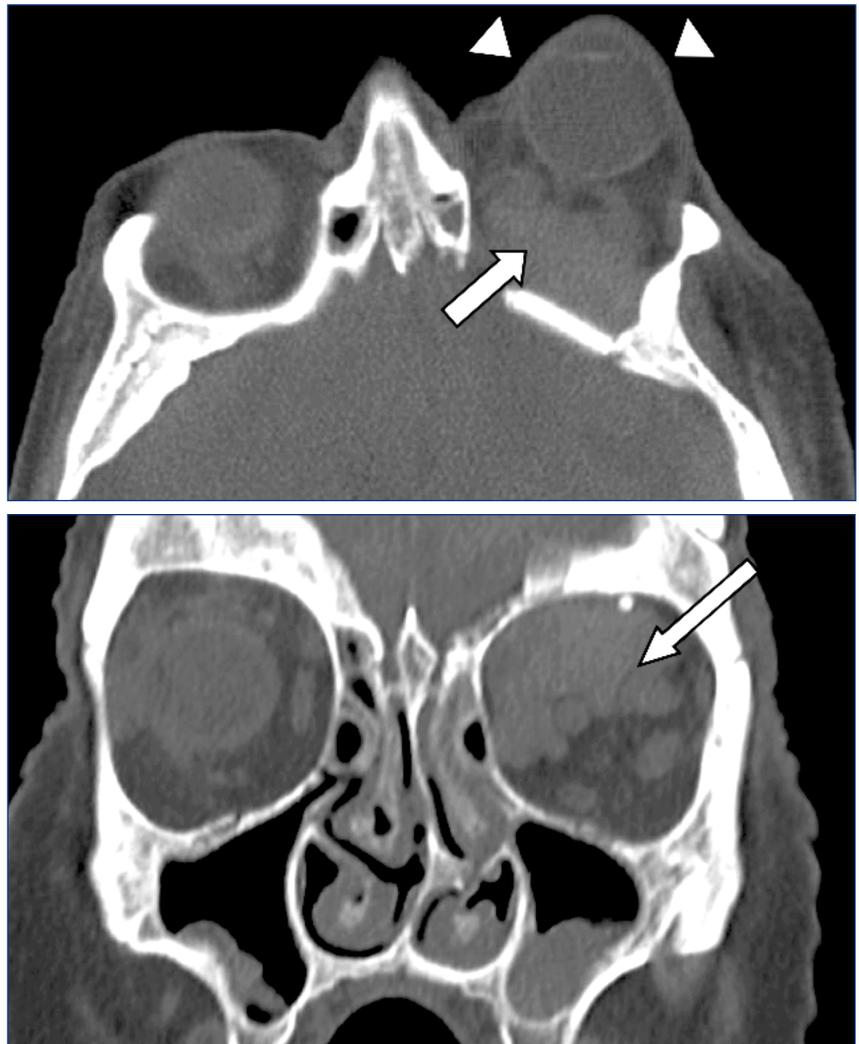
DR. ZHANG: Patients with OCS often present with decreased vision, severe eye pain and proptosis. Additional concerning findings include diplopia, periorbital swelling, afferent pupillary defect (APD), diffuse subconjunctival hemorrhage, chemosis, tight eyelids and decreased retrobulbar pulsation as physical evidences of increased intraorbital pressure (IOP).² Fundoscopic exam may also reveal vascular and optic disc edema and the absence of spontaneous venous pulsation (SVP). While our patient did have a proptotic eye and a retrobulbar mass, she did not endorse any new ocular complaints and or new vision deficits, making her case a clinical conundrum.

Other vision-threatening conditions that require emergent ophthalmologist consultation include caustic eye exposures (ocular chemical burns) or direct ocular trauma (i.e. open globe ruptures) that require EM clinicians to either initiate immediate ocular irrigation or placing a protective barrier. Neither ophthalmology emergencies would present as painless proptosis without external irritation.

DR. JESSICA SMITH: How do you explain the poor vision (count-fingers only) of the left eye and respective absence of afferent pupillary defect (APD)?

DR. MAUREEN LLOYD: Great catch! We reviewed the patient's records and she has always had better vision on her left eye than her right eye; at the ED bedside, the right eye had no light perception. Even after the head trauma, the left eye was still the better seeing-eye. As a result, she did not develop an APD because the left eye still offered more afferent input than the right eye.

DR. WILLIAM BINDER: If this patient had a retrobulbar hematoma, what would be the ultimate therapy?



DR. JOSEPH: In the setting of progressive vision loss and concern for OCS, clinicians should consider performing an emergent lateral canthotomy.³ EM clinicians should consider performing this vision saving procedure by identifying the lateral canthus and incising the canthus at full thickness to sever the lateral canthal tendon in order to release the ocular pressure. After lateral canthotomy, efforts should be made to decrease IOP, including head-of-bed elevation, analgesia, antiemetics, and coagulopathy corrections. Visual acuity and intraocular pressure should also be assessed every 15 minutes after the procedure until the patient demonstrates objective and subjective improvements.⁴

Complications may include eyelid droop, ptosis, or infection, the former of which can be cosmetically addressed by an oculoplastic surgeon after OCS has been appropriately addressed.⁴ It is imperative that patients with high suspicion of an open globe should not receive any examination or therapeutic procedures, such as IOP measurement or lateral canthotomy. In such cases an eye shield should be placed over the eye until the patient is emergently evaluated by an ophthalmologist.

DR. MARK GREVE: The patient appeared to have proptosis from a retrobulbar mass, but did not have severe eye pain or vision loss. Was a lateral canthotomy performed?

DR. ZHANG: While this patient had every risk factor for a retrobulbar hematoma and a concerning CT imaging, we were hesitant to perform this procedure as the patient did not have any orbital fractures, compromised visual acuity or EOM on the proptotic eye. We consulted ophthalmology for the unusual presentation of retrobulbar hematoma and painless proptosis.

DR. ROBERT TUBBS: What did the ophthalmologist find?

DR. LLOYD: I was the consulting ophthalmologist. Because we had low suspicion for ruptured globe injuries, I was able to measure the intraocular pressure (IOP) on both eyes and noted a lower IOP on the left proptotic eye than the right normal appearing eye (15 vs. 30 mm Hg). While pupillary dilatation in the setting of significant head trauma can interfere with subsequent pupillary exams to discern potential mass effect, the CT in this case did not reveal intracranial hemorrhage and we were able to dilate this patient for funduscopic exam. A fully dilated slit lamp exam only revealed dilated tortuous conjunctival vessels in the left proptotic eye, with normal appearing cornea, anterior chamber, iris, lens and vitreous on both eyes without any fluorescein uptake. The fundus exam, including disc, macula, and vessels of both eyes was also normal.

Due to the reassuring ocular exam, we agreed to hold off on performing a lateral canthotomy in the absence of impending vision loss and instead observed the patient for any further worsening or changes in vision.

DR. BINDER: Did the patient worsen?

DR. ZHANG: Two hours after the patient's arrival, the ED providers noted a gradual resolution of the patient's proptosis. The initial CT finding was concerning for a retrobulbar hematoma in the setting of head trauma; however, this read was reevaluated and the Hounsfield units were considered to be less consistent with blood, and more consistent with a "lobulated hyperdense soft tissue mass within the left orbit suspicious for tumor." The tumor had apparently been displaced by the trauma, and over time reverted back to its previous position. The finding was discussed with the patient's family and a joint decision was made to withhold any surgical intervention due to the patient's age and goals of care. The patient was ultimately discharged back to the nursing home with outpatient ophthalmology follow-up for diagnosis with a new, left orbital tumor. The patient continued to experience intermittent painless proptosis at the nursing home after discharge, but never complained of any visual disturbances.

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