Orbital Varix: An unusual cause of sudden unilateral exophthalmos

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ABSTRACT

About 2% of orbital masses are orbital varices, uncommon vascular abnormalities that can occasionally cause unilateral exophthalmos, particularly when venous pressure is elevated. Patients may experience proptosis, thrombosis, haemorrhage, or episodic discomfort when these varices interact with extra-orbital arteries.

We report a 57-year-old man who developed right periorbital oedema and diplopia on down gaze after forceful abdominal straining while inflating a balloon. CT and MRI showed well-defined retrobulbar enhancing lesions with prominent vascular markings, and a larger right-sided lesion demonstrating low T2 and DWI signal, indicating haemorrhage within a venous malformation. These findings supported a diagnosis of intra-orbital haematoma secondary to orbital varix. Since there were no signs of orbital compartment syndrome or optic nerve compression, the patient was treated conservatively and remained stable during follow-up.

Key words: Exophthalmos; Mass; Orbital varix; Proptosis.

INTRODUCTION

Blood from the eye is usually drained by the superior and inferior ophthalmic veins, which drain into the cavernous sinus; the central retinal vein empties into the superior ophthalmic vein. Orbital varices are dilatations of the veins draining the eye that cause proptosis. This can result in thrombosis, haemorrhage, and compression of the orbital nerve. [1] Orbital varices, which are distensible veins with unusually thin walls and low flow rates, are considered rare and represent only 2% of orbital expansive processes, which are caused by the dilatation and multiplication of intra-orbital venous elements. There is little information on orbital varicosities, and their cause is unknown. Although they are usually asymptomatic, ocular varicosities can cause sudden sight loss or unilateral periorbital discomfort. They may manifest as unilateral exophthalmos that worsens with exertion or a proclive posture. [2]

The diagnosis is made possible by imaging, specifically MRI with injected sequences or angiography. The treatment options are varied, evaluated on an individual basis, and include invasive surgery, sclerotherapy or abstinence with monitoring. [3]

CASE PRESENTATION

Symptoms onset (29 March 2025): A 57-year-old man experienced sudden swelling around his right eye and painless double vision when looking downward, which resolved when he covered one eye. The complaint started after the patient had to use significant abdominal pressure in an attempt to inflate a balloon. There was no ocular pain, photophobia, photopsia, or trauma.

Presentation (March 30, 2025): The patient sought medical attention for swelling after a day. After taking the patient's medical history, it was discovered that they had hypertension

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and diabetes mellitus, and were not taking any anticoagulants. He was employed in a warehouse and had no family or personal history of eye conditions.

Ophthalmic Examination:

1. Pupils: Round and equal with normal direct/consensual reflexes; no Relative Afferent Pupillary Defect (RAPD).
2. Colour vision: Normal bilaterally by the pink colour test.
3. Visual fields: Within normal limits.
4. Auscultation: No audible bruit or pulse-synchronous sounds; no evidence of arteriovenous fistula.
5. Refraction (non-cycloplegic): Sph -0.75, Cyl +0.25, Axis 77° for the right eye, and Sph -1.00, Cyl +0.50, Axis 68° for the left eye.
6. As for visual acuity (uncorrected): OD: 1.0 (Plano), OS: 1.0 (Plano). Intraocular pressure (I-care, mmHg): OD: 20; OS: 16.
7. Slit Lamp:
   - OD: Mild chemosis, slight posterior bulbar injection; clear cornea; quiet anterior chamber; normal iris; age-appropriate lens.
   - OS: Normal findings.
   - Fundoscopy: Clear media; sharp optic discs; normal maculae and vasculature; attached retinae bilaterally.

Blood test and biochemistry: TSH, eGFR, and ESR were normal. Following history and ophthalmological examination, the conclusion was: right-sided exophthalmos with reduced ocular motility. Vision preserved. No optic disc oedema. Although myositis was suspected, it was ruled out due to the lack of pain, periorbital tenderness, and inflammatory symptoms on examination. Due to its brief clinical course, carotid–cavernous fistula was also considered; however, the absence of episcleral vascular dilatation, auscultatory bruit, and dilated retinal veins on fundoscopy argues against it.

Imaging:

1. CT Orbit with Contrast (March 30, 2025): A decision was made to order a CT scan of the orbit with IV contrast. The findings were: bilaterally well-demarcated, relatively homogeneous contrast-enhancing solid masses retrobulbar, closely related to the medial and inferior rectus muscles on the right, and to the inferior rectus muscle on the left, as seen in Figure 1. Prominent vascular markings in both orbits and engorged cavernous sinuses bilaterally. No bony destruction or remodelling related to the masses. No cystic components. Marked right-sided exophthalmos. The patient was discharged with instructions to return to the radiology department for an orbital MRI on 1 April 2025.

2. MRI Orbit with Contrast (1 April 2025): MRI of the orbits with contrast revealed a larger, contrast-enhancing lesion in the right orbit. On T2 and DWI sequences, there is low signal intensity. This combination is strongly suggestive of blood products rather than tumour or inflammation, as seen in (Figure 2,3). Solid orbital tumours generally appear iso- or

Figure 1 | CT scan with contrast shows bilateral varicose veins.

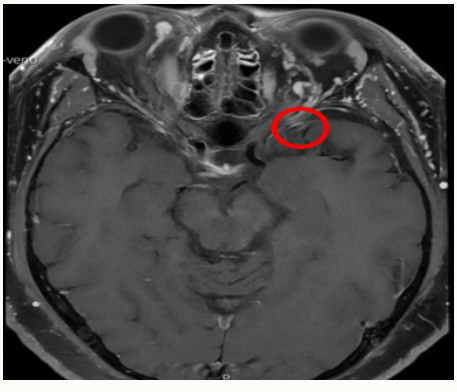

Figure 2 | Axial T1-weighted MRI with contrast showing dilated intraorbital varicose veins (circled) medial to the right optic nerve.

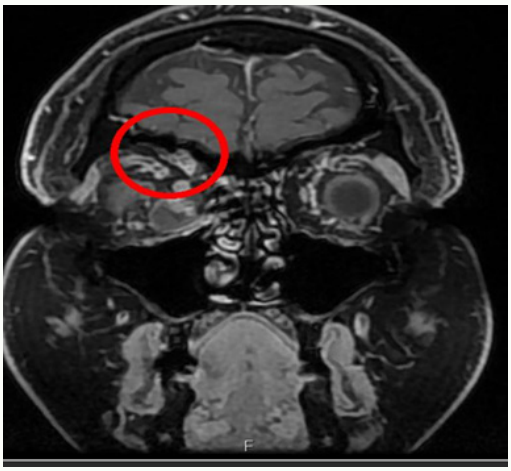

Figure 1 | Coronal T1 sequence with contrast shows intraorbital haematomas on the right side, with varicose veins due to increased pressure.

hyperintense on T2, while inflammatory lesions typically demonstrate surrounding oedema or diffusion restriction—features not seen here. This finding raises suspicion of bleeding from orbital varices.

Based on the patient's clinical presentation, history, examination and imaging findings, it was concluded that the condition is likely intra-orbital haematomas, largest on the right side, associated with varicose veins due to increased pressure. The haemorrhage was located close to the optic nerve, but there were no signs of optic nerve oedema or compression, nor any evidence of orbital compartment syndrome.

Management : The decision was made to manage the patient conservatively, instructing him not to make any movements that might increase pressure, such as bending, coughing, or straining, and to call emergency services if the condition worsened, with follow-up scheduled for 10 April.

Follow-up (April 10, 2025): The patient returned for follow-up reporting gradual improvement since the previous visit. He no longer experienced exophthalmos. However, he noted pain on upward and lateral gaze in the right eye, particularly during rapid movements. There was no diplopia in primary gaze, though downward diplopia persisted on lateral gaze. On Examination:

1. Pupils: Round and equal with normal light response; no RAPD.
2. Position and Motility: No exophthalmos (Hertel 18/19 mm, base 121 mm). Ocular motility was full, though pain was elicited at extremes of upward and lateral gaze in the right eye.
3. Lee Screen: Normal.
4. Optical Coherence Tomography (OCT) (Right eye): Normal Retinal Nerve Fibre Layer (RNFL) with mild Ganglion Cell Layer (GCL) involvement in the papillomacular bundle.
5. OCT (Left eye): Normal RNFL and intact GCL.

Although the haemorrhage remained close to the optic nerve, there were no clinical signs of optic nerve compression at this visit. The patient was advised to take paracetamol 1 gram up to four times daily as needed for pain. Due to his occupation involving physical exertion in a warehouse setting, sick leave was recommended to avoid activities that might increase venous pressure and potentially trigger recurrent haemorrhage from the orbital varix.

DISCUSSION

Patients with orbital venous malformations normally do not exhibit symptoms until they are adults, although they usually occur at birth. The weakening of the venous wall and the Sagging of blood flow in the valveless orbital veins are two hypothesised explanations of orbital varix. A thrombosed ocular varix may eventually develop as a result of recurrent bouts of orbital venous wall engorgement, which cause poor venous wall compliance and prolonged blood pooling.[4] The typical clinical manifestations of orbital varices include intermittent proptosis, exacerbated by the prone position, bending over, or the Valsalva manoeuvre.[5] In line with previous experiences, our patient had sudden exophthalmos and diplopia following severe abdominal straining during balloon inflation, underscoring the dynamic, pressure-sensitive character of orbital varices. Earlier studies have

also noted that thrombosis or haemorrhage may be the initial manifestation of a previously unrecognised varix, sometimes resulting in abrupt, painful proptosis or even visual loss.[6]

Imaging is required to rule out differential diagnoses and to evaluate for encephalocele, cerebral venous malformation, or related bone deformity. Advanced imaging modalities, such as computed tomography scans and magnetic resonance imaging (MRI), along with clinical assessments and certain procedures, such as fluorescein angiography and high-frequency ultrasonography, are employed as diagnostic tools in orbital varices cases. A varix manifests as a smooth or heterogeneous enhancing soft-tissue mass on CT with contrast. Orbital varix may show patchy enlargement in cases of thrombosis. CT contrast tests can be utilised in conjunction with an MRI angiography.[7,8]

Treatment is usually conservative; however, deep distensible venous malformations have been traditionally treated with surgery. The friable nature of the lesions and their propensity to bleed make surgical removal difficult. This can result in significant bleeding and vascular insufficiency that compromises the optic nerve.[9] If symptoms are present, embolisation or laser surgery are alternatives to surgery.[10] Conservative treatment was suitable for our patient, supported by the patient's stable optic nerve function, maintained vision, and improving symptoms.

Additionally, because orbital varices are extremely sensitive to pressure, activity modification is crucial to their management. Re-bleeding or varix enlargement may result from heavy lifting, bending, or straining that mimics a Valsalva manoeuvre by applying pressure to the valveless orbital veins and inducing rapid venous dilatation.[11] To lower the chance of recurrence and enable the haemorrhage to end safely, our patient was recommended to restrict their activities.

CONCLUSION

An intermittent, progressive exophthalmos that can evolve quickly is typically the first sign of orbital varices. Since the Valsalva manoeuvre raises venous pressure in the head and neck, it can make orbital varices more noticeable and exacerbate symptoms such as proptosis. To establish the diagnosis of orbital varices and rule out differential diagnoses, imaging is crucial under the right circumstances..

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Abbreviations list: Computed Tomography (**CT**), Diffusion-Weighted Imaging (**DWI**), Erythrocyte Sedimentation Rate (**ESR**), Estimated Glomerular Filtration Rate (**eGFR**), Ganglion Cell Layer (**GCL**), Intravenous (**IV**), Magnetic Resonance Imaging (**MRI**), Oculus Dexter, right eye (**OD**), Oculus Sinister, left eye (**OS**), Optical Coherence Tomography (**OCT**), Retinal Nerve Fibre Layer (**RNFL**), Thyroid-Stimulating Hormone (**TSH**).

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