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POEM

Unilateral Optic Disc Swelling – An Atypical Presentation for a Large Frontal Meningioma

Chrisp Benjamin [1 3], Pouryahya Pourya [1 2 3]*, Meyer Alastair [1 2 3]

1. Casey hospital, Emergency Department, Program of Emergency Medicine, Monash Health, Victoria
2. Monash Emergency Research Collaborative, School of Clinical Sciences, Monash Health, Monash University, Victoria
3. Faculty of Medicine, Nursing and Health Sciences, Monash University, Victoria

Corresponding Author*:

A/Prof Pourya Pouryahya MD, FACEM, GC ClinEpi, CCPU, M Traumatology, MPH
Monash University - Casey hospital, Monash Health, Victoria
Email: Pourya.Pouryahya@monashhealth.org

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Ethics: Written informed consent was given by the patient about which this case was written. Details of the history have been anonymised and any imaging for this report have been deidentified. Ethics approval for this case report has been granted by the local hospital ethics committee. ERM: 114100.

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ABSTRACT

Intracranial masses pose frequent diagnostic dilemmas for community facing physicians especially in patients presenting with neurological or ophthalmological signs.

We describe a case of a large meningioma in a 47-year-old man presenting with left sided optic disc swelling and right visual field disturbance alongside atypical headaches, and mild behavioural disturbance. Neuroimaging demonstrated a large mass with signs of raised intracranial pressure (ICP) and parenchymal herniation. He underwent surgical debulking and biopsy, confirming the suspected diagnosis. Post-operative course was complicated by day one hemiparesis due to venous strokes, with full subsequent motor recovery.

Whilst raised ICP is classically thought to cause bilateral optic disc swelling, unilaterality does not exclude this. Careful assessment and use of red flag indicators are therefore needed in determining need for neuroimaging.

Declining utility of fundoscopy in non-specialists creates an additional barrier to diagnosis in these presentations and warrants increased research or training to bridge this gap.

Introduction:

Primary brain tumours (BT) are common cancers in those under 65 but are uncommon when pooled across cancers in all ages. Despite this, they demonstrate disproportionately higher morbidity and mortality rates, even among non-malignant cases. Meningiomas represent the commonest non-malignant primary BT, with data from the United States demonstrating that they account for 53% of cases [1].

Symptoms associated with intracranial masses include headaches, new focal neurology, visual acuity (VA) changes, persistent vomiting, new onset seizures or behavioural changes (including reduced energy, apathy, executive dysfunction and disinhibition) (2–4). Symptoms such as these are commonplace, but as BT remain a rare cause each symptom, correctly diagnosing a brain tumour from such symptoms

can be troublesome [3]. For instance, at least 50% of headaches are attributed to primary causes: tension-type, migraine and trigeminal neuralgia [5].
Intracranial masses represent an important differential in these presentations. The challenge to community-facing physicians is stratifying which patients require more investigation. Studies advocate for the utilisation of 'red flag' indicators in headache presentations. These include changes in severity from orthostatic/Valsalva manoeuvres, acute change in existing headaches, new headache in those >50 years, progressive change in headache over days/weeks, focal neurology or prior malignancy history [4].
Fundoscopic assessment for raised optic discs should form a part of this diagnostic workup but, through multiple factors regarding training and healthcare professionals' perceptions of this component, it's utility by non-specialists, has been declining [6].

Case report:

In September 2024, a 47-year-old man with a history of hypercholesterolaemia and hypertension was referred to the emergency department (ED) by his optician, having noted new left sided optic disc swelling compared to two months prior. This review was due to patient concerns of new progressive right eye visual disturbance despite a recent new glasses prescription. He denied loss of vision, diplopia or photophobia.
The patient also reported intermittent, severe headaches with bilateral cervical to frontal radiation. He denied diurnal, orthostatic or Valsalva exacerbations and reported only a single, isolated episode of vomiting. He had achieved moderate control of these headaches with the use of simple analgesia, physiotherapy exercises and heat packs. He denied weight loss, fevers, change in energy levels or seizure activity during this time. The patient's family raised concerns of cognitive changes including mild intermittent delays in responses to questions.

Ophthalmological assessment demonstrated no diplopia, no visual field loss, normal conjugate gaze, normal pupillary light reflexes, no change in colour vision and no periorbital, cranial or cervical skin changes or tenderness. He was orientated to time, place and person with preserved attention and memory with his wife corroborating the history. With his new glasses prescription, right eye VA was 6/30 and left eye VA was 6/6. Following pupillary dilation using topical tropicamide drops, left sided optic disc swelling was visualised on fundoscopy with a normal appearing right optic disc.
Further examination demonstrated preserved power (MRC grade 5/5) in all limbs, preserved reflexes, no loss to light touch sensation and no signs of cerebellar dysfunction.
The ophthalmology team suggested computerised tomography (CT) imaging of the brain was indicated and, if negative for acute pathology, the patient could be reviewed as an outpatient. The neurology team also suggested a CT brain and, if this were negative, no further neurology input would be needed at this time.
A CT angiogram demonstrated a large (52mm TR x 50mm AP x 49mm CC) right, homogenously hyperdense paraclinoid frontal lobe mass (Figure 1). Involvement of multiple intracranial arterial vessels was noted including narrowing and medial displacement of the right supraclinoid internal carotid artery (ICA), posteromedial displacement of the right M1 middle cerebral artery (MCA), non-enhancement of right M2 MCA (with surrounding collateral vessel enhancement) and displacement of the anterior cerebral arteries (ACA). This scan also demonstrated compression of the right optic nerve, global sulcal effacement, right lateral ventricle effacement, anterior and posterior clinoid process erosions and 14mm left midline shift. Given the appearance and location, a sphenoid wing meningioma was suspected.

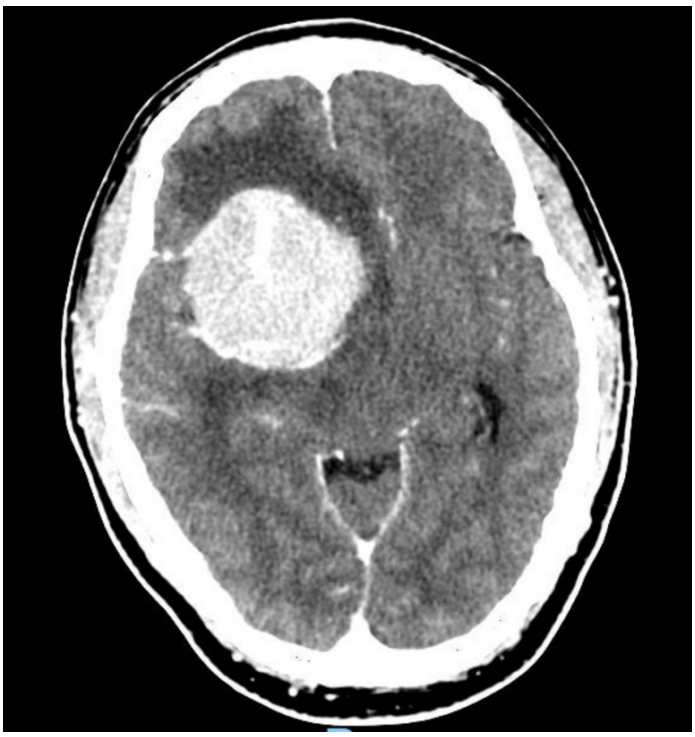

Figure 1 – CT with contrast (axial view) demonstrating a 52x50mm (TR x AP) ovoid enhancing frontotemporal mass with midline shift, sulcal effacement and ventricular effacement

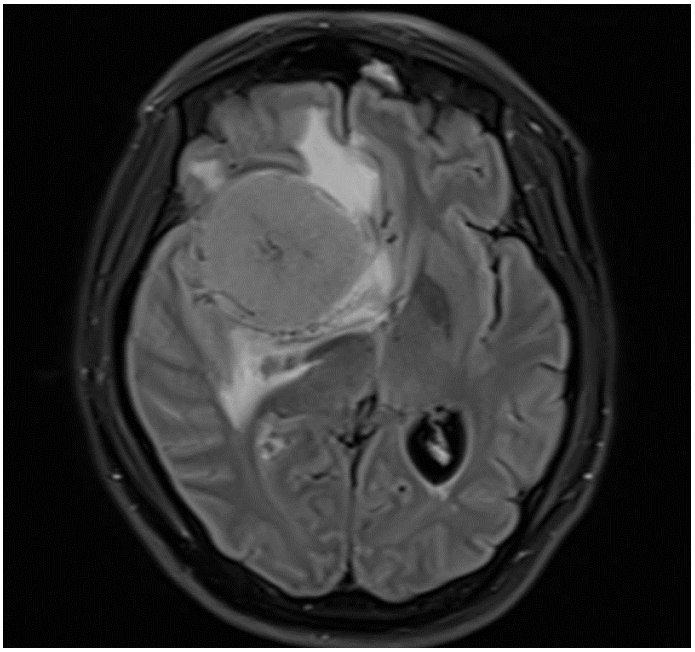

Figure 2 – MRI with contrast (T2 dark fluid- axial view) demonstrating the large mass with associated vasogenic oedema and encasement of regional arterial supply

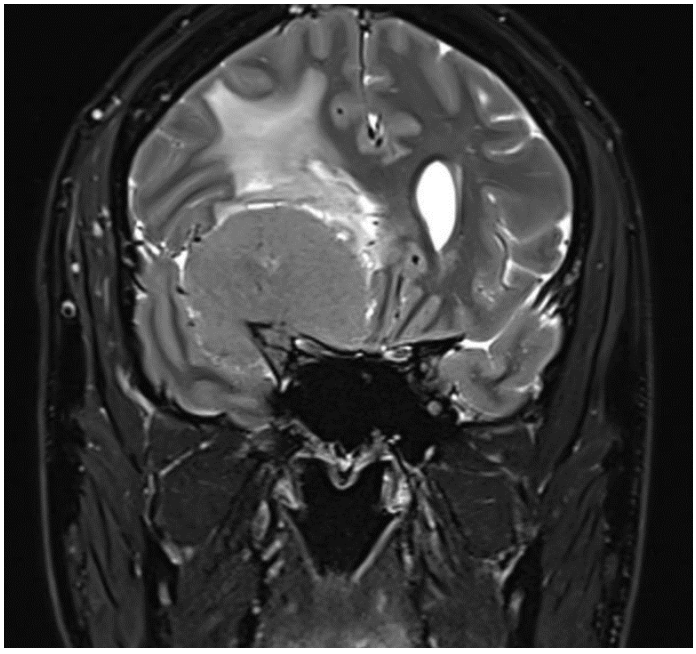

Figure 3 – MRI with contrast (T2 – coronal view) demonstrating mass abutting but without invasion of the right optic nerve tract.

Given these findings, this patient was discussed with the neurosurgical on call team. He was commenced on oral dexamethasone and transferred urgently to the tertiary neurosurgical centre for urgent review.

Magnetic Resonance Imaging (MRI) (Figure 2) of his brain and orbits detailed further significant vascular involvement, including invasion of the right cavernous sinus, encasement of the right supraclinoid ICA, proximal right M1 MCA and foetal posterior cerebral artery (PCA). The A1 ACA segment was absent or occluded and the right M1 MCA was severely stenosed. The mass directly abutted the lateral surface of the right optic nerve but without evidence of involvement or chronic nerve atrophy (Figure 3).

Formal ophthalmology assessment noted improvement in his VA to 6/6 bilaterally with grade 1-2 optic disc swelling in the left eye without evidence of vascular changes and normal appearance of the right optic disc.

Operative management involved craniotomy with dissection of the tumour, retrograde to the direction of the MCA. Gradual tumour bulk removal allowed for visualisation of the optic nerve, ICA, ACA, MCA, posterior communicating artery (PCOM) and anterior communicating artery. Despite the operation's success in removing the majority of the tumour bulk, the mass was closely adherent to the MCA (and associated perforators), cavernous sinus and right posterior communicating artery. These sections were unable to be completely excised. Biopsies were taken, demonstrating tissue consistent with World Health Organisation (WHO) grade 1 meningioma without invasion into brain parenchyma.

Post-operative recovery was complicated with day one dense left hemiparesis. A CT stroke code identified an acute right MCA territory infarct with a subsequent MRI identifying acute infarcts of the right basal ganglia and caudate head. As perforator arteries were thought to be culprit, the patient was managed conservatively, where, over the following week, he made a full neurological recovery. This rapid symptomatic improvement suggested that the observed infarcts were likely related to venous strokes. On discharge, the patient had regained power, was mobilising independently and remained fully cognisant. He was planned for reviews from neurosurgical, endocrinology, ophthalmology and physiotherapy perspectives.

Discussion:

This case demonstrates a rare and important presentation for community facing clinicians when assessing individuals for raised ICP, both regarding the discordance in findings between eyes and the atypical secondary symptoms.

Presentation with unilateral optic disc swelling was the main diagnostic dilemma, especially given the contralateral changes in reported vision. Classically, an intracranial mass large enough to precipitate raised ICP and therefore optic disc swelling is thought to do so bilaterally[7]. Unilateral optic disc swelling

usually suggests local pathologies (AION, ON and, by extension, multiple sclerosis) or with concomitant contralateral optic nerve atrophy (Foster-Kennedy syndrome (FKS)) [8].

FKS may have offered an explanation in the mismatch between optic disc appearance and VA changes. Though, without direct evidence of optic nerve involvement or atrophy, this case would not match this conditions usual phenotype [8].

Pathophysiological studies demonstrated that development of raised optic discs is not directly due to raised ICP, rather consequential disruptions in axoplasmic flow within the optic nerve sheath causing cellular oedema and extracellular fluids accumulation. These studies also demonstrated that supratentorial masses would initially lead to a unilateral or asymmetrical raised optic disc but, importantly, affecting the optic nerve ipsilateral to the mass – contrary to this case [7].

Case reports detailing individuals presenting with unilateral optic disc swelling are sparse with the majority of these attributed to idiopathic intracranial hypertension (IIH) [9]. Knowledge of this atypical presentation is therefore crucial to avoid premature exclusion of raised ICP.

The additional symptoms in this patient's presentation were also not stereotypical for an intracranial mass. His headache lacked the orthostatic variation and persistent vomiting consistent with raised ICP. Secondly, the behavioural changes reported by his family were not fully consistent with those usually found in frontal brain tumours (apathy, disinhibition, executive dysfunction or anergy) [2].

Bedside fundoscopy remains an important component of these assessments [7]. Despite this, clinical utilisation by non-specialists has been declining. Contributory factors to this include lack of equipment or knowledge to perform the examination, perceived disapproval from seniors and low perceived clinical utility [6]. Bedside ocular ultrasound (BOUS) has been shown to be a useful non-invasive clinical adjunct to assess for the presence of optic disc swelling, demonstrating sensitivities between 90-100% and may offer an alternative approach to this part of the assessment [10].

Conclusion:

Intracranial masses remain an important differential for those presenting with visual changes, headaches and changes in behaviour. With the ever-increasing utilisation of CT imaging in the ED, investigating such pathologies is becoming more straightforward. This case demonstrates the importance of a comprehensive assessment in those with symptoms consistent with raised ICP, with specific focus on lesser assessed and atypical features. This, combined with screening for red flag symptoms, are key to stratifying these patients, allowing for early identification of potentially life-threatening diagnoses.

The linchpin in this case was the ophthalmoscopy findings, as without this, he may have presented later in his disease course. Given the noted decline in fundoscopy in non-specialists, without work into increasing its utility or incorporating alternative tools, patients such as this, may be missed.

References

1. Miller KD, Ostrom QT, Kruchko C, Patil N, Tihan T, Cioffi G, et al. Brain and other central nervous system tumor statistics, 2021. CA Cancer J Clin. 2021 Sep 24;71(5):381–406.

2. Cabrera S, Edelstein K, Mason WP, Tartaglia MC. Assessing behavioral syndromes in patients with brain tumors using the frontal systems behavior scale (FrSBe). Neurooncol Pract. 2016 Jun 1;3(2):113–9.

3. Comelli I, Lippi G, Campana V, Servadei F, Cervellin G. Clinical presentation and epidemiology of brain tumors firstly diagnosed in adults in the Emergency Department: a 10-year, single center retrospective study. Ann Transl Med. 2017 Jul;5(13):269.

4.Palmieri A, Valentinis L, Zanchin G. Update on headache and brain tumors. Cephalalgia. 2021 Apr 28;41(4):431–7.

5.Viera AJ, Antono B. Acute Headache in Adults: A Diagnostic Approach. Am Fam Physician. 2022 Sep;106(3):260–8.

6.Dunn HP, Kang CJ, Marks S, Dunn SM, Healey PR, White AJ. Optimising fundoscopy practices across the medical spectrum: A focus group study. PLoS One. 2023;18(1):e0280937.

7. Hayreh SS. Pathogenesis of optic disc edema in raised intracranial pressure. Prog Retin Eye Res. 2016 Jan;50:108–44.

8.Masayuki Hata, Kazuaki Miyamoto. Causes and Prognosis of Unilateral and Bilateral Optic Disc Swelling. Neuro-Ophthalmology. 2017 Apr;

9. Huna–Baron R, Landau K, Rosenberg M, Warren FA, Kupersmith MJ. Unilateral swollen disc due to increased intracranial pressure. Neurology. 2001 Jun 12;56(11):1588–90.

10. Carter SB, Pistilli M, Livingston KG, Gold DR, Volpe NJ, Shindler KS, et al. The role of orbital ultrasonography in distinguishing papilledema from pseudopapilledema. Eye. 2014 Dec 5;28(12):1425–30.