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Silent Until It Isn't: A Case Report of Intracranial Aneurysm Diagnosis in Primary Care

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Abstract

Intracranial aneurysms are abnormal dilatations of blood vessels that develop as a result of the progressive weakening of the vessel wall. Their most serious complication is rupture, leading to subarachnoid hemorrhage, which is associated with high morbidity and mortality. We present the case of a man with multiple cardiovascular risk factors who presented with intermittent diplopia and headache. Following neurological examination and cranial computed tomography, multiple unruptured aneurysms were identified. This case report highlights the importance of a thorough physical examination, comprehensive history-taking, and recognition of red flag signs in primary care consultations to enable prompt diagnosis and improve patient outcomes.

Categories: Family/General Practice, Neurology
Keywords: aneurysmal subarachnoid hemorrhage, diplopia, headache, intracranial aneurysm, primary care

Introduction

Intracranial aneurysms are abnormal dilations of blood vessels caused by the progressive weakening of their walls [1]. They occur in approximately 3% to 5% of the population and, although most patients with cerebral aneurysms remain asymptomatic throughout their lives, some aneurysms may cause a mass effect and compress cranial nerves that can cause focal deficits or may grow and rupture, causing a subarachnoid haemorrhage, a medical emergency associated with high morbidity and mortality [2].

The main risk factors for the development and rupture of aneurysms include arterial hypertension, smoking, a family history of cerebral aneurysms, female sex, older age, and certain genetic disorders, such as polycystic kidney disease and Ehlers-Danlos syndrome [2].

When rupture occurs, the most characteristic symptom is a sudden, extremely severe headache, often described as the “worst headache of one’s life”. Other symptoms may include nausea, vomiting, loss of consciousness, neck stiffness, and neurological deficits [1]. Approximately 30% of cases result in immediate death. Among survivors, only half regain full neurological function, while the remaining patients experience long-term complications, such as cognitive and memory impairment, behavioural changes, and difficulties with balance, speech, and coordination [3].

Diagnosis is primarily performed using computed tomography (CT), magnetic resonance imaging (MRI), and angiography. Treatment most commonly involves craniotomy and surgical clipping of the aneurysm [4].

Case Presentation

A 62-year-old man presented with a medical history of smoking (45 pack-years), psoriasis, prostate adenocarcinoma treated with radical prostatectomy, arterial hypertension, diabetes mellitus, osteoarticular disease, generalised anxiety disorder, and dyslipidaemia. Regular medication included nebivolol 5 mg, lisinopril/amlodipine 20 mg/5 mg, atorvastatin 20 mg, chlorthalidone 50 mg, calcipotriol/betamethasone 50mcg/g /0.05 mg/g, metformin 1000 mg, and trazodone 150 mg.

In mid-2026, the patient attended a scheduled hypertension follow-up appointment, reporting occasional episodes of diplopia that had been occurring for two weeks. These episodes were triggered by lateral cervical rotation, lasted a few seconds, and resolved spontaneously. Vital signs were: Blood Pressure (BP) 148/82 mmHg (reference value: <130/80 mmHg), Heart Rate (HR) 84 bpm (reference range: 60-100 bpm), HbA1c 6.6% (reference value: <5.7%). As the brief neurological examination revealed no abnormalities, laboratory tests and a non-enhanced cranial CT scan were requested, and the patient was referred for an ophthalmology consultation.

Laboratory investigations revealed no abnormalities, and the non-enhanced CT scan showed a “small hypodense area in the left thalamus, possibly representing a vascular sequela or enlargement of the perivascular space”, with no other significant findings.

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Three weeks after the scheduled appointment, the patient returned for an unscheduled consultation, reporting a one-week history of right temporofrontal headache triggered by a coughing episode during a respiratory infection and associated with ipsilateral ocular pain (pain score: 7/10). He denied being awakened from sleep by the pain, fever, loss of consciousness, photophobia, phonophobia, nausea, or vomiting. He reported partial relief of the headache with paracetamol and ibuprofen.

The brief neurological examination revealed right-sided ptosis, with no other facial asymmetries. The pupils were equal in size, although the right pupil responded differently to light accommodation than the left. Reflexes and extraocular movements were preserved; however, right ocular pain occurred on left gaze (levoversion). No dysmetria was detected on the finger-to-nose test. Muscle strength was preserved in all four limbs, the Romberg test was negative, and gait was normal. BP was 161/92 mmHg, and HR was 85 bpm.

Given the clinical presentation, the patient was referred to the emergency department (ED). A repeat cranial CT scan with contrast (Figure *1*) was performed.

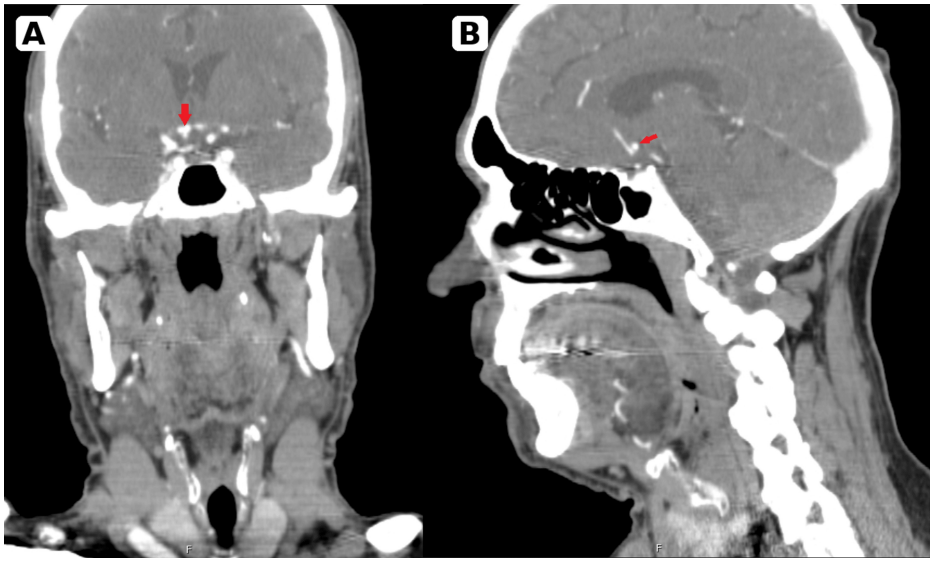


FIGURE 1: Contrast-enhanced CT scan

Coronal and sagittal contrast-enhanced computed tomography images with an arrow demonstrating aneurysms of the posterior communicating artery (scan A) and anterior cerebral artery (scan B).

It revealed a saccular aneurysm at the origin of the right posterior communicating artery (PCom) with 6.5x4mm, a saccular aneurysm of the anterior cerebral artery (ACA) with 4x3mm, a pseudoaneurysm of the cervical segment of the left internal carotid artery (ICA), and a small aneurysm at the origin of the left anterior choroidal artery.

The diagnosis was subsequently confirmed by MRI and angiography.

The patient was then transferred to the Neurosurgery Department, where he underwent a right pterional craniotomy for clipping of the PCom aneurysm, without complications. In a second procedure, the remaining aneurysms were clipped. Following surgery, the patient maintained the right third cranial nerve palsy, which showed progressive improvement, with complete resolution of diplopia three weeks after the first surgery. His clinical journey is outlined in Table *1*.

Date	Clinical events	Clinical findings and management
Mid-2026	First primary care visit – Scheduled hypertension follow-up	Intermittent diplopia for 2 weeks, triggered by lateral neck rotation, lasting a few seconds and resolving spontaneously. Blood pressure (BP): 148/82 mmHg; Heart Rate (HR): 84 bpm; HbA1c: 6.6%. Neurological examination was unremarkable. Laboratory tests and non-contrast cranial CT were requested, and ophthalmology referral was arranged.
25 days after first visit	Second primary care visit – Unscheduled consultation	One-week history of right temporofrontal headache following a coughing episode, associated with ipsilateral ocular pain (7/10). Right-sided ptosis and asymmetric pupillary light response were observed. Right ocular pain on left gaze. BP: 161/92 mmHg; HR: 85 bpm. Urgent referral to the ED.
Day of the second visit	Emergency department (ED) admission	Contrast-enhanced cranial CT revealed four vascular lesions: right PCom aneurysm (6.5 × 4 mm), ACA aneurysm (4 × 3 mm), left cervical ICA pseudoaneurysm, and a small left anterior choroidal artery aneurysm. Diagnosis confirmed by MRI and angiography.
Five days after ED admission	First surgical procedure	Right pterional craniotomy and clipping of the right PCom aneurysm, without complications.
A month after first surgery	Second surgical procedure	Surgical clipping of the remaining aneurysms.
Three weeks after the first surgery	Postoperative follow-up	Persistent right third cranial nerve palsy with progressive improvement. Complete resolution of diplopia three weeks after surgery.

TABLE 1: Clinical timeline of the patient's presentation, diagnostic assessment, treatment, and follow-up

BP: blood pressure; HR: heart rate; PCom: posterior communicating artery; ACA: anterior cerebral artery; ICA: internal carotid artery.

Written informed consent was obtained from the patient for the publication of this case report.

Discussion

Intracranial aneurysms are frequently asymptomatic and are often diagnosed incidentally or after the development of symptoms resulting from aneurysm growth, mass effect, or rupture. Subarachnoid haemorrhage is the most feared complication because of its associated morbidity and mortality. Recognising manifestations suggestive of aneurysmal disease before rupture is therefore of particular clinical importance [1,3,4]. In this context, Primary Health Care (PHC) plays an important role in identifying clinical red flags and ensuring timely referral for specialist assessment [5,6].

This case illustrates the complexity of the initial assessment of non-specific neurological symptoms in a patient with multiple cardiovascular risk factors. Intermittent diplopia, lasting only a few seconds and triggered by cervical rotation, was the first clinical manifestation. Although the initial neurological examination revealed no significant abnormalities, the emergence of a new visual symptom warranted further investigation. The subsequent development of right temporofrontal headache, ipsilateral ocular pain, and right eyelid ptosis substantially changed the clinical picture and increased concern for potentially serious neurovascular disease [5,6].

Ptosis associated with pupillary abnormalities and ocular pain is a particularly important clinical finding because it may indicate oculomotor nerve dysfunction caused by a compressive lesion. In this case, the location of the right posterior communicating artery aneurysm was anatomically compatible with possible involvement of the third cranial nerve. The patient subsequently developed third cranial nerve palsy, which progressively improved following neurosurgical intervention. This clinical course highlights the importance of correlating examination findings with vascular anatomy and the neurological structures potentially involved, without disregarding focal symptoms or signs when the remainder of the neurological examination is preserved [2,5].

Another relevant aspect concerns the interpretation of diagnostic imaging. The initial non-contrast cranial CT scan did not reveal significant abnormalities that established the diagnosis. Multiple aneurysms were subsequently identified through more specialised vascular imaging, complemented by magnetic resonance imaging and angiography. The sensitivity of aneurysm detection depends on the imaging modality, acquisition protocol, aneurysm size, and anatomical location. Although non-contrast CT is essential in the evaluation of suspected acute intracranial haemorrhage, it is not designed to exclude an unruptured intracranial aneurysm. CT angiography (CTA) and magnetic resonance angiography (MRA) are useful non-invasive techniques for detecting and characterising intracranial aneurysms, whereas digital subtraction angiography may be required when greater diagnostic detail is necessary or when treatment is being considered. Persistent or progressive symptoms should therefore prompt clinical reassessment and consideration of appropriate vascular imaging [2,5,7].

The multiplicity of the lesions identified is also noteworthy. Aneurysms were diagnosed in different arterial territories, including the right posterior communicating artery and the anterior cerebral artery, together with a pseudoaneurysm of the cervical segment of the left internal carotid artery and a small aneurysm at the origin of the left anterior choroidal artery. Multiple intracranial aneurysms are a recognised clinical finding, and their prevalence varies across patient populations and imaging series. This case illustrates the importance of evaluating the cerebral vasculature comprehensively when clinical suspicion is well founded, rather than focusing exclusively on the lesion thought to be responsible for the presenting symptoms. The identification of multiple lesions also informed the subsequent neurosurgical approach, which was performed in two operative stages [2,4,8].

Among the patient's risk factors, hypertension and a substantial cumulative smoking history are particularly relevant, in the context of diabetes mellitus and dyslipidaemia. Hypertension and smoking are established risk factors associated with intracranial aneurysms, and smoking cessation and blood pressure control are recommended components of risk-factor management in patients with unruptured intracranial aneurysms. However, these factors do not independently determine the rupture risk of an individual aneurysm, which requires consideration of additional clinical and aneurysm-related characteristics. Comprehensive vascular risk assessment and intervention targeting modifiable factors are therefore important components of follow-up, in coordination with the hospital team and in accordance with an individualised management plan [2,4,7].

From a PHC perspective, this case highlights the importance of controlling risk factors and the continuity of care and clinical reassessment when symptoms evolve unfavourably. The absence of significant abnormalities during an initial assessment should not provide false reassurance when symptoms persist, change in character, or become associated with new objective findings. A focused medical history, careful characterisation of symptom onset and progression, neurological examination, and recognition of red flags are essential for clinical decision-making. In particular, the development of a new headache associated with ptosis, diplopia, or pupillary abnormalities warrants urgent assessment to exclude a potentially serious neurovascular cause. In this case, urgent referral to the emergency department enabled further diagnostic investigation and access to specialised treatment [5,6].

Conclusions

This case highlights the fundamental role of PHC in recognising clinical manifestations and red flags potentially associated with intracranial aneurysms, even when the initial assessment is unremarkable. Although intracranial aneurysms are less commonly encountered in PHC, their timely recognition is crucial to facilitate early diagnosis, early referral, and prevent potentially devastating complications. The progression from transient diplopia to headache, ocular pain, eyelid ptosis, and pupillary abnormalities underscores the importance of identifying neurological red flags and reassessing evolving symptoms.

An initially unremarkable clinical examination or non-contrast imaging study should not preclude further investigation when new signs emerge or symptoms worsen. A thorough medical history, careful physical examination, timely referral for urgent assessment, and appropriate vascular imaging are essential to facilitate early diagnosis and specialist treatment. Furthermore, the identification and management of modifiable risk factors remain important components of follow-up, reinforcing the contribution of family medicine to patient safety and the prevention of potentially serious complications.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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Disclosures

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