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CASE REPORT

Acute headache with a twist

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Abstract

This case report follows the events of a 36-year-old woman who presented to a hospital five days post-partum with an acute severe headache and vomiting. Despite a normal initial computed tomography (CT) head scan, a CT venogram was done due to neurological deterioration and revealed hydrocephalus secondary to subarachnoid haemorrhage (SAH). We discuss the role of CT imaging in the diagnosis of SAH, the risks of current guidelines for lumbar puncture (LP) and describe other important differential diagnoses for headache in the postpartum patient.

Key words: Headache; Hydrocephalus; Postpartum period; Subarachnoid haemorrhage

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Introduction

A 36-year-old woman presented to the hospital five days postpartum with an acute severe headache and vomiting. The initial computed tomography (CT) head scan was unremarkable. She was admitted to the medical team for a lumbar puncture at 12 hours after the headache onset. Deterioration of the patient prompted further imaging and a CT venogram revealed hydrocephalus secondary to subarachnoid haemorrhage (SAH). The patient became less responsive and required external ventricular drain insertion. We discuss the role of CT imaging in the diagnosis of SAH.

Case report

A 36-year-old woman presented to the emergency department with an acute headache. She had delivered a healthy baby girl five days earlier by normal vaginal delivery without complications, and had no past medical history. The headache awoke her from sleep at 04:00 am and remained severe, associated with several episodes of vomiting. It had started suddenly behind the left ear and spread to the left hemicranium; it was throbbing in character. She was hypertensive (167/78 mmHg) and apyrexial. The Glasgow Coma Scale (GCS) was 15/15. Neurological examination showed no focal neurology. ECG was normal. Blood tests showed a mild anaemia (Hb 101 g/L) consistent with the recent delivery and normal inflammatory markers. A CT scan was arranged by the emergency medicine team, which was performed at 07:48 am and reported as normal (Figure 1(1)). Given the pain severity, she was referred to the medical team.

At assessment by the medical team, the patient had severe occipital pain worsened by reclining, with worsening hypertension (179/109 mmHg, normal heart rate). Examination remained normal, with no meningism. The working diagnosis was subarachnoid haemorrhage, despite the negative CT scan, in view of the thunderclap onset and the occipital location. It was therefore considered that lumbar puncture 12 hours after symptom onset was required.

On consultant review the differential diagnosis was broadened to include cerebral venous sinus thrombosis (in view of the recent delivery and the evolving postural element) and postpartum preeclampsia (in view of the hypertension). A CT venogram was performed, revealing no venous thrombus but rather new acute hydrocephalus and evidence of subarachnoid haemorrhage (Figure 1(2)).

Meanwhile, the patient became less responsive (GCS 10/15, E4M5V1), and was transferred to the regional neurosciences centre. An external ventricular drain (EVD) was inserted and a CT angiogram showed a small volume posterior fossa haemorrhage in the fourth ventricle and lower basal cisterns with hydrocephalus (Figure 1(3)). The following

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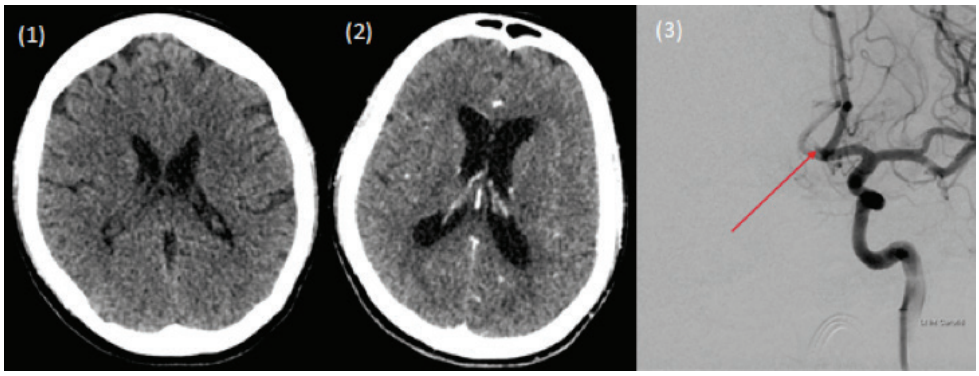

Figure 1. Patient computed tomography (CT) head and CT venogram images: (1) Unenhanced CT scan within 6 h of the onset of the headache, (2) CT venogram 14 h after the onset of the headache – note the ventricular dilation, particularly of the posterior horns, and radiocontrast in the venous phase, (3) selective digital subtraction angiography of the left internal carotid artery, showing a small (1 mm) aneurysm of the anterior communicating artery (ACOM); a red arrow has been added for emphasis.

morning, she underwent a transfemoral digital subtraction angiogram of the cerebral arteries. This showed a small (1 mm) aneurysm of the anterior communicating artery which was treated with coil embolization.

She was managed according to the SAH protocol; which suggests close neurological monitoring (with target intracranial pressure <22 mmHg), close oxygenation, temperature and blood pressure monitoring (with the aim for cerebral perfusion of 60 mmHg), electrolyte monitoring and fluid balance optimisation with crystalloids and adequate analgesia with paracetamol and morphine. The EVD was clamped 12 days after transfer and removed 24 hours later. She spiked temperatures up to 39.4 °C for two subsequent days with ultrasound confirming the presence of retained products of conception. This was managed conservatively with antibiotics. She was discharged without focal neurology.

Discussion

Headache is common after delivery: it affects 40% of women (Negro et al, 2017). Primary headaches (where the pain is the disease) are more common, but secondary headaches (where the pain is the symptom) should always be considered, as the postpartum period carries an increased risk for many of them, particularly cerebral venous sinus thrombosis and cervical artery dissection (Skeik et al, 2015). Other causes of postpartum thunderclap headaches include cervical arterial dissection and pituitary apoplexy (Skeik et al, 2015; Negro et al, 2017). Finally, there is a form of reversible cerebral vasoconstriction syndrome (RCVS) that affects women in the postpartum period and presents with thunderclap headaches; it is also known as postpartum cerebral angiopathy (Skeik et al, 2015; Negro et al, 2017).

CT of the brain within 6 hours of onset has been shown to be very sensitive for SAH (Perry et al, 2011) but our case illustrates that it does not fully exclude SAH, and lumbar puncture at 12 hours may still be needed in a patient with a suggestive history.

The development of hydrocephalus secondary to SAH can evolve from obstruction of cerebrospinal fluid (CSF) circulation by blood products. Hydrocephalus may also occur as a result of CSF malabsorption precipitated by disruption of the blood brain barrier due to aseptic inflammation. Finally, CSF hypersecretion and arachnoid granule fibrosis can lead to chronic hydrocephalus (Chen et al, 2017).

In retrospect, would lumbar puncture have caused tonsillar herniation in view of the hydrocephalus if it had been decided not to perform the CT venogram? The hydrocephalus in this case was not obstructive, and lumbar puncture would have been important to confirm subarachnoid haemorrhage, as rebleeding carries substantial morbidity and mortality. Even in obstructive hydrocephalus, tonsillar herniation is now not common with the use of modern spinal needles.

In conclusion, the management of postpartum headaches require assessment for secondary causes and close multidisciplinary management to achieve the best outcomes.

Learning points

- CT, though very sensitive, does not always exclude SAH.
- Before considering lumbar puncture after normal CT and suspicion of SAH, hydrocephalus should be considered.
- Pregnancy carries a higher risk of intracranial events postpartum, with varied possible aetiologies to consider.

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Availability of data and materials

All data included in this study are available upon request by contact with the corresponding author.

Author contributions

SAR, HA, JFDW and AT contributed to the conception of the work. JFDW, SAR and HA drafted the manuscript and contributed substantially to the work. All authors contributed to important editorial changes in the manuscript. All authors read and approved the final manuscript. All authors have participated sufficiently in the work and agreed to be accountable for all aspects of the work.

Ethics approval and consent to participate

Consent was obtained from the patient.

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Conflict of interest

All authors have completed the ICMJE uniform disclosure form. The author Dr. Jacob F De Wolff is a member of the editorial board of this journal. We declare that Jacob F De Wolff had no involvement in the peer review of this article and had no access to information regarding its peer review. Other authors declare no conflict of interest.

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