Frontal lobe meningioma mimicking preeclampsia: A case study

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Abstract

We report a case of a left frontal lobe meningioma presenting in a woman with proteinuric preeclampsia in her first term pregnancy. The patient had a background of antepartum migraines that resolved in the second trimester of pregnancy. Postpartum, she required urgent surgery and sustained convulsions after surgery. She had no residual disease and has had another successful pregnancy. This case highlights the importance of cerebral imaging in the context of an atypical clinical course of preeclampsia. Although headaches are common in pregnancy and usually benign, other, more serious, diagnoses should be considered with atypical headaches, a change in the nature of the headache, and headaches that persist despite appropriate treatment. A full neurological examination including fundoscopy to exclude papilloedema should be performed and abnormal findings require further investigation.

Keywords

Meningioma, preeclampsia, migraines, headaches, pregnancy

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Case report

A 37-year-old nulliparous woman had an IVF pregnancy with triplets following the transfer of two embryos. The monochorionic, diamniotic twins died at 16 weeks, possibly after twin–twin transfusion syndrome. The remaining fetus had a two vessel cord but had continued growth on serial ultrasound scans. She was induced at 40 weeks and 1 day and had a caesarean section for fetal distress, giving birth to a healthy, smaller than expected, male infant weighing 2702 g.

She was asthmatic and had a history of migraine in her 20's, which recurred in the first trimester of pregnancy and disappeared after the demise of the monochorionic twins at 16 weeks of pregnancy. After this, her antenatal period was uncomplicated.

The day after the delivery, she became acutely hypertensive with a blood pressure (BP) of 190/96 mmHg (booking BP 118/76 mmHg) and developed a severe frontal headache and nausea. She was diagnosed with preeclampsia with proteinuria (urine protein to creatinine ratio 130 mg/mmol), mildly abnormal liver function tests (aspartate aminotransferase 55 U/L; alanine aminotransferase 59 U/L) and thrombocytopenia (platelets $104 \times 10^9/\text{mL}$). The episode of severe hypertension was treated with 10 mg of oral nifedipine and she was commenced on methyldopa, 250 mg tds. The headache and nausea initially settled with analgesia. Good BP control was achieved (systolic BP between 120 and 140 mmHg and diastolic BP between 85 and 90 mmHg) and her liver function tests improved over the next 4 days. Her platelets continued to fall (minimum $72 \times 10^9/\text{mL}$) but had improved to $104 \times 10^9/\text{mL}$ by Day 4.

Four days after the birth, her headache and nausea recurred. Her reflexes were normal, there were no focal neurological signs and her pupils were constricted and the fundi were unable to be visualized. In view of her recurrent symptoms, a cerebral Computed Tomography (CT) scan was performed. This showed a large left frontal lobe meningioma ($60 \times 40 \text{ mm}^2$ with calcification) and midline shift. The tumour was unusual for a meningioma in that it demonstrated minimal enhancement with contrast. A magnetic resonance imaging (MRI) scan confirmed these findings. The patient underwent surgery to remove the meningioma 8 days postpartum. Histopathology revealed a $5.8 \times 5.8 \times 2.8 \text{ cm}^3$, Grade 1 meningioma.

The day after surgery she developed generalised tonic-clonic seizures despite prophylactic phenytoin. These were controlled with additional phenytoin. A repeat CT scan revealed a subdural haemorrhage ($58 \times 70 \text{ mm}^2$) in the surgical bed and cerebral oedema with midline

shift in the third ventricle. She was managed conservatively with strict BP control and dexamethasone. She had worsening liver function, with increases in all liver enzymes. This was thought to be due to the phenytoin; it was changed to levetiracetam and the liver function tests started to improve after 3 days. She continued to have intermittent severe headache and the choice of analgesics was limited due to her abnormal liver function and preeclampsia. There was a transient period of right hemiparesis and dysphasia on day 9 post-operatively.

Six weeks post-surgery, the headache had resolved, but there was still some memory loss and occasional dysphasia. Renal and liver function had normalised. A repeat MRI scan 3 months after surgery showed no residual tumour and she had no residual neurological deficit.

Discussion

Meningiomas in pregnancy are rare with an incidence of about 1 in 13,000 deliveries.¹ Lusi et al. reported that in a cohort of 17 patients with pregnancy-related presentation of meningioma, 9 (53%) of the women presented in the third trimester or later.² In this same study, 11 women (65%) were aged between 31 and 40 at diagnosis. This is consistent with our patient who was 37 and developed symptoms after delivery. Pregnancy has been associated with the rapid growth of meningiomas and the potential for occasional but sudden life-threatening

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Table 1. Differential diagnosis of headaches in pregnancies.^{8,9}

Differential diagnosis	Common clinical features	Epidemiology	Investigations
Tension headache	Stress related		
Migraines	Unilateral and throbbing Prodromal symptoms Photophobia	<ul style="list-style-type: none"> • 50–90% improve in pregnancy • Improvement in second and third trimester • Worsens if bottle feeding 	
Drug-related headaches	Vasodilators Calcium-channel blockers		
Epidural-related headaches	Frontal and postural headache Relieved when lies down Onset 24 h after epidural block	<ul style="list-style-type: none"> • Postpartum 	
Preeclampsia	May be severe and associated with other neurological symptoms, e.g. visual disturbances	<ul style="list-style-type: none"> • From 20 weeks gestation 	Full blood count, liver and renal function, growth and fetal wellbeing scan, urine analysis
Idiopathic 'benign' intracranial hypertension	Often retro-orbital Increased cerebrospinal fluid pressure	<ul style="list-style-type: none"> • More common in obesity 	CT or MRI Lumbar puncture
Subarachnoid haemorrhage	Sudden and severe Occipital Focal neurological signs common Meningism	<ul style="list-style-type: none"> • 20 in 100,000 pregnancies • 2–3 times increased risk in pregnancy • 20 times increased risk postpartum 	CT or MRI Lumbar puncture Magnetic resonance angiography
Cerebral venous thrombosis	Associated with seizures, vomiting, signs of raised intracranial pressure 30–60% with focal signs that are transient	<ul style="list-style-type: none"> • Postpartum mostly • 5–60% of all CVT occur in pregnancy or postpartum period 	Thrombophilia screen Magnetic resonance venogram CT or MRI
Meningitis	Petechial rash Fevers Viral-like illness and symptoms		Lumbar puncture Blood cultures Full blood count
Space-occupying lesion	Gradual onset and progressive signs Focal headache		CT or MRI

growth.² This association may be related to sex hormone receptor expression in the pregnancy-associated meningiomas with progesterone receptor (PR)-positive meningiomas being more common than estrogen receptor (ER)-positive ones.^{2,3} Another explanation for this rapid tumour growth is that it may be due to an increase in tumour vascularity and intracellular fluid in pregnancy.^{2,4}

Ismail et al. noted that the most frequent presenting complaints are headaches, visual disturbances, nausea and vomiting.⁵ They can also present with seizures, visual impairments, hemiparesis, mood changes and confusion.^{3–7} This patient had severe headaches and nausea, which were initially attributed to preeclampsia.

Complaints of headache, nausea and vomiting are common during pregnancy and this can steer practitioners away from considering serious neurological conditions.⁴ Headaches due to brain tumours are mostly gradual in onset, diffuse, non-remitting and commonly unilateral.³ Symptoms can also be confused with hyperemesis gravidarum in early pregnancy or preeclampsia in late pregnancy.⁷ This woman had both preeclampsia and a history of migraine, which made the diagnosis of a meningioma challenging. Common causes of headache in early pregnancy include migraine, tension headaches and dehydration due to hyperemesis (Table 1). Other causes are rare in pregnancy and the postpartum period but must be considered if there are unusual features to the headache, persistence despite treatment and particularly in the presence of abnormal neurological signs.

Migraine in pregnancy is common. During pregnancy, more than half of the women with pre-existing classical migraine will have a reduction in frequency and severity of migraine attacks.⁸ Improvement occurs mostly in the second and third trimester,

especially in those who suffer from premenstrual migraine and migraine without aura.⁸ Pre-existing migraine is associated with an increased risk of preeclampsia.⁸ Following delivery, migraines are not uncommon, especially in the first few days postpartum.⁹ Women with pre-existing migraine who breastfeed are less likely to experience migraines until they menstruate again.⁹

CT scanning is generally not required in women with preeclampsia who have headache but being alert to alternative diagnoses is important. At any time in pregnancy, atypical headache requires a full neurological examination, particularly looking for signs of raised intracranial pressure (ICP). In this case, the key factor prompting imaging was the recurrence of the severe headache after adequate BP control.

Meningiomas may be associated with raised ICP, meaning that delivery by caesarean section or an elective instrumental delivery with an epidural block may be indicated.⁶ However, epidural or spinal analgesia is relatively contraindicated with an elevated ICP because of the risk of coning due to dural puncture. Ideally, multidisciplinary management with the anaesthetists and neurosurgeons is advised to determine the induction of anaesthesia process and delivery timing in the presence of a raised ICP and altered medical condition of the patient.^{5–7} However, due to the rarity of the condition in pregnancy, obstetric and anaesthetic management needs to be individualised based on the location and size of the tumour and the medical condition and gestational age of the woman.

In conclusion, headaches in pregnancy are common and are usually benign. Other, more serious, diagnoses need to be considered for atypical headaches, those associated with other neurological symptoms or if

symptoms persist despite appropriate management. A full neurological examination including fundoscopy should be performed and abnormal findings necessitate further investigation.

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Contributorship

FJY completed the original draft. DGK and BMA were responsible for the care of the patient and amended the draft.

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