

Postpartum ischaemic stroke following an epidural blood patch

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Introduction

The physiological adaptations in the cardiovascular system and coagulability that accompany the pregnant state contribute to the increased risk of an ischaemic stroke. These are more significant around delivery and in the postpartum period. There are specific conditions related to pregnancy, such as pre-eclampsia, eclampsia, choriocarcinoma, peripartum cardiomyopathy, amniotic fluid embolisation and postpartum cerebral angiopathy, which must be considered along with other causes.

This article reports a case of cerebral ischaemia in a young healthy parturient, whose epidural analgesia was complicated by a dural puncture requiring an epidural blood patch. The difficulties in definitively elucidating the cause of seizures and cerebral infarction in the postpartum period and the impact of anaesthetic interventions are discussed.

Discussion

In a recent review article by Khalid et al (2020) the incidence of pregnancy-related stroke was stated as 30 in 100 000 pregnancies. There are pregnancy-specific conditions that can

Case report

A 33-year-old primigravida woman, at full term of her pregnancy, was admitted to the authors' delivery suite. She denied any medical problems, regular medication, allergies, smoking, or the use of any recreational drugs or herbal remedies. Her pregnancy was otherwise uncomplicated. On admission she was normotensive with no proteinuria on dipstick analysis.

Epidural analgesia was requested, which took several attempts at insertion because of technical difficulties. A 16G Tuohy needle with loss of resistance to saline technique was used each time. In the first attempt at the L2–L3 epidural space, insertion of the catheter led to persistent paraesthesia of the left hip. The second and third attempts made at L3–L4 were unsuccessful. The fourth attempt at L3–L4 resulted in dural puncture with the epidural needle. A spinal catheter was inserted. Administration of low dose epidural mixture did not produce effective analgesia. Three hours later an emergency caesarean section necessitated a general anaesthetic. There was no haemodynamic instability in the perioperative period.

On the second postoperative day, she developed a frontal headache that was predominantly postural with no neurological signs. This was initially managed with paracetamol, ibuprofen and morphine for presumed postdural puncture headache. The option of an epidural blood patch was also discussed. The patient was reluctant initially but agreed on the fourth day as her symptoms did not improve. Epidural blood patch was performed without any immediate complications.

Approximately 3 hours after the blood patch, the patient reported slurred speech and weakness in her right arm. Neurological examination confirmed right arm hemiparesis with homonymous hemianopia. Computed tomography of the brain ruled out intracranial haemorrhage. She was subsequently started on aspirin 300 mg.

A day later she developed an episode of self-terminating grand mal seizures lasting 1 minute. Her blood pressure was 120/50 mmHg. Magnetic resonance imaging of the brain confirmed a left territorial middle cerebral artery fronto-parietal infarct. Other pathologies such as cerebral venous sinus thrombosis and space-occupying lesions were excluded. She was transferred to a high dependency unit for neurological observations.

While on the high dependency unit, the patient remembered that she had been diagnosed as having raised intracranial pressure when she had been investigated for recurrent ear infection and visual defects, and her father suffered from a clotting disorder, the details of which were not known to her.

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Case report (continued)

A repeat computed tomography of the head and magnetic resonance venogram did not provide any additional information. Bilateral carotid Doppler ultrasound was normal. Risk factors such as hereditary antithrombin III deficiency, protein C and S deficiencies and vasculitis were excluded. However, she was found to be heterozygous for the prothrombin gene.

Bubble echocardiography showed a left to right interatrial shunt with significant shunt reversal and transoesophageal echocardiography revealed a patent foramen ovale with limited left to right shunt, thickened right coronary cusp of the aortic valve but normal functioning ventricles with no vegetations.

Her neurological symptoms gradually improved. She was discharged home on the tenth postoperative day, but readmitted on the following day with a recurrence of right-sided weakness and slurred speech. Repeat computed tomography of the brain was normal. She was discharged home on prophylactic levetiracetam and aspirin.

Table 1. Risk of paradoxical embolism score

Risk factors	Score
History of hypertension	No (1)
History of diabetes	No (1)
History of previous stroke or transient ischaemic attack	Yes (1)
Smoking	No (1)
Cortical infarct on imaging	Yes (1)
Age 30–39 years	Yes (4)
Total points	9

From <https://www.mdapp.co/risk-of-paradoxical-embolism-rop-score-calculator-423/>

increase the risk of stroke such as eclampsia, amniotic fluid embolus, postpartum angiopathy and postpartum cardiomyopathy, although data regarding these conditions are scant. Causes of ischaemic stroke that are not specific to pregnancy include venous sinus thrombosis, cardiovascular thromboembolic phenomenon and vasculitic disorders.

Cryptogenic stroke can complicate atrial fibrillation, patent foramen ovale and thrombophilia. This patient had a normal 12-lead electrocardiogram during the seizure and remained in sinus rhythm. As reported by Mojadidi et al (2018), 40% of patients with cryptogenic stroke have patent foramen ovale. This patient had a patent foramen ovale with a risk of paradoxical embolism score of 9 (Table 1), which suggests a high chance of developing a stroke. This score gives an 88% chance that the stroke was the result of patent foramen ovale, and a 2% risk of recurrence in the next 2 years.

Could the epidural blood patch have contributed to cerebral ischaemia? The authors found two case reports of seizures following epidural blood patch (Mercieri et al, 2003; Ng and Manikappa, 2012). In a case series of eight patients, Vance et al (1995) concluded that cerebral vasoconstriction could provide an explanation for the development of both headache and seizures complicating dural puncture. Coppage et al (2004), in a case series of 23 patients with a history of a previous ischaemic stroke, showed no recurrence of ischaemic stroke during subsequent pregnancy or postpartum period.

Conclusions

This case highlights the diagnostic difficulties when stroke and seizures occur in the postpartum period and in the presence of contributory factors. Despite the possible role of dural puncture and the epidural blood patch, the diagnosis of cryptogenic stroke from a patent foramen ovale appears to be the most likely cause, based on radiological findings.

Learning points

- Neither the embolic phenomenon from patent foramen ovale nor the vasospastic effects of an epidural blood patch alone can explain the long-lasting sustained vasospasm that occurred in this patient.
- Diagnosis of a commonly occurring benign condition in the postpartum period such as postdural puncture headache should be evaluated carefully and secondary causes that are potentially life threatening should be considered.

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