

Subarachnoid hemorrhage following spinal Anesthesia for cesarean sections

Abstract

Background: Severe headache in pregnancy is concerning for pre-eclampsia, migraine, post dural spinal headaches, and other intracranial pathology.

Case: A 26-year-old para 1 presented for repeat Cesarean section. After receiving spinal anesthesia, she developed a sudden, severe headache. Two hours post-operatively, the patient experienced a seizure. CT scan confirmed the diagnosis of subarachnoid hemorrhage.

Conclusion: Subarachnoid hemorrhage should be considered when assessing obstetric patients with severe headache after spinal anesthesia.

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Introduction

Severe headache during pregnancy can lead to a broad spectrum of differential diagnoses, including pre-eclampsia, migraine, post dural spinal headaches, and intracranial pathology. Herein is described a case of an obstetric patient who was admitted for a repeat Cesarean section. After receiving spinal anesthesia, she developed a sudden, severe headache and subsequently experienced a seizure two hours post-operatively. A CT scan confirmed the diagnosis of subarachnoid hemorrhage. A diagnosis of subarachnoid hemorrhage should be considered when assessing obstetric patients with an atypical headache.

Case

A 26-year-old para 1 presented in early labor at 37 weeks gestation and four days. Her previous obstetric history consists of one Cesarean section and one miscarriage. No other significant medical or surgical history was noted. The current pregnancy was uneventful, including her denial of any history of elevated blood pressure. Vital signs remained within normal limits upon admission. Immediately after receiving spinal anesthesia at the level of L3/L4, the patient complained of a severe headache, reporting it to be "the worst headache of my life." Vital signs continued to be stable while she remained normotensive. Pain medications were given which resolved the headache within 30 minutes of onset. This was followed by an uneventful Cesarean section.

The patient was transferred to the recovery room post-operatively with no complaints. Two hours later, however, the patient exhibited a tonic clonic seizure, lasting approximately 60-90 seconds. Postictal state with altered state of consciousness was noted, while vital signs remained normal. Despite the patient being normotensive, urine and toxemia labs were drawn and intravenous magnesium sulfate was initiated for suspected eclampsia. A head CT scan without contrast was performed, which demonstrated a high density within the left frontal sulcus, which could represent a small volume of subarachnoid hemorrhage. There was no mass effect, midline shift or hydrocephalus (Figure 1).



Figure 1 Head CT without contrast showing left subarachnoid hemorrhage.

The toxemia lab results returned negative, whereupon the diagnosis of subarachnoid hemorrhage was made and the magnesium sulfate was discontinued. After a neurosurgery consult, a CT angiography was performed to rule out aneurysm or other vascular anomalies. The results were normal, with no evidence of intracranial vascular abnormality (Figures 2-4). On post-operative day 1, an MRI without contrast was performed which revealed minimal subarachnoid hemorrhage in the left middle frontal sulcus (Figure 5). A 48-hour video EEG showed no seizure activity, and EKG likewise was normal, as was the MRI venography (Figure 6). The patient was discharged without any symptoms on day six after the procedure, to be followed up with the neurology team.



Figure 2 Head CT angiography showing no abnormality in the vascular system and no signs of aneurysm.

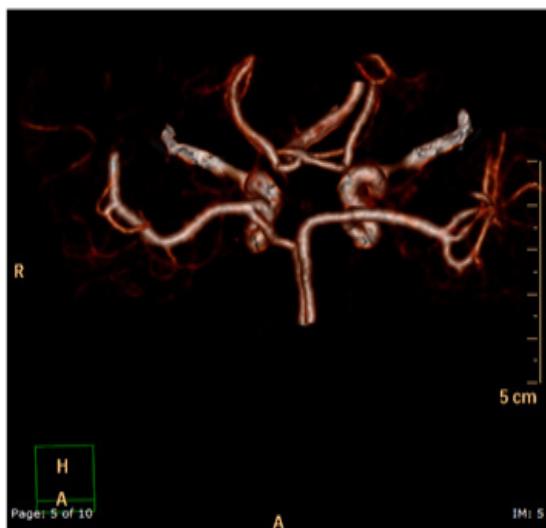


Figure 3 Head CT angiography showing the circle of willis.

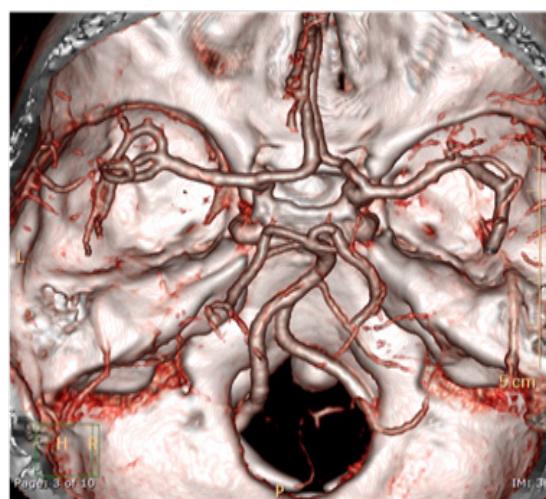


Figure 4 Head CT with contrast showing the vascular system.



Figure 5 MRI showing left subarachnoid hemorrhage.



Figure 6 MRI Venography showing the vascular system.

Discussion

Subarachnoid hemorrhage (SAH) consists of a sudden bleeding into the subarachnoid space, which causes extravasations of blood into the subarachnoid space between the pia and arachnoid membranes.¹ It occurs in various clinical contexts, the most common of which is head trauma. However, the most common use of the term SAH refers to non-traumatic (or spontaneous) hemorrhage, which usually occurs with a ruptured cerebral aneurysm or arteriovenous malformation (AVM). Symptoms include sudden, severe headache, usually accompanied by loss or impairment of consciousness; secondary vasospasm (causing focal brain ischemia); meningism; and hydrocephalus (causing persistent headache and obtundation).²

Diagnosis is by CT or MRI. If neuroimaging is normal, diagnosis is by cerebrospinal fluid (CSF) analysis.³ Treatment consists of supportive measures and neurosurgery or endovascular treatment, preferably in a comprehensive stroke center. A congenital intracranial saccular or berry aneurysm is the cause in about 85% of patients. Bleeding may stop spontaneously. Aneurysmal hemorrhage may occur at any age but is most common between ages 40 to 65. In pregnancy,

the risk of SAH increases with gestational age, most likely because of hormonal and hemodynamic changes with the ensuing pregnancy. Only two percent of SAH occur during labor. The consensus is that pregnant women should be treated according to the same neurosurgical principles as for non-pregnant patients.

The literature is scant regarding SAH after spinal anesthesia, particularly in obstetrical patients. A case of SAH after spinal anesthesia was reported by Eggert et al.,⁴ of a 29-year-old patient needing removal of a retained placenta. In this case, SAH developed after ephedrine was given because of hypotension with systolic blood pressure nadir of 90mm Hg. The maximum recorded value afterwards was only 150mm Hg. The sudden swing in blood pressure could have facilitated the ruptured of a potentially weakened vessel wall before auto-regulation became effective. Another hypothesis is that transmission of intra-spinal CSF pressure changes to the intracranial compartment resulted in the rupture of intracranial vessels. In our case, the onset of the severe headache was sudden and occurred immediately after the insertion of spinal anesthesia. The presentation of headache was atypical. Two hours after the Cesarean section, the patient experienced a seizure. Eclampsia was considered and the patient was treated with magnesium sulfate until the diagnosis was ruled out. After the seizure, a head CT scan was undertaken which establish the diagnosis of SAH, while the head CT angiography ruled out evidence of intracranial vascular abnormality. The head MRI imaging confirmed the diagnosis of minimal subarachnoid hemorrhage in the left middle frontal sulcus. Should the patient require anesthesia in the future, we will probably avoid spinal anesthesia, there by hopefully decreasing the chance of SAH, despite the rarity in the literature of reported SAH after spinal anesthesia in a healthy young patients.

In conclusion, we believe that the possibility of a SAH increases with multiple attempts of spinal anesthesia, as this most likely cause's spinal vessel to rupture, either directly or indirectly by inducing differential pressure changes between cerebrospinal fluid and intravascular spaces; however, definite mechanisms have not

been completely understood. Nonetheless, patients undergoing spinal puncture should be instructed to report any neurological abnormality, which may result in irreversible damage. In cases of altered consciousness, extensive neuro radiological evaluation is necessary. Of utmost importance is that physicians responsible for spinal puncture possess sound judgment and clinical competence.⁵

Teaching points

A diagnosis of subarachnoid hemorrhage should be considered when assessing obstetric patients with an atypical headache.

Acknowledgements

None.

Conflict of interest

The author declares no conflict of interest.

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