



Cerebral subdural hematoma following spinal anesthesia; A Case report:

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ABSTRACT

The present article describes an uncommon case of acute subdural hematoma following Spinal anesthesia after cesarean delivery, a 24 year-old female primigravida with 37 weeks of gestation whose pregnancy was terminated due to high blood pressure and received treatment for preeclampsia. About 48 hours after cesarean delivery, she developed a severe headache and her brain CT scan revealed a small size subdural hematoma in occipital area and she managed conservatively.

Keywords: Subdural hematoma, Spinal anesthesia, Preeclampsia, Cesarean delivery

INTRODUCTION

Post deliver headache (especially in a preeclamptic patient undergoing cesarean section through spinal anesthesia) has several differential diagnosis, difficult diagnosis problems may require a brain imaging. Subdural hematoma following dural puncture is a very rare complication of spinal anesthesia in labor but potentially fatal. It may be cranial or spinal [1,2]. The cause is low cerebrospinal fluid pressure following dural puncture leading to traction and tearing of thin-walled dural blood vessels [3]. A spontaneous subdural hematoma associated with preeclampsia, have been reported in some cases in the literature [4]. Early diagnosis and treatment are of importance for the prognosis. The article review the neurological complication of pregnancy and delivery, focusing on Subdural hematoma after spinal anesthesia.

Case presentation

A 24 year-old Iranian woman, presented with complaints of headache to the emergency department. She had cesarean delivery at gestational age of 37 weeks, 48 hours prior to this admission. In previous admission, she did not have any history of headache, epigastric pain, blurred vision, nausea and vomiting. She was admitted due to high blood pressure that her blood pressure was systolic 160 mmHg and diastolic 110 mmHg. It was controlled with intravenous Hydralasine. After 2 hours, cesarean section was planned for her due to non-reassurance fetal heart rate. Surgery was done under spinal anesthesia and a male infant weighing 3000 grams, with APGAR score of 9 and 10 respectively in the first and fifth minutes was delivered by vertex. In her laboratory data, urine protein: 3+, CBC liver function test and kidney function test were normal. She was received intravenous mg-so4 (prophylactic against convulsion) for 24 hours. During postpartum period her blood pressure controlled with oral anti-hypertensive medications. After 40 hours, the patient left the hospital. At that time she did not have any complaint, and had blood pressure of systolic 120 mmHg and diastolic 80 mmHg. 8 hours later, she presented with gradual onset headache in occipital area, without nausea, vomiting and blurred vision. Her headache was not postural. In the second admission, on examination, her reading was 15/15, as measured in the Glasgow coma Scale on arrival. Her vital sign were:

blood pressure: 130/80 mm Hg, heart rate: 90 beats per minute, respiratory rate: 18 breathes per minute, and temperature: 37 C. On examination of the central nervous system, on fundoscopic examination, both optic disks were normal, and there was no focal neurological deficit. Analgesia was prescribed for her (Acetaminophen). Due to continuing of headache, a neurological consultation and neuroimaging was ordered. She was transferred to another center due to the absence of neuroimaging devices and neurologist in our center. On the same day, brain CT scan was done for her and subdural hematoma was detected in her imaging (image1). She was admitted there with diagnosis of subdural hematoma in occipital area and managed conservatively. Finally after 72 hours, she was discharged symptom free with oral anticonvulsant medication.

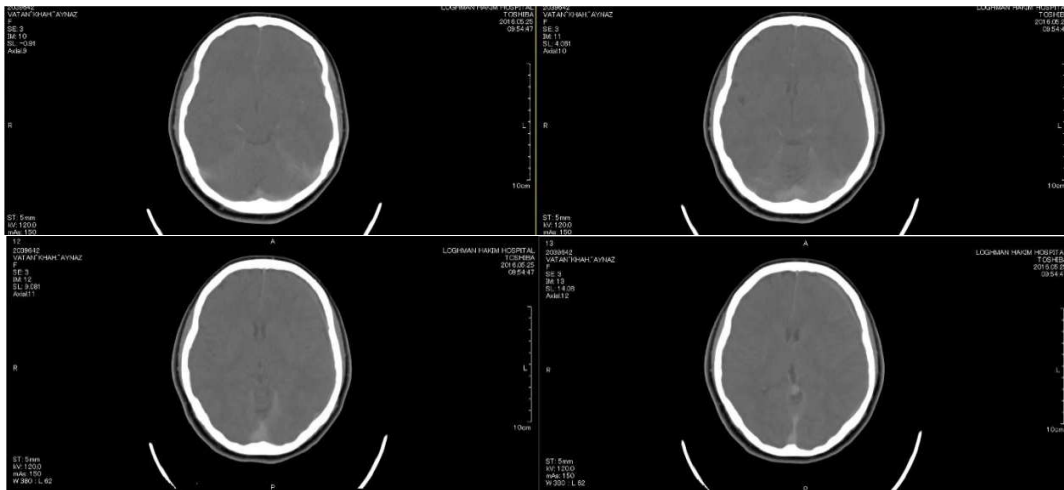


Figure 1. Brain CT scan showing small size subdural hematoma in occipital area

DISCUSSION

Pregnancy induces physiological, hormonal and physical changes that may cause hypertensive, hemorrhagic, hematological and liver complications [5].

Neurological disorders in pregnancy and postpartum are relatively common and can be classified into 3 categories [6]:

- 1-Do not related to pregnancy status(e.g:intracranial neoplasms).
- 2-Previous neurological disorders (e.g: multiple sclerosis).
- 3-Disease whose incidence increases during pregnancy.

The case reported here is included in the third category. The brain-vascular disease has a higher incidence in pregnancy for several reasons, among them, fluid overload, which can result in hypertension, high levels of estrogen with known prothrombotic effect and endotheliopathy related to preeclampsia [7].The most frequent pathologies in this context are the posterior reversible encephalopathy, reversible cerebral vasoconstriction of the syndrome and ischemic stroke. Rarely, intracranial bleeding in such patients is usually related to previous aneurysms, arteriovenous malformations of the rupture and bleeding disorders (thrombotic thrombocytopenic purpura, HELLP syndrome, and disseminated intravascular coagulation).

The differential diagnosis of post-delivery headache include: 1- Post-dural-puncture-headache (PDPH), 2- preeclamptic headache, 3-subdural or subarachnoid haemorrhage, 4-simple tension or migraine headache, 5- meningitis and 6-cortical vein thrombosis [8].

1.PDPH which was initially described by Bier in 1898; Is a well known complication of spinal anesthesia with a reported incidence of 1-2% in an obstetric population [9,10].If the epidural space is punctured with a 16 gauge Touhy needle postspinal headache develops due to leakage of cerebrospinal fluid (CSF) in over half of the cases [10].

The exact mechanisms behind PDPH is not known. One possible explanation is that liquor leakage gives a reduction in CSF pressure; intraspinally as well as intracranially. Low CSF pressure despite cerebrovasodilation (leading to pain by itself), causes sagging of the brain and supporting structures [11]. Altering cerebrospinal dynamics, this downward displacement of intracranial structures, results in a caudally-directed movement of the spinal cord and brain, which in turn, places direct traction on the pain-sensitive structures (dura, blood vessels, dural sinuses, cranial nerves and bridging vein) and stretches them, which can cause painful reflex vasodilation of cerebral blood vessels [12,13]. The extent of leakage increases with needle diameter [14,15].

About 90% typical PDPH may occur within the first 72 hours and 66% within the first 48 hours of dural puncture and usually subsides in a few days with bedrest and analgesia [16,17].

PDPH has a postural component (getting worse by sitting up and standing). The pain is characteristically relieved in supine position and associated with neck stiffness. Photophobia, diplopia and mild deafness are also commonly reported [10]. The reported pain relief with cerebral vasoconstrictor drugs, e.g.: caffeine may support a vascular etiology for PDPH pain. The symptoms usually disappear or are markedly reduced within one week, if treated properly [18]. Postspinal headache is often transient and harmless, but despite treatment, severe and prolonged PDPH should be regarded as a warning sign of a subdural hematoma or intracerebral hemorrhage [19,20]. Macon *et al.* reported that the symptoms of subdural hematoma (SDH) are different from PDPH [21]. A differential diagnosis in this case was PDPH, but due to non-postural headache, we was suspicious to other causes.

2. Preeclampsia is a multisystemic disease; characterized by the hypertension (systolic blood pressure above 140 mmHg, and/or diastolic blood pressure above 90 mmHg), proteinuria (above 300 mg in 24 hours urine or urine protein /creatinine ratio urine above 0.3) and edema. It affects approximately 5-7% of pregnant women and typically occur during the second or third trimester of pregnancy⁷. Some severe signs in affected patients are nausea, vomiting, headache, epigastric pain and etc. That should be carefully considered. Among preeclamptic complications during pregnancy, intracranial bleeding disorders and spontaneous Subdural hematoma are so rare and have high mortality [22,23].

Not traumatic subdural hematoma in pregnancy and postpartum period are most associated with HELLP syndrome [23], with concomitant parenchymal bleeding. Little is known about the pathophysiology of these causes [24], since atraumatic subdural hematoma with absence of coagulopathy is a rare complication of preeclampsia; the diagnosis of preeclampsia as the casual condition was discounted, moreover no other signs and symptoms were present.

Brain ischemia and hemorrhage are almost always accompanied by a blood pressure increase of at least 10% due to alteration of the self-regulatory mechanisms, induced by vasoactive substance release at the injury site [25]. Cases of spontaneous peripartum acute subdural hematoma and intracerebral hemorrhage have been reported in the literatures, but in association with the HELLP syndrome [26] or with thrombocytopenia caused by idiopathic thrombocytopenic purpura; which our patient was not included.

Intracranial hemorrhage is a rare complication occurring in 0.01-0.05 % in pregnancies. The ruptured aneurysms or arterio-venous malformations (AVM) are the most common causes of intracranial hemorrhage [4], they usually causes a subarachnoid hemorrhage. Pregnancy-induced hypertension and preeclampsia is also risk factors of intracerebral hemorrhage [27]. Most cases of SDH occur after trauma, spinal anaesthesia, coagulopathy, dural metastases, meningiomas and aneurysms and are extremely rare in the context of pregnancy and postpartum [28].

3. SDH is a common condition complicating around 1% of head trauma [28], but a rare form of intracranial hemorrhage associated with pregnancy. The estimated incidence is 1 in 220,000 after spinal anesthesia [29]. SDH refers to the presence of blood in the virtual space, between the dura and arachnoid.

In severe cases after spinal anesthesia, if the traction on dural vessels (following CSF leakage) gets more; tearing can occur and this rupture of a vessel in the emissary vein system (bridging brain to skull) leads to SDH [18]. Thorsen has reported the multiple petechial hemorrhages on the surface of the brain after spinal anesthesia [30].

The symptoms of such intracranial hematomas are most often severe and persistent headache, in recumbent position. Sometimes accompanied with other signs such as vomiting, memory loss, ophthalmoplegia, papilledema, psychosis,

blunting of vision, drowsiness and disorientation. However In many cases, somnolence, confusion or coma, are the symptom that first lead to diagnosis [10]. In this case, only symptom was severe persistent headache.

The onset of these symptoms varies from the first to the fourth day after delivery [31]. Only 2 cases of prolonged headache after dural puncture due to SDH were reported in the literature. Kung et al reported a case with chronic SDH four weeks after spinal anesthesia [20]. Similarly Cohen et al. described persistent headache due to SDH 42 days after spinal anesthesia [32]. In our case, presentation was 48 hours after spinal anesthesia.

A Computed tomography scan or Magnetic resonance imaging will confirm the diagnosis and must be performed urgently when this diagnosis is suspected [10]. The management of subdural hematoma is either conservative (clinical observation and possible intracranial pressure monitoring) or surgical evacuation. For this reason, the patient was transferred to a neurosurgical unit. An early diagnosis of the hematoma may allow medical treatment of SDH, thus surgical evacuation maybe avoided. In view of the small size of the hematoma, coupled with a rapid return to normal neurological status, conservative management was deemed appropriate. Hematomas under 5 mm often spontaneously resolve. In cases requiring surgery, preoperative neurological status affects postoperative survival. Early hematoma evacuation and young age are favorable prognostic factors [33]. Palvin et al. described 2 cases with large SDH relived with surgical treatment [9]. It could be argued that early blood patching may decrease the risk of Subdural bleeding by preventing a fall in CSF pressure [31]. In this case, hematoma was small size and the patient managed conservatively.

In this patient, the history was not suggestive of cortical vein thrombosis, and this was excluded later on brain MRI. There were no features to support a diagnosis of meningitis at this time; no pyrexia and no leukocytosis, or neutrophilia.

CONCLUSION

Finally in our case, probably the spinal anesthesia caused the pathophysiological basis for the occurrence of SDH rather than preeclampsia. While we emphasizes the rarity of SDH as a complication of dural puncture, this case report highlights the importance of including it, in the differential diagnosis. So the anesthesiologists, obstetricians and midwives should be aware of the rare and serious complication of spinal anesthesia during cesarean section. Consequently, when a patient complains of severe, prolonged headache, unrelieved by conservative treatment after spinal anesthesia, the possibility of SDH should be considered. Since early detection and diagnosis are crucial to ensure appropriate management and treatment, so in these patients, early neuroimaging or neurosurgical consultation is recommended.

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