Anesthesia & Clinical Research

Al-zaben et al., J Anesth Clin Res 2014, 5:8
http://dx.doi.org/10.4172/2155-6148.1000430

Case Report Open Access

Intracranial Subdural Hematoma Following Spinal Anesthesia in a Pregnant Patient: Case Report and Review of the Literature

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Abstract

Postdural puncture headache is a well- known complication of spinal anesthesia, but the subsequent development of intracranial subdural hematoma is a serious life–threatening complication which should be urgently treated. We present the case of a 32-year-old pregnant woman who was scheduled for cesarean section. Spinal anesthesia was induced using a 25-gauge Quincke spinal needle. After 48 hours she developed postdural puncture headache which was treated conservatively and she was discharged home. On the 30th day post operatively, the patient developed intracranial subdural hematoma which was surgically evacuated in the operating room and the patient had full recovery.

Our report reviews the literature on 49 patients who developed a postdural puncture headache complicated by intracranial subdural hematoma following spinal anesthesia. Careful follow up and good communication between the anesthesiologist, the obstetrician and the neurosurgeon is essential for early diagnosis and management of possible subdural hematoma for patients developing a postdural puncture headache.

Keywords: Spinal anesthesia; Post dural puncture headache; subdural hematoma

Introduction

Severe headache after spinal anesthesia in a pregnant patient has a broad differential diagnosis, including postdural puncture headache and intracranial pathologies [1]. Cerebral subdural hematoma is a serious life–threatening complication that may be misdiagnosed with postdural puncture headache [2]. It carries a high risk for morbidity and mortality if it is not detected and treated early [3]. We present a case that illustrates the importance of careful assessment of post-spinal headache as it could be more serious than just benign postdural puncture headache.

Case Report

A 32 year old, 65-kg, 165-cm pregnant woman (G4 P3) was scheduled for cesarean section at 39 weeks gestation because of breech presentation. She was previously healthy. There was no history of hemorrhagic diathesis, use of anticoagulants or non-steroidal anti-inflammatory drugs. She was taking iron and folic acid supplementation. Preoperative laboratory tests including complete blood count and coagulation parameters were within normal limits. The patient was consented for spinal anaesthesia.

Oxygen saturation, non-invasive arterial blood pressure and heart rate were continuously monitored in the operating room. On the first attempt, spinal anesthesia was performed with the patient in sitting position with a 25-gauge Quincke type spinal needle at the L3-L4 interspace using 12.5 mg of 0.5% isobaric bupivacaine. There was no blood or paraesthesia during insertion of the needle and she had adequate block. She had uneventful intraoperative course.

Twenty-four hours after surgery the patient experienced fronto-temporal postural headache, which was treated as postdural puncture headache with bed rest, intravenous hydration and simple analgesics. Her headache was continuous even when she was discharged from the hospital on the fourth postoperative day. Following discharge her headache worsened to the point where she could no longer nurse her baby, her headache became non-postural, and not relieved with analgesia medications.

On the 30th day postoperatively, the patient presented to the emergency room complaining of severe non-postural headache accompanied with blurring of vision, nausea and dizziness. There was no history of trauma. Neurological examination demonstrated mild upper and lower left limb weakness. A computed tomography (CT) scan revealed a 15 mm thick acute subdural hematoma involving the right cerebral hemisphere convexity causing mass effect into the underlying hemisphere sulci (Figure 1).

The patient was admitted to the hospital. A right fronto-temporal craniotomy was performed and the hematoma was evacuated. Her symptoms resolved entirely and the patient did not develop any further symptoms. She was discharged home after one week and had uneventful postoperative course during her follow up for six months.

Discussion

Spinal anesthesia has become very popular for pregnant patients undergoing cesarean section. It has the advantage of avoidance of complications of general anesthesia and its consequences but it has its

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Received May 28, 2014; **Accepted** August 02, 2014; **Published** August 12, 2014

Citation: Al-zaben K, Ja'bari AA, Massad I, Zuabi W, Tamimi A, et al. (2014) Intracranial Subdural Hematoma Following Spinal Anesthesia in a Pregnant Patient: Case Report and Review of the Literature. J Anesth Clin Res 5: 430. doi:10.4172/2155-6148.1000430

Ref	Age/Sex	Time for diagnosis	Predisposing factors	Needle	Symptoms
[12]	49/M	12 weeks	MP	25 G Quincke	**HC and visual disturbances**
[13]	24/M	?	?	25 G Quincke	**HC and tinnitus**
[14]	25/F	4 weeks	Pregnancy	?	**Diplopia**
[15]	48/F	48 hours	None	27 G Quincke	**HC, right upper limb paresis**
[16]	27/F	13 days	Pregnancy	25 whitacre	**HC, vomiting and hemiparesis**
	49/F	24 hours	None	25 whitacre	**HC, ptosis and hemiparesis**
[17]	73/F	5 days	None	26 G	**HC and vomiting**
[18]	70/F	4 days	None	24 Quincke	**HC, vomiting and confusion**
[19]	53/F	24 hours	?	?	**Coma**
[20]	39/F	21 days	None	25 G Quincke	**HC**
[8]	39/F	42 days	Double puncture	27 G Quincke	**HC and vomiting**
	32/F	40 days	Pregnancy/MP	27 G Quincke	**HC**
[21]	69/M	<1 day	MP	?	**Hemiparesis and coma**
[22]	26/F	<1 day	Pregnancy	24 G Quincke	**HC, nausea and vomiting**
[23]	31/F	8 days	Pregnancy/MP	26 G	**HC and diplopia**
[24]	29/F	20 days	Pregnancy	26 G	**HC and dysphasia**
[25]	38/M	3 weeks	None	26 whitacre	**HC and hemiparesis**
[26]	68/M	40 days	None	24 G Sprotte	**HC**
[27]	41/F	25 days	None	19 G	**HC and diplopia**
[28]	88/F	3 days	Brain atrophy	25 G Quincke	**Confusion and sleepiness**
[29]	38/M	40 days	None	22 G Quincke	**HC**
[30]	38/F	2 weeks	None	27 G	**Diplopia**
[31]	59/M	2 days	Brain aneurysm	27 G whitacre	**HC and confusion**
[32]	28/F	6 hours	Pregnancy	24 G	**HC and hemiparesis**
[33]	29/F	1 day	Pregnancy	24 G Sprotte	**HC and vomiting**
[34]	20/M	1 week	None	23 G Quincke	**HC and vomiting**
[35]	42/M	10 days	Anticoagulants	27 G whitacre	**HC, vomiting and coma**
[36]	31/F	14 days	Pregnancy	22 G	**Hemiparesis**
[37]	27/F	5 days	Pregnancy	26 G	**Left hemiparesis and aphasia**
[38]	71/M	5 days	None	22 G Quincke	**HC and vomiting**
[39]	39/F	6 days	MP	25 G Quincke	**HC and vomiting**
[40]	63/F	11 days	Anticoagulants	22 G	**HC and hemiparesis**
[41]	68/M	30 days	None	22 G	**HC and confusion**
[42]	68/M	2 weeks	MP	25 G Quincke	**HC and left orbital pain**
[43]	67/M	6 days	None	22 G Quincke	**Coma**
[44]	67/M	3 weeks	MP	25 G	**Frontal HC and confusion**
[45]	50/M	30 days	None	?	**HC and confusion**
[46]	33/F	26 days	Pregnancy	21 G	**HC and confusion**
[47]	63/M	29 days	None	24 G	**Dysphasia and hemiplegia**
[48]	70/M	21 days	None	22 G	**HC, vomiting and confusion**
[3]	39/F	30 days	Pregnancy	26 G	**HC and left hemiparesis**
[49]	67/M	10 days	None	22 G	**Disorientation and hyperreflexia**
[50]	37/M	6 days	MP	25 G Quincke	**Coma**
[51]	69/M	48 days	None	22 G	**HC, diplopia and confusion**
[52]	33/F	5 days	Pregnancy	26 G Pencil-point	**HC,tinnitus**
[52]	27/F	? days	Pregnancy	?	**HC,seizures**
[52]	18/F	42 days	Pregnancy	?	**HC,photophobia**
[52]	28/M	6 weeks	None	?	**HC**
[52]	24/F	2 days	?	25G Qunicke	**HC, tinnitus**

MP: Multiple puncture; HC: Headache

Table 1: Reported cases of intracranial subdural hematoma after spinal anesthesia.

complications like hypotension, postdural puncture headache, nerve damage, meningitis, intracerebral hemorrhage, spinal and cranial hematoma [3,4].

Postdural puncture headache (PDPH) is a frequent, unpleasant complication of lumbar puncture and spinal anesthesia. The mechanism that is proposed for this phenomenon is the persistent leakage of cerebrospinal fluid through the dural puncture site, leading to the caudal displacement of the brain with traction on pain-sensitive structures and the thin subdural bridging veins, possibly causing a slow and constant blood leakage from these veins [5]. The blood can accumulate over time causing subdural hematoma and leading to symptoms of high intracranial pressure.

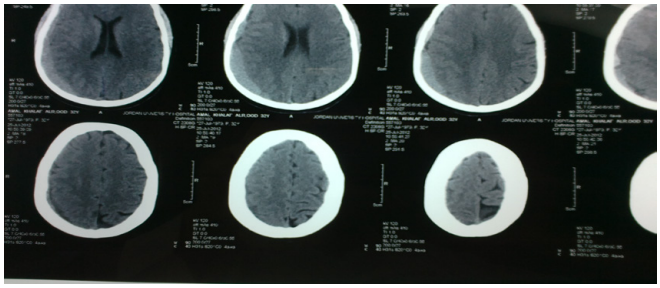

Figure 1: Computed tomography (CT) of the head showing acute subdural hematoma involving the right cerebral hemisphere convexity measuring 15 mm in maximal width and causing mass effect into the underlying right hemisphere sulci.

PDPH has certain features which can help in diagnosis and management; it usually appears within the first 24-48 hours after puncture, located on the frontal or occipital regions or both worsening significantly upon assuming the upright position and improving significantly upon lying down. It may persist up to 2 weeks and generally responds well to conservative management (hydration, bed rest, simple analgesics and epidural blood patch). Additional symptoms may include neck pain, nausea, emesis, interscapular pain, photophobia, diplopia, dizziness, and change in hearing, visual blurring, cranial nerve palsies and radicular upper extremity symptoms [6].

The occurrence of subdural hematoma increases the intracranial pressure which can be associated with non-postural headache, vomiting, convulsions, hemiplegia, confusion, sleepiness and coma. The main problem is that the differentiation between the neurological symptoms of intracranial hypotension and subdural hematoma can be difficult, but the most important warning sign is the change in headache characteristics from postural to non-postural.

Our patient developed postural headache in the first few days which was treated conservatively before discharge from the hospital. She was lost to follow up for about 14 days when she started to have a change in the characteristics of her headache to more severe non-postural headache. At that time we thought that the patient may have an intracranial pathology which should be investigated but she refused to be admitted to the hospital due to social reasons despite the clear clinical advice which delayed the diagnosis. She did not present to the hospital until her headache became intolerable and associated with other neurological symptoms.

Predisposing factors for PDPH and subsequent development of subdural hematoma include, pregnancy, dehydration, multiple dural punctures, using thick needles, coagulopathy, cerebral vascular abnormalities, brain atrophy and alcohol consumption [3]. The only contributing factor in our case was pregnancy as we used a 25 Gauge spinal needle (the smallest needle in our province), and CSF flow was detected at first attempt. However using fine needles does not eliminate the possibility of occurrence of this complication as reported here and in other literature cases [7,8].

It seems that venous congestion during pregnancy can make bridging veins more susceptible to rupture. Sudden increases in venous pressure of these dilated veins by coughing or abdominal compression during labor and delivery can lead to an augmentation of tension, especially at the subdural portion of bridging veins [9]. It is widely believed that pregnancy increases the risk of stroke. Reports have shown that the incidence of intracerebral hemorrhage is increased in the six weeks after delivery [10]. There are also reported cases of spontaneous spinal epidural hematoma during pregnancy [11].

Review of the literature disclosed 49 cases of intracranial subdural hematoma after spinal anesthesia (Table 1). In 15 patients the only predisposing factor was pregnancy. There was no predisposing factor in 20 patients. Headache was present in 37 patients. A 27 gauge needle was used in 6 patients. The age of patients ranged between 20 to 88 years. The earliest diagnosis of subdural hematoma was six hours after spinal anesthesia and the latest was 12 weeks. Two patients were on anticoagulants, one patient had brain aneurysm, nine patients had multiple punctures and four patients died.

In the 49 cases reported here, 41patients required surgical drainage. Conservative treatment is indicated for small blood collections without deviation of the structures in the intracranial midline that do not cause relevant clinical repercussions. Our patient had surgical evacuation of the hematoma due to the mass effect into the underlying hemisphere sulci which caused her neurological symptoms (headache, right-sided weakness, blurring of vision, nausea and dizziness).

The delayed diagnosis, in many cases, implies that subdural hematoma wasn't taken into consideration as a complication of spinal anesthesia. Fortunately our patient had complete recovery despite the delay in diagnosis and the surgical evacuation of the hematoma. As a result of this case, we have modified our practice so that every patient is instructed regarding this possible complication and asked to contact the anesthesiologist in the case of a change in the characteristics of the headache, that is, from postural to non-postural.

The true incidence of subdural hematoma after spinal anesthesia may be greater than the published case reports. This suggests that headaches following spinal anesthesia can be a diagnostic challenge for the clinician. Subdural hematoma must be suspected when headache persists despite conservative treatment or when a non-postural character appears. The presences of neurological deficits, seizures, signs of intracranial hypertension, or alterations of consciousness are additional late warning signs.

In conclusion, patients developing PDPH unrelieved by conservative measures, as well as the change of PDPH from postural to non-postural, require careful follow-up for early diagnosis and management of possible subdural hematoma. Investigation with a head CT or MRI is mandatory. Pregnant women seem to be more susceptible to the formation of subdural hematoma after spinal anesthesia.

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Citation: Al-zaben K, Ja'bari AA, Massad I, Zuabi W, Tamimi A, et al. (2014) Intracranial Subdural Hematoma Following Spinal Anesthesia in a Pregnant Patient: Case Report and Review of the Literature. J Anesth Clin Res 5: 430. doi:10.4172/2155-6148.1000430