

Cesarean section in spinal anesthesia on a patient with mesencephalic tumor and ventriculoperitoneal drainage -A case report-

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A seventeen-year-old pregnant woman with a mesencephalic tumor and ventriculoperitoneal (VP) drainage was admitted to the hospital at full term pregnancy to give birth. Elective cesarean section was performed because of her prime disease (mesencephalic tumor), breech position of the baby, gestational diabetes and expected weight of the baby of more than 4 kg. The operation was performed under spinal anesthesia. Spinal block was performed smoothly, using a pencil point spinal needle 27 G, at the L3-L4 intervertebral space, with hyperbaric bupivacaine 8 mg plus fentanyl 15 µg. Sensory block Th 5 was reached within 5 minutes. The patient was hemodynamically stable during the anesthesia and the procedure was uneventful. The woman developed no neurologic symptoms, and a healthy female child was born. This is the first case of a pregnant woman with a cerebral tumor and VP drainage on whom a successful delivery was performed with C-section under spinal anesthesia. (Korean J Anesthesiol 2012; 63: 263-265)

Key Words: Anesthesia spinal, Brain stem neoplasms, Cesarean section, Ventriculoperitoneal shunt.

Until the 1960's, hydrocephalus had a poor prognosis, but since silicon Cerebrospinal fluid (CSF) shunts were put into use later in that decade, there was a dramatic increase of survival rate. Until 1988, there had been only 13 mentioned cases of pregnancy in patients with CSF shunts [1]. Today, it is presumed that ventriculoperitoneal (VP) drainage in a pregnant patient with hydrocephalus, if it works properly, does not affect the method of delivery (vaginal labor or caesarean section). These patients are also appropriate for epidural or spinal analgesia/anesthesia, although caution would need to be taken [2].

Cerebral tumors are rare in pregnancy; they usually appear as an urgent condition when the patient signalizes headache, seizures and motoric or visual disturbances. If the pregnancy can be carried through to term, then the cesarean section (C-section) is performed, mostly under general anesthesia. In some cases, during this procedure, the brain tumor is also operated.

We present a case of elective C-section in spinal anesthesia at primigravida with VP drainage and mesencephalic tumor.

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Case Report

A seventeen-year-old pregnant woman with a mesencephalic tumor and VP drainage was admitted to the Obstetric Department to be prepared for elective C-section. Anamnestically, and from the available medical data, we discovered that the patient had the mesencephalon tumor since her 9th year. During her childhood, VP drainage was implanted, because of the brain tumor, and an attempt of a stereotactic biopsy was performed. The stereotactic biopsy was unsuccessful and was not repeated due to the improvement of the patient's medical condition and the lack of evidence that the illness was progressing. Since then, the patient has been under regular annual neurosurgical control. On the most recent Magnet Resonance imaging (MR), performed one month before her pregnancy, the dimensions of the tumor were: axial 27.7×27.2 mm, coronal 28.9×19.8 , sagittal 27.1×23.2 mm (Fig. 1). Eight obstetric examinations were performed during pregnancy, but no neurosurgical control was performed. We assume that VP drainage worked well because the patient had no symptoms of increased intracranial pressure. There were some complications during the pregnancy. In the 27th week there was a urinary-infection that was treated with antibiotics, and the patient also developed gestational diabetes.

The patient was scheduled for elective C-section because of her prime disease (mesencephalic tumor), breech position of the baby, gestational diabetes and expected weight of the baby of more than 4 kg. Under the assumption that the VP drainage worked well, we decided to perform the operation under spinal anesthesia because of expected difficult airway management.

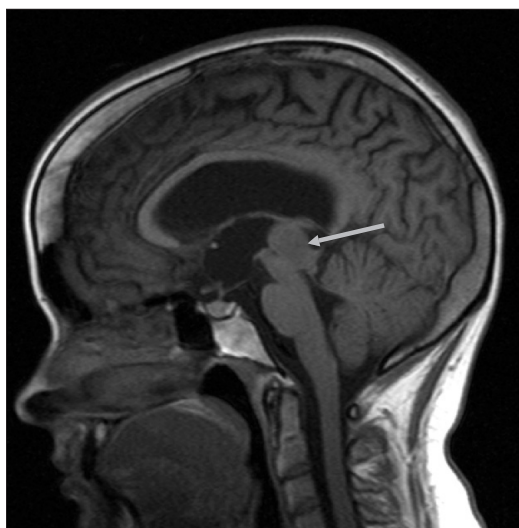


Fig. 1. Brain MR of patient one month before pregnancy. Dimensions of tumor are axial 27.7×27.2 mm, coronal 28.9×19.8 , sagittal 27.1×23.2 mm.

The patient had a Mallampati score IV, edematous soft tissue of the face and mouth and a high Body mass index (BMI) 38.

Coagulation parameters were good: prothrombin time 10 s, platelets count $386 \times 10^9/L$, and blood pressure was 150/100 mmHg. The patient signed the informed consent and was prepared for a regional anesthesia with intravenous pre-hydration. Spinal block was performed with a pencil point spinal needle 27 G, at the L3-L4 intervertebral space, with hyperbaric bupivacaine 8 mg plus fentanyl 15 µg.

The patient's height was 157 cm and her weight was 95 kg. We used the manufacturer's dose recommendation (from 10–20 mg), though with a reduction because of the substitution of fentanyl. Sensory block Th 5 was reached within 5 minutes. The patient was hemodynamically stable during the anesthesia, systolic blood pressure was between 120 and 150 mmHg, pulse was 80–120/min, and oxygen saturation was 100%. The operative procedure was uneventful; a female child was born, weighing 4,050 g, and 50 cm in length. The Apgar score in the first and fifth minute was 10/10. The postoperative period was also uneventful, so the mother and child were discharged from the hospital on the 8th day after birth.

Discussion

While referring to the past literature, we found a series of case reports about newly detected hydrocephalus or brain tumor during pregnancy [3-8]. Today, it is presumed that VP drainage on a pregnant patient with hydrocephalus does not affect the mode of labor: vaginal or caesarean section. C-section should be reserved only for patients with a malfunction of the shunt or with obstetric indications. Epidural or spinal analgesia and anesthesia are also allowed, but a certain amount of attention must be given [2]. Increased intra-abdominal pressure during the pregnancy can lead to disturbance of liquor drainage and eventually result in a malfunction of the shunt. According to Wisoff et al. [3], 59% of such patients have an increase of intracranial pressure. During the pregnancy, there is an increase of the amount of liquor content and venous distension, which compromises compliance and leads to symptoms of increased intracranial pressure [9]. The risk of VP drainage malfunction is minimal because the valve is unidirectional and intra-abdominal pressure during labor is only intermittently increased [9].

The approach taken with pregnant patients with a cerebral tumor should be multidisciplinary, involving a neurosurgeon, obstetrician, neonatologist and anesthesiologist. Individual case management is advised according to the surgical and neuroanesthetic requirements and to the gestational age.

Therapeutic options include [7,10,11]:

1) Neurosurgery performed while maintaining fetus in utero

in early pregnancy

- 2) C-section before neurosurgical operation
- 3) C-section followed by neurosurgical operation

There are no general recommendations for delivery with these patients so the decision lies on the recommendation of the neurosurgeon for each patient. Although there are some mentioned cases of vaginal delivery, most of the patients with a brain tumor are scheduled for C-section.

Pregnancy itself causes hormonal imbalance with fluid retention, a more turbulent response to stress, and some repercussions to the central nervous system (CNS). A brain tumor causes shifting of neurovascular structures and the surrounding oedema. In combination with pregnancy, especially during the vaginal (natural) delivery where a rise in intracranial pressure is present, there is a greater risk of fatal complications such as brain incarceration or haemorrhage of the tumor. Anesthesia for patients with a brain tumor must be treated very delicately and the anesthesiologist must decide whether to use general or regional anesthesia. Each type of delivery bears its own risks. General anesthesia comes with the danger of aspiration and an insufficient depth of anesthesia can cause a rise in intracranial pressure (ICP). Regional anesthesia, e.g. spinal anesthesia, can cause loss of liquor and brain incarceration. Regional anesthesia may be appropriate when delivery is performed subsequent to successful and uncomplicated neurosurgery. The woman should be alert, cooperative, and preferably have normal ICP. This approach reduces the risk of life threatening induced morbidity and mortality [11]. Also, while most of the anesthesiologists chose general anesthesia for C-section [5,10], nowadays there are several case reports of regional anesthesia for patients with brain tumors [12-14].

With our patient, we were confronted with a double challenge; mesencephalic tumor and VP drainage. We found ourselves with the dilemma of which type of anesthesia to chose. Since the patient had no symptoms of her prime disease during the pregnancy, and no signs of raised ICP, we treated her as capable for regional (spinal) anesthesia.

The patient's medical records reassured us that her brain tumor was stationary and the functionality of the VP drainage was evaluated on the grounds of lack of symptoms for raised ICP.

According to the available literature, this is the first case of a pregnant woman with cerebral tumor and VP drainage who underwent successful delivery with C-section under spinal anesthesia.

From our experience and referring to the past literature the following conclusions were drawn:

- VP drainage in a pregnant patient with hydrocephalus does not affect the mode of labor: vaginal or caesarean section

- Epidural or spinal analgesia and anesthesia are also allowed in patients with VP drainage
- Delivery method for patients with brain tumors and/or VP drainage should be determined by consensus between the obstetrician and neurosurgeon
- Regional anesthesia is safe for patients who have a brain tumor and implanted VP-drainage that works properly

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