

Anesthetic Management of A Pregnant Woman With A Cervical Intramedullar Ependymoma

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ABSTRACT

Spinal tumors are rare in pregnancy, but their importance arises from causing serious problems in terms of continuing pregnancy. Increased tumor growth or edema, increased vascularity, or pregnancy-related immunotolerance under hormonal influence constitute or exacerbate the symptoms. A 21-year-old primiparous pregnant woman at 30 weeks gestation was admitted with quadriparesis to the Neurosurgery Department with a previous history of numbness and weakness in her right shoulder, bilateral arms, and legs in the 1st trimester, gradually increasing during the pregnancy. Due to the increased risk of morbidity, neurosurgical intervention was not delayed. We aimed to present the anesthetic approach in the surgery of a pregnant woman with a cervical intramedullary ependymoma. Neuromonitorization of the mother was performed by neurologists and fetal heart monitorization by obstetricians. Additionally bispectral index and body temperature was monitored. A central venous and an arterial line were established and the patient's position was changed to a sitting position. Partial C2, C3-4 total laminectomy and excision of the mass were performed. At the end of the operation, the patient was extubated. Both the fetus and mother were doing well. A multidisciplinary approach and careful consideration of the timing of both surgery and delivery should be considered. Individual case management has to be tailored to the surgical and neuroanesthetic requirements according to gestational age.

Key words: pregnancy, spinal tumor, neuroanesthesia

Introduction

Spinal tumors are rare in pregnancy, but their importance arises from causing serious problems in terms of continuing pregnancy. Increased tumor growth or edema, increased vascularity, or pregnancy-related immunotolerance under hormonal influence constitute or exacerbate the symptoms. Especially, progressive neurologic deficits necessitate urgent spinal surgery in the pregnant patients (1). Pregnant women with cervical or lumbar neurosurgical pathologies undergoing emergent neurosurgery have been reported previously in the literature (2). The aim of this case report was to present the anesthetic approach in the surgery of a pregnant woman with a cervical intramedullary ependymoma.

Case Report

A 21-year-old primiparous pregnant woman at 30 weeks gestation was admitted with quadriparesis

to the Neurosurgery Department at Hacettepe University Hospital. Her preoperative history revealed that numbness and weakness had started in her right shoulder, bilateral arms, and legs in the 1st trimester and gradually increased during the pregnancy. Her physical examination was compatible with the complaints, and the fetus was otherwise normal. Magnetic resonance imaging (MRI) showed a localized heterogeneous, diffuse, and destructive intramedullary mass between C₂ and C₃₋₄. Due to the increased risk of morbidity, neurosurgical intervention was not delayed. After administration of 10 mg intravenous (IV) metoclopramide and 50 mg of ranitidine, standard monitorization including a 5 lead ECGs, noninvasive blood pressure (BP), and peripheral oxygen saturation (SpO₂) were performed. Oropharyngeal examination was evaluated as Mallampati Class II. Preoperative blood pressure,

heart rate, and SpO₂ were 110/70 mmHg, 90 beat/min, and 98%, respectively. Rapid sequence induction of anesthesia was performed with 2 mg/kg of IV propofol and 0.6 mg/kg of rocuronium and the patient was intubated with a cuffed 7.5 mm of endotracheal tube. Anesthesia was maintained with IV remifentanyl and propofol infusion with approximately 50% O₂-air mixture during the operation. A central venous and an arterial line were established and the patient's position was changed to a sitting position. Beside neuromonitorization of the mother by neurologists, fetal heart monitorization was performed by obstetricians. In order to avoid a decrease in uteroplacental blood flow, the intraoperative systolic blood pressure and end-tidal carbon dioxide were aimed to be maintained at ≥ 100 mmHg and at 35-40 mmHg, respectively. Additionally bispectral index and body temperature was monitorized. Partial C₂, C₃₋₄ total laminectomy and excision of the mass were performed by the help of neuromonitorization, in a 6 hour of duration by the neurosurgeons. Estimated blood loss was approximately 100 mL and urine output was 1200 mL during the operation. Normal fluid (crystalloid and colloid) was administered to counteract insensible loss and no erythrocyte suspension was given. Postoperative analgesia was provided with a 1000 mg IV paracetamol infusion. At the end of the operation, the patient was extubated. Both the fetus and mother were doing well and after neurological examination, she was sent to the neurosurgery intensive care unit.

Discussion

A spinal tumor complicating a pregnancy is rarely seen and the serious risks of surgery and anesthesia during pregnancy are important not only for the mother, but also for the fetus. The literature is generally unhelpful about the anesthetic management in neurosurgery for the pregnant patient, and so planning and decision-making must be based largely on general principles of neurosurgical and obstetric anesthesia. During surgery both the selected anesthetic technique and the drugs influence the pregnant woman's hemodynamic status. It is important to avoid using teratogenic drugs during surgery. Nitrous oxide has especially been shown to inactivate DNA synthesis and has teratogenic effects (3). Additionally reversal agents should be administered slowly in order to avoid acetylcholine increasing and some data show that sodium nitroprusside may cause cyanide toxicity in animals. Moreover we

know that high dose esmolol or beta blocker drugs has been associated with fetal bradycardia, but they are not contraindicated during pregnancy (3).

Careful airway assessment and sequentially rapid induction planning is pivotal. Rapid sequence induction is advisable especially in the second trimester to avoid the risk of aspiration (4). Because of upper airway edema, pregnant women are usually considered to be difficult to intubate. Our patient was both pregnant and had a cervical tumor. In patient with a cervical tumor the intubation should be performed with manual in line stabilization or by the use of a fiberoptic bronchoscope. The urgency of airway intervention is the most important factor in planning airway management for patients with potential C-spine problems. For patients requiring immediate airway control, rapid sequence induction followed by orotracheal intubation with cricoid pressure and manual in-line immobilization of the head and neck should be maintained (5). The anesthesiologist should be ready and equipped properly in case of difficulty and consideration of awake fiberoptic intubation, cricothyroidotomy or transtracheal ventilation. Furthermore precautions for aspiration should be taken before anesthesia during pregnancy, so antiemetics were used before the operation in this case (6).

During the spinal surgery, in prone position, the placental perfusion may increase in pregnant patients. Nevertheless, difficulties like fetal monitoring, emergent cesarean delivery, and increased epidural venous bleeding may be encountered (7). Sitting position was implemented and in order to avoid air embolism central subclavian catheter was placed in this patient.

Intraarterial BP monitoring is recommended before induction of anesthesia, so that hemodynamic changes are quickly observed and treated. Bispectral index may be useful if electrode placement does not interfere with surgical access (8). Body temperature should be monitorized with a urinary bladder or esophageal temperature probe in the pregnant patient undergoing neurosurgery in order to achieve normothermia. In addition, hourly urine output should be monitored and IV fluid therapy during cerebral and spinal neurosurgery should consist of isonatremic, isotonic, and glucose-free solutions to reduce the risk of cerebral edema and hyperglycemia (9). Accordingly, our patient was given crystalloid solution.

Intra-operative neuromonitorization helps the neurosurgeon and enables them to operate more precisely and with less risk of post-operative neurological deficit. By neuromonitoring the surgeon adjusts their strategy, confirm decisions, and improve new procedures (10). Fetal heart monitoring perioperatively should be individualized and based on

consultation with obstetricians (11, 12).

Neurosurgery especially cervical tumors are rare during pregnancy, but mandate a multidisciplinary approach and careful consideration of the timing of both surgery and delivery. Individual case management has to be tailored to the surgical and neuroanesthetic requirements and to the gestational age.

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