



## Emergency Caesarean Section in a Parturient with an Inoperable Brainstem Astrocytoma: A Case Report

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### Abstract

Anesthetic management of pregnant women with cerebral tumors remains a real challenge for the anesthesiologists. Medical care of such patient will be influenced by the type and localization of the tumor, the risk of increased Intracranial Pressure (ICP), gestational age and clinical symptoms. We present the case of a parturient with an inoperable glioma who strongly requested to prioritize her baby's life, even at her own expense. After discussion with the obstetrician and the neurosurgeon, it was decided to perform a caesarean section at term, under general anesthesia. We discuss the rationale of our anesthetic plan, based on a total intravenous technique completed by a loco-regional postoperative analgesic approach that was successfully applied to the patient when she was admitted at 35 weeks of amenorrhea for spontaneous labor. We also debate the ethical dilemma posed by the patient requirement to prioritize her baby's life at all costs.

**Keywords:** Glioma; Pregnancy; Delivery; Anesthesia; Neurological

### Introduction

Knowledge of diffuse low-grade gliomas natural history has grown considerably in the past few years leading to improved therapeutic management and prognosis. Therefore, an increased number of young women suffering from this pathology now consider pregnancy. A few published case reports [1-5] discuss the anesthetic management and the therapeutic options in patients developing ICP during pregnancy. Our approach is original in that the patient we had to manage was in a palliative situation following an inoperable glioma when the baby was conceived. Her request to prioritize the life of her baby, even at her own expense, constitutes an ethical dilemma for us. The patient gave written informed consent for publication of this case report.

### Case Presentation

A 29-year-old gravida 1 para 0 at a gestational age of 31 weeks presented for anesthetic consultation for a scheduled caesarean section. Eight years ago, she was diagnosed with an inoperable low-grade astrocytoma located in the left inferior brainstem. Two years ago, she underwent a palliative decompression surgery because of tumor evolution causing hydrocephalus and increased ICP. Long-term corticoid treatment with methylprednisolone was instituted. At the preoperative visit, she presents with right hemiparesis, oculomotor, deglutition and coordination disorders, but preserved cognitive functions. She has only one request; the baby's life must be prioritized over her own. After discussion with the obstetrician and the neurosurgeon, it was decided to perform an elective caesarean section after 37 weeks of amenorrhea to avoid pushing efforts and systemic hypertension, resulting in an increased ICP and potential cerebellar engagement. Although spinal anesthesia should be considered as the best option for the baby [6], as it has been recommended by the American Society of Anesthesiologists (ASA) [7], it was not considered here as it puts the patient at high risk of brain stem herniation or intracranial hemorrhage. An anesthetic plan was established, based on total intravenous anesthesia combining propofol and remifentanyl, considering the necessity to avoid any increase in ICP.

At 35 weeks of amenorrhea, the patient was admitted for spontaneous onset of labor and it was decided to proceed without waiting for the caesarean section. Metoclopramide 10 mg was administered intravenously to the patient to improve gastric emptying.

In the operating room, the patient was installed in a 30 degrees left-lateral tilt position. Monitoring included 3 leads electrocardiography, non-invasive blood pressure, pulse oximetry, cerebral entropy, neuromuscular TOF watch and continuous fetal heart rate. Pre-oxygenation was initiated, while patient's vital signs were stable and within normal limits. General anesthesia was

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**Received Date:** 24 Feb 2022

**Accepted Date:** 21 Mar 2022

**Published Date:** 31 Mar 2022

#### Citation:

Esterhazy M, Cornet J, Longneaux J-M, Van der Linden P. Emergency Caesarean Section in a Parturient with an Inoperable Brainstem Astrocytoma: A Case Report. *World J Surg Surgical Res.* 2022; 5: 1374.

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initiated with target-controlled propofol infusion using Schnider model started at 5 µg/mL, remifentanyl infusion using Minto model started at 2 ng/mL then reduced to 1.5 ng/mL, and 1 mg/kg of rocuronium. Rapid sequence induction was executed, and patient's trachea was intubated easily with 7.5 mm cuffed tube using a videolaryngoscope (GlideScope® Verathon, USA). Mechanical ventilation was started with a tidal volume of 6 mL/kg<sup>1</sup> ideal body weight and 4 mmHg of PEEP, while respiratory rate was adapted to maintain end-tidal CO<sub>2</sub> between 30 and 35 mmHg. Fetal heart rate remained within the normal range of 120 to 160 beats per minute up to delivery, which occurred 1 minute after incision. Baby's Apgar scores were 9/9/10. After placenta removal, Carbetocin 100 µg was infused over 1 minute. According to the endocrinologist, 50 mg hydrocortisone was administered. No major hemodynamic changes were noted, and vasopressors have not been used during surgery.

At the end of the procedure, paracetamol 1 g and ketorolac 30 mg were administered. A bilateral ultrasound guided transversus abdominis plane block using 40 mL of Levobupivacaine 0, 25% with adrenalin 1/200.000 was performed. Sugammadex 4 mg/kg was administered to reverse the neuromuscular blockade while TOF count was 2/4. Twenty minutes after the drugs had been stopped, the patient recovered spontaneous ventilation and was able to open her eyes. Her trachea was extubated without aspiration.

In the post-anesthesia care unit, neurological examination remains stable and vaginal blood loss was negligible, and the patient was authorized to return to the maternity ward one hour after her admission. For post-operative analgesia, she only required level-1 analgesics. Corticoid treatment was re-instituted on the day after surgery. Post-partum was uneventful, and she was discharged 7 days after delivery. In the months following her operation, the patient was still able to care for her baby with some assistance, despite a progressive deterioration of her neurological status.

## Discussion

Few publications have addressed the anesthetic management of caesarean section in women with cerebral tumors and no one with an inoperable lesion. The large majority of these case reports are relatively old (from 1999 to 2015) [2-4] and do not take into account specific approaches regarding the use of muscle relaxants, their antagonization and postoperative loco-regional analgesic techniques such as Transversus Abdominis Plane block. Multiple factors such as the type and localization of the tumor, the risk of increased ICP, gestational age and clinical symptoms will influence the medical care of the patient [8]. The ASA practice guidelines for obstetric anesthesia confirm the need for multidisciplinary care [7].

Antiemetic prophylaxis must be considered for parturients with an elevated ICP receiving general anesthesia [8]. We used only intravenous metoclopramide for its gastric prokinetic properties because of patient's deglutition disorders, contraindicating any oral medication.

Recommendations regarding the choice of the anesthetic technique remain contradictory in the literature [9]. We decided to use total intravenous anesthesia combining propofol and remifentanyl as it has already been used successfully for caesarean section [1]. It allows hemodynamic stability, rapid recovery of the new-born and presents antiemetic and anticonvulsant properties. This drugs association decreases ICP while maintaining cerebral perfusion pressure [10]. Although minimal, the risk of neonatal respiratory

depression exists [11], requiring specific attention after delivery. As airway management for obstetric patient may be complicated by physiologic and anatomic changes linked to pregnancy, we decided to use the videolaryngoscopy technique to increase the success rate of the initial intubation attempt [12].

Neuroprotective anesthetic management strategy was applied throughout the surgery. The use of lower tidal-volume to minimize intrathoracic pressure and a close monitoring of end-tidal CO<sub>2</sub> have been recommended [8].

Pharmacologic management of uterine muscle tone can potentially impact hemodynamic stability and ICP. Although the risk to benefit profile of Carbetocin remains debated, it presented the advantages over oxytocin of a simplified administration scheme (one single slow injection of 100 mcg) and a better efficiency for preventing postpartum hemorrhage in women undergoing CS [13].

Emergence from anesthesia and tracheal extubation procedures should be as smooth as possible. Preventive strategies consist in post-operative analgesia control, antiemetic prophylaxis and coughing avoidance secondary to tracheal stimulation [8]. In agreement with a previous report, transversus abdominis plane block was effective in producing adequate early postoperative analgesia [5]. Complete antagonization of neuromuscular blockade is mandatory. Although the effects of Sugammadex on ICP remain largely unknown, this drug is considered safe for use regarding its pharmacodynamic properties [14].

The management of this patient allowed us to review the most recent actual literature and to update new approaches, whether specific or not. Moreover, the originality of this case report is based on the ethical dilemma posed by the management of this patient. Suffering from an incurable tumor, this patient asked that we took any action that could protect her baby even at her own expense. This demand puts us in a very difficult position: it prevents us from respecting the principle of giving priority to the life of the mother, and therefore, it does not allow us to do the best we can, for her and her baby, with calculated risks. In such a situation, we deemed that the least damaging option was to aim for the highest possible good at the cost of what Plato calls a "noble lie" (The Republic, book III, 414b). Although never an ideal solution, it becomes ethically acceptable under two conditions. Firstly, the result thus achieved cannot be in contradiction with the wishes of the patient but must include them to achieve a greater purpose. This was clearly the case here as we tried to do what was best, not only for the baby - as the patient had requested - but also for her - which she couldn't envision. Secondly, this noble lie must be the only way to preserve the trust and dialogue that is paramount to any patient relationship.

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