



# Anaesthetic Management in Successive Spinal Surgeries During Pregnancy and Postpartum

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*Cite this article as:* Coşkun D, Mahli A, Sabuncu Ü, Özdemir R, Emmez H, Günaydın DB. Anaesthetic Management in Successive Spinal Surgeries During Pregnancy and Postpartum. *Turk J Anaesthesiol Reanim* 2020; 48(5): 420-2.

## Abstract

In this case report, we present a parturient with spinal tumour who required neurosurgery before and after caesarean delivery under general anaesthesia. A 25-year-old woman at 30 weeks of gestation and suffering from bilateral lower-limb weakness and sensory deficit due to spinal tumour underwent emergent laminectomy and decompression surgery under general anaesthesia. In this case, total intravenous anaesthesia was used. Two weeks later, the patient underwent emergent caesarean delivery under general anaesthesia due to preterm labour and gave birth to a healthy new-born. Meanwhile, pathological exam revealed soft tissue sarcoma requiring re-operation for gross total excision in the postpartum Week 4, which was followed by multisection chemoradiotherapy. The patient survived for 3 years, that is, until generalised systemic and neural metastasis. General anaesthesia management in surgeries before and after caesarean delivery in patients with spinal tumours is of utmost importance in providing optimal maternal, foetal and neonatal safety using a multidisciplinary team approach.

**Keywords:** General anaesthesia, pregnancy, postpartum, neurosurgery, spinal tumour

## Introduction

When planning a treatment strategy for spinal cord lesions during pregnancy, multiple factors, such as the location of the spinal cord compression, presence of spinal deformity, speed of neurologic decline and stage of pregnancy, must be considered (1-3). Therefore, in this paper, we aimed to present the anaesthetic management of a parturient with spinal tumour, who required neurosurgery before and after caesarean section (CS).

## Case Presentation

A 25-year-old woman, gravida 1, para 0, at 28 weeks of gestation with a 4-day history of bilateral lower-limb weakness and sensory deficit, was admitted to our institution. Magnetic resonance imaging of the dorsal spine revealed a lesion at the entire T8–9 thoracic vertebra involving the posterior elements, and osseous extension into the extradural space and paravertebral soft tissue. She was urgently referred to the neurosurgery department at 30 weeks of gestation to undergo laminectomy and decompression. According to airway exam, the patient was evaluated as Mallampati Class II. After obtaining the patient's informed consent, prophylaxis with intravenous (IV) metoclopramide 10 mg, ranitidine 50 mg and cefazolin 1 g was performed. Then, the maternal heart rate and rhythm (electrocardiogram), non-invasive blood pressure, peripheral oxygen saturation and foetal heart rate (FHR) were monitored, and the operation table was tilted 15° to the left to avoid aortocaval compression. After 3-min preoxygenation with 100% oxygen, rapid-sequence induction was performed using IV propofol (2 mg kg<sup>-1</sup>) and rocuronium (0.5 mg kg<sup>-1</sup>) followed by total intravenous anaesthesia (TIVA) with propofol and remifentanyl. Afterwards, central venous and arterial lines were inserted to monitor haemodynamics and the acid–base status. Then, the patient was turned to the complete left lateral decubitus position for surgery. Spinal cord decompression by total laminectomy of T8 and T9, and subtotal ex-

It has been presented as a poster at the 15<sup>th</sup> World Congress of Anesthesiologists, Buenos Aires, Argentina

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Received: 26.07.2019 Accepted: 21.08.2019  
Available Online Date: 05.02.2020

cision of the lesion, lasted for 2 h. Maternal haemodynamics and FHR were maintained throughout the entire operation. The patient was transferred to the post-anaesthesia care unit. At 32 weeks of gestation, emergency CS was performed due to preterm labour. After standard aspiration prophylaxis and preoxygenation with 100% oxygen, anaesthesia induction was performed with IV propofol 2 mg kg<sup>-1</sup> and rocuronium 0.5 mg kg<sup>-1</sup> to facilitate endotracheal intubation with rapid-sequence induction using an ID of 7.0 tube followed by 0.75 minimum alveolar concentration (MAC) sevoflurane inhalation in 50% oxygen-nitrous oxide mixture until delivery. A healthy male infant was born, and the Apgar scores were evaluated as 9 and 10 at 1 and 5 min, respectively. Oxytocin 20 IU in 1000 mL Ringer's lactate solution was given by IV infusion. The CS operation lasted 32 min. After antagonising the residual neuromuscular block with IV neostigmine 2 mg and atropine 1 mg, the patient was extubated. Multimodal postoperative analgesia was provided with IV tramadol 1 mg kg<sup>-1</sup> and paracetamol 1 g. Since the pathological examination revealed soft tissue sarcoma, the patient was admitted for re-operation to achieve gross total excision at postpartum 4 weeks. After tumour excision and T8 and T9 corpectomy, spinal stabilization was performed by bilateral posterolateral approach using interbody titanium cage and pedicular screws in T6, T7, T10 and T11. Multisession chemoradiotherapy was performed immediately after surgery. The patient survived for 3 years, that is, until generalized systemic and neural metastasis developed.

## Discussion

In the current case report, successful general anaesthesia management for the first neurosurgical treatment in the left lateral decubitus position during pregnancy, emergency CS under general anaesthesia, and re-operation in the postpartum period followed by chemotherapy were presented, and the patient lived for 3 years.

Spinal cord tumours, or metastasis, with neurologic deficit requiring neurosurgical decompression surgery during preg-

nancy are rare. Some of these neurosurgical procedures may be required either before or after delivery, depending on the progress of the disease. In one case report, neurosurgical management of hemangiopericytoma located in the spinal cord at 28 weeks of gestation under general anaesthesia followed by CS of a term parturient was presented (4). In contrast to that case report, a paraplegic parturient having spine metastasis due to breast cancer initially underwent CS at 34 weeks of gestation under general anaesthesia using inhalation anaesthetics, and neurosurgical decompression was proceeded in the prone position during the same anaesthesia session (5). Our case has been unique in presenting the management of three operations (two neurosurgeries before and after CS). Both a total laminectomy for decompression at 30 weeks of gestation antenatally and neurosurgical decompression due to progressive paraplegia in the lower extremity resulting from spine metastasis of breast cancer in the prone position immediately after CS were performed under general anaesthesia using TIVA the first time. However, emergency CS due to preterm labour was performed using inhalation anaesthesia with sevoflurane.

The order of surgeries, including expectant management of delivery, was planned according to the progress of the disease in the present case report. The neurosurgical decompression surgery was performed in the third trimester, while elective caesarean delivery was planned at term. However, an emergency CS due to preterm labour was required 2 weeks after neurosurgery.

Regarding anaesthesia options, either balanced anaesthesia with isoflurane or TIVA have been proved to be safe because of favourable rapid recovery characteristics in high-risk cases with permanent neurological damage requiring cortical somatosensory-evoked potentials monitoring. In this case, we particularly used TIVA-based general anaesthesia in neurosurgery before delivery, not only to provide rapid recovery, but also to prevent preterm labour risk associated with inhalation anaesthetics. Regardless of the anaesthesia technique, we aimed to maintain uteroplacental perfusion with the aid of FHR monitoring performed continuously by an obstetrician fellow throughout the entire operation.

Although a number of cases with herniated disc and/or cauda equina symptoms requiring urgent surgery under neuraxial anaesthesia before delivery have been previously reported in the literature (6-9), we did not consider performing a neuraxial technique because of the unpredictability of the operation in such a complicated condition. Therefore, our general anaesthetic management using TIVA for the neurosurgical decompression surgery performed in the lateral decubitus position before delivery in addition to inhalation anaesthesia for emergency CS in the present particular parturient is unique.

### Main Points:

- When planning a treatment strategy for spinal cord lesions during pregnancy, multiple factors, such as the location of the spinal cord compression, presence of spinal deformity, speed of neurologic decline and stage of pregnancy, must be considered.
- Close attention to maternal and foetal parameters is essential for successful outcomes during non-obstetric surgery in pregnant patients.
- General anaesthesia management for both neurosurgery and CS in patients with spinal tumours is of utmost importance to provide optimal maternal, foetal and neonatal safety with a multidisciplinary team approach.

## Conclusion

Close attention to maternal and foetal parameters is essential for successful outcomes during non-obstetric surgery in pregnant patients. General anaesthesia management for both neurosurgery and CS in patients with spinal tumours is of utmost importance to provide optimal maternal, foetal and neonatal safety with a multidisciplinary team approach.

**Informed Consent:** Written informed consent was obtained from patient who participated in this case.

**Peer-review:** Externally peer-reviewed.

**Author Contributions:** Concept – D.C.; Design – D.C., A.M.; Supervision – D.C., A. M.; Resources – D.C., A.M.; Materials – D.C.; Data Collection and/or Processing – D.C., Ü.S., R.Ö.; Analysis and/or Interpretation – D.C., A.M., H.E., D.B.G.; Literature Search – D.C., A.M., Ü.S., D.B.G.; Writing Manuscript – D.C., A.M., Ü.S., R.Ö., H.E., D.B.G.; Critical Review – D.C., A.M., D.B.G.; Other – D.C.

**Conflict of Interest:** The authors have no conflicts of interest to declare.

**Financial Disclosure:** The authors declared that this study has received no financial support.

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