

Berrin GÜNAYDIN¹
Sema ÖNCÜL¹
Mehmet ERDEM²
Memduh KAYMAZ³
Hakan EMMEZ³
Zerrin ÖZKÖSE¹

General anesthesia for cesarean delivery followed by anterior and posterior spinal cord decompression of a parturient with symptomatic spine metastasis due to breast cancer

Abstract: Cesarean delivery of a parturient suffering from paraplegia followed by anterior corpectomy and posterior spinal cord decompression because of spine metastasis at T1 due to breast cancer was presented. General anesthesia was uneventfully completed after rapid sequence anesthesia induction with propofol, ketamine, and succinylcholine, which was maintained by isoflurane inhalation in 50% oxygen-air mixture until delivery of the newborn. After delivery, remifentanyl infusion was added to isoflurane inhalation in approximately 33%/66% oxygen:air until skin closure of the latter operation. Consequently, satisfactory recovery of paraplegia resulting from spine metastasis and delivery of a healthy baby were provided by successful and uneventful management of sequential caesarean delivery and neurosurgical intervention requiring double different positioning successively under general anesthesia.

Key words: Breast cancer, metastasis, cesarean section, anesthesia

¹ Department of Anesthesiology,
Faculty of Medicine,
Gazi University,
Ankara - TURKEY

² Department of Gynecology and
Obstetrics, Faculty of Medicine,
Gazi University,
Ankara - TURKEY

³ Department of Neurosurgery,
Faculty of Medicine,
Gazi University,
Ankara - TURKEY

Meme kanserine bağlı semptomatik omurga metastazı olan gebede sezaryeni takiben anterior ve posterior spinal kord dekompresyonu için genel anestezi

Özet: Meme kanserine bağlı T1'de omurga metastazından dolayı parapleji şikayeti olan gebede, sezaryenle doğumu takiben yapılan anterior korpektomi ve posterior dekompresyon sunuldu. Propofol, ketamin ve süksinilkolinle gerçekleştirilen hızlı indükiyondan sonra yenidoğan çıkana kadar % 50 oksijen-hava içinde izofluran inhalasyonu ile idame ettirilen genel anestezi sorunsuz bir şekilde tamamlandı. Doğumdan sonraki operasyonda cilt kapanıncaya dek % 33/66 oksijen/hava içinde izofluran inhalasyonuna remifentanil infüzyonu eklendi. Sonuçta omurga metastazından kaynaklanan paraplejinin iyileşmesi ve sağlıklı bir bebeğin doğması, başarıyla ve sorunsuz bir şekilde yönetilen genel anestezi altında iki farklı pozisyon gerektiren sırayla yapılan sezaryen ve beyin cerrahisi girişimiyle sağlanmıştır.

Anahtar sözcükler: Meme kanseri, sezaryen, anestezi

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Introduction

Skeletal metastasis due to breast carcinoma was shown to be located in the long bones, spine, or pelvis. The dreaded complication of spine metastasis was the neurologic compromise due to spinal cord compression requiring surgery. The symptomatic skeletal metastasis of breast cancer in Swedish population requiring operation was reported to be 17% (1).

Pregnant patients with emergent cervical or lumbar neurosurgical benign pathologies undergoing cesarean delivery and neurosurgery sequentially have been reported previously in the literature (2-5). In the present case report, a parturient with breast carcinoma suffering from paraplegia has been scheduled to undergo

Correspondence

Berrin GÜNAYDIN
Department of Anesthesiology,
Faculty of Medicine,
Gazi University,
06500, Beşevler
Ankara - TURKEY

gunaydin@gazi.edu.tr

cesarean section (CS) followed by anterior corpectomy and posterior spinal cord decompression because of spine metastasis at T1 under general anesthesia and her postpartum follow-up was presented.

Case report

The 38-year-old primiparous parturient who underwent radical mastectomy and received chemotherapy because of infiltrative ductal carcinoma (Grade 2/3) 9 years ago was admitted with paraplegia at 31 weeks. According to her preoperative history; neck, shoulder, and back pain started in the 2nd trimester of her pregnancy. Cardiovascular, respiratory, and hematologic systems were normal as was the development of the fetus. Neurologic examination of the upper extremity showed no sensory or motor deficits, but 2/5 degree of motor deficit at the lower extremity with hypoesthesia below T8. Magnetic resonance imaging showed medullary bone marrow infiltration at lower cervical and upper thoracic vertebrae with complete obliteration of the spinal canal and cord compression at the corpus of the T1 (Figures 1 and 2).

Laboratory results were unremarkable except high CEA and Ca-15-3 levels, which were 14.4 ng mL^{-1} and 33.4 U L^{-1} , respectively. The symptoms showed progression and bladder dysfunction developed during waiting for the fetal maturation. Therefore, sequential CS and neurosurgical intervention were planned at 34 weeks.

After administration of intravenous (iv) metoclopramide 10 mg and ranitidine 50 mg in a fast running Ringer's lactate (RL) solution, the standard monitoring, including 4 lead ECGs, noninvasive blood pressure, and peripheral oxygen saturation (SpO_2), was performed. Oropharyngeal examination was evaluated as Mallampati Class II. Preoperative blood pressure, heart rate, and SpO_2 were 130/85 mmHg, 90 beat/min, and 98%, respectively. Operation table was tilted 15° to the left for avoiding aortocaval compression leading to supine hypotension syndrome.

Rapid sequence induction of anesthesia was performed with iv propofol 1 mg kg^{-1} and ketamine 0.5 mg kg^{-1} . Endotracheal intubation was facilitated



Figure 1. T₂-weighted sagittal, cervico-thoracic MRI showing spinal cord compression and compression of T₁.

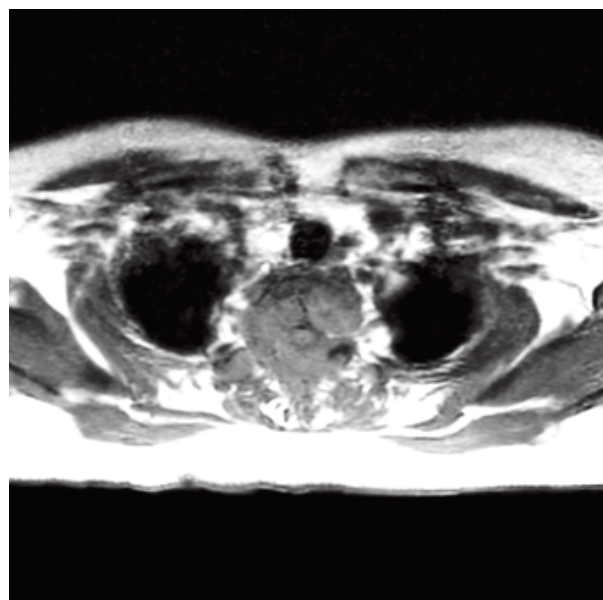


Figure 2. T₁-weighted axial MRI showing metastatic spinal tumor surrounding and compressing spinal cord at T₁ level.

with iv succinylcholine 1.5 mg kg^{-1} with a cuffed 7.0 mm of endotracheal tube. Anesthesia was maintained with approximately 0.7 MAC of isoflurane in 50% O_2 -air mixture until delivery. After delivery of a healthy infant weighing 1850 g with 1 and 5 min Apgar scores of 8 and 10, remifentanyl infusion (varying between 0.1 and $0.25 \text{ } \mu\text{g kg}^{-1} \text{ min}^{-1}$) and oxytocin 20 IU in 1000 mL of RL were started. Maintenance of neuromuscular block was provided with incremental rocuronium administration. The CS lasted 45 min and it was uneventful. Invasive arterial hemodynamic monitorization was performed prior to turning the patient to prone position with protecting abdomen and uterus from pressure.

The latter operation including bilateral decompressive T1 laminectomy, anterior discectomy at C7-T1 and T1-2, median corpectomy at T1, tumor excision, and anterior stabilization by distractible corpectomy cage and plate were performed by the neurosurgeons in 5 h. Estimated blood loss was approximately 800 mL for CS, and 1000 mL for spine surgery. Urine output was 1200 mL during both of the operations.

The patient received 3 units of erythrocyte suspension and 2 units of fresh frozen plasma in addition to the normal fluid (crystalloid and colloid) administration that would counteract insensible loss and urine output throughout the entire operation period.

At the very end of the sequential operations, residual neuromuscular block was antagonized with neostigmine 1 mg and atropine 1/2 mg followed by the extubation of the patient. Postoperative analgesia was provided by iv bolus morphine 0.1 mg kg^{-1} followed by infusion of 0.25 mg h^{-1} via patient controlled analgesia.

The patient received 4 sequences of radiotherapy in the postpartum 1-month period and then discharged. When patient was readmitted to the hospital for control 2 months after the operation, patient could walk without support for 10 min according to the physical therapy and rehabilitation reports.

The Ca-15-3 level decreased to 15.3 U L^{-1} (normal limit 0-31). Though CEA level decreased to 9.87 ng mL^{-1} (normal limit 0-5), it was still out of normal range.

Discussion

Anesthetic management for a symptomatic spine metastasis due to the breast cancer requiring neurosurgical decompression because of the resulting progressive paraplegia in the lower extremity of a pregnant at 34 weeks was presented in the current case report.

Neurosurgical compromise requiring surgical intervention during pregnancy is not rare. Cervical intraspinal lipoma and intradural cervical inflammatory pseudotumor leading quadriparesis have been described in full-term pregnant patients in the literature. Cesarean section was performed under general anesthesia followed by the cervical decompression laminectomy in these two case reports (2, 3). Rapid sequence induction of general anesthesia using propofol and succinylcholine with cricoid pressure followed by sevoflurane 1 MAC in 100% oxygen for sequential CS and laminectomy of a multiparous parturient at 35 weeks with disc herniation and cauda equina syndrome has recently been reported (4). However, this is the first case report presenting a parturient having an operation history of radical mastectomy because of infiltrative ductal breast cancer with recent spine metastasis resulting in progressive paraplegia requiring surgery. Although the present case report seems to be similar to the previous reports because of the necessity of sequential CS and decompression surgery under general anesthesia considering 2 different positions, it mainly differs because of the anticipated poor prognosis and survival rate. Median survival from diagnosis of bone metastasis was reported to be 22 months if bone was the 1st site of metastasis or 5 year survival rate after bone metastasis was 26.1% (1,5). For the management of general anesthesia, we currently used half of the required propofol dose for induction by adding half of the required induction dose of ketamine, which also provided analgesia followed by the administration of isoflurane 0.7 MAC in 50% oxygen-air mixture until delivery. After clamping the umbilical cord, we started remifentanyl infusion and continued until the end of surgery. The present spine surgery lasted 5 h. Fortunately, uterine atony requiring additional uterotonic administration did not occur during that period, but patient required transfusion

of blood and blood products because of the bleeding from the operation site. In contrast to the case report of Al-areibi et al. (4), we avoided cricoid pressure during induction because of the particular location of the metastasis though it is one of the primary important considerations of general anesthesia for CS.

In conclusion both surgeries from different disciplines requiring supine and prone positioning successively were performed successfully under general anesthesia and completed uneventfully. Postpartum radiotherapy and physical rehabilitation contributed to complete the recovery of paraplegia.

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