

Case Report

Anesthetic Management of a Patient with Spinal Metastasis from Breast Cancer: A Case Report

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ABSTRACT:

Spinal tumors, particularly metastatic lesions, are a debilitating condition that can present with a wide range of symptoms and lead to significant impairment of both the physiological and psychological aspects of a patient's health. Effective management of these tumors requires a multidisciplinary approach, especially in anesthetic care, where the risk of complications is high. This case highlights the anesthetic challenges involved in the care of a 55-year-old patient with metastatic spinal disease from breast cancer, requiring thoracic laminectomy for tumor decompression. Key issues discussed include the use of neuro-monitoring, the individualized anesthetic approach, hemodynamic management, and the complications arising from extensive metastatic involvement.

Keywords:

Case Presentation:

Patient History:

A 55-year-old female with a history of breast cancer, previously treated with mastectomy, presented with progressive lower back pain, numbness, and difficulty walking over the last two months. She required assistance while walking but denied urinary retention, incontinence, constipation, or saddle numbness. On examination, she was alert and oriented but had a left foot-drop gait.

Physical Examination:

Neurological Assessment:

- Strength: Decreased in both feet, rated at 4/5 bilaterally.
- Reflexes:
- Triceps: +2 bilaterally.
- Biceps: +2 bilaterally.
- Brachioradialis: +2 bilaterally.
- Patellar: +2 bilaterally.
- Achilles: 0 bilaterally.
- Additional Findings:
- No lower back tenderness was noted.
- Loss of plantar reflex bilaterally.
- Gait consistent with foot drop; sensation intact, but motor strength diminished.

Diagnostic Workup:

MRI Findings:

- Multiple vertebral metastases with involvement of the conus medullaris.
- Osseous metastatic deposits in lumbar vertebrae and iliac bones.

Preoperative Laboratory Results:

The patient underwent a full preoperative assessment, including laboratory tests and imaging. Key results:

- WBC Count: $11.4 \times 10^9/L$.
- Hemoglobin: 12.3 g/dL.
- INR: 1.15.
- Creatinine: 0.53 mg/dL.
- A blood cross-match was ordered before surgery.

Anesthesia Management:

Induction:

The patient was induced with:

- Fentanyl 200 mcg.
- Propofol 200 mg.
- Rocuronium 50 mg.

These agents were selected to ensure smooth intubation and adequate muscle relaxation while allowing for neuro-monitoring compatibility.

Intraoperative Neuro-Monitoring:

- Techniques: Somatosensory evoked potentials (SSEPs) and motor evoked potentials (MEPs) were employed.
- Adaptation: To enhance neuro-monitoring signals, the anesthetic regimen was switched from sevoflurane to total intravenous anesthesia (TIVA).

Maintenance of Anesthesia:

Regimen:

- Propofol infusion at 250 mg/hr.
- Dexmedetomidine at 0.5 mcg/kg/hr.
- Analgesia: Remifentanyl infusion for intraoperative pain management.
- Hemodynamic Management:
- Labetalol infusion at 0.5 mg/min to control intraoperative hypertension.

Emergence and Extubation:

The patient was extubated once she was fully awake, obeying commands, and breathing spontaneously. Postoperative neurological assessment showed persistent preoperative deficits, including the loss of the Achilles reflex on the left side.

Surgical Outcome:

The patient underwent thoracic laminectomy for tumor decompression. During surgery, the left foot-drop worsened, prompting the surgeon to halt further tumor debulking to prevent additional neurological damage.

Postoperative MRI revealed:

- Multiple brain metastases.
- Intramedullary conus medullaris lesions.
- Leptomeningeal carcinomatosis.

These findings indicated a poor overall prognosis.

DISCUSSION:

Pathophysiology:

Spinal metastases cause direct tumor invasion, mechanical compression, vertebral disruption, and vascular compromise. The patient's neurological symptoms, including foot drop and Achilles reflex loss, were likely caused by conus medullaris involvement. Leptomeningeal carcinomatosis, a result of malignant cell dissemination into cerebrospinal fluid, further contributed to her deterioration.

Epidemiology and Impact:

- Spinal metastases affect 30–70% of cancer patients.
- Breast cancer is a leading cause, with thoracic involvement being most common.

Challenges in Anesthetic Management:

1. Neuro-Monitoring in Metastatic Disease:

- SSEPs and MEPs were critical for real-time spinal cord monitoring, guiding intraoperative decisions.
- Transition to TIVA ensured clearer neurophysiological signals, avoiding interference from volatile agents like sevoflurane (1)
- SSEP and MEP is considered a standard of care by many professionals but there is a controversy opinion regarding its effectiveness and prognosis on the outcome (2,3,4,6)
- Studies have shown that neural-monitoring in patients with intramedullary spinal cord tumors that underwent surgery showed positive outcome in improving postoperative neurological outcomes and decreasing the incidence of spinal cord injury (5)
- Also Studies showed that Neural-monitoring did not have any impact on the hospital stay or cost, and in-hospital complications, which means using it has nearly no side effects. (6)
- Recent study has showed high predictive value for SSEP changes to postoperative complications and neurological outcomes (7)

2. Hemodynamic Stability:

- Maintaining stable spinal cord perfusion is essential. Both hypotension and hypertension can exacerbate neurological deficits.
- This case involved hypertensive control with labetalol and remifentanyl (8).

3. Multidisciplinary Approach:

- Collaboration between anesthesiology, oncology, neurosurgery, and neurophysiology ensured comprehensive patient care (9).

4. Postoperative Considerations:

- Pain management was multimodal.
- Regular neurological assessments and imaging were critical for early detection of deterioration.
- Given the poor prognosis, early palliative care referral was integral for symptom control and end-of-life planning (10).

5. Emerging Themes:

Checklist adaptation, clinical pathways and crew resource management can make a well-organized system easy to implement and help in the event of postoperative

complications and preventing these complications in subsequent cases.

CONCLUSION:

This case underscores the complexities of anesthetic management in patients with spinal metastasis from breast cancer. A tailored anesthetic approach, neuro-monitoring, and hemodynamic stability were crucial in minimizing neurological risks. Integration of palliative care and a multidisciplinary team provided holistic care, improving the patient's quality of life despite the poor prognosis.

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