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Spinal Anesthesia for Emergency Cesarean Section in a Parturient with Newly Diagnosed Multiple Myeloma: A Case Report

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Abstract:

- ***Background***

Multiple myeloma is a malignant disorder characterized by clonal proliferation of plasma cells producing monoclonal immunoglobulins. The disease primarily affects older adults and its occurrence during pregnancy is rare. Anesthetic management in such patients may be challenging due to anemia, renal dysfunction, skeletal involvement, hyperviscosity, and possible coagulation abnormalities.

- ***Case Presentation***

A 28-year-old Indian primigravida at 37 weeks gestation with recently diagnosed multiple myeloma presented in the late stage of labor and required emergency lower segment cesarean section due to fetal distress. The diagnosis was suspected during evaluation for antenatal anemia. Peripheral blood smear demonstrated rouleaux formation and urine examination detected Bence-Jones proteins. Preoperative investigations showed hemoglobin 8 g/dL, platelet count 1.2 ×10⁵/µL, PT/INR 11.2 s / 0.8, and serum creatinine 1.4 mg/dL suggesting possible renal involvement. Spinal anesthesia was performed at the L4–L5 interspace using 12.5 mg hyperbaric bupivacaine with 20 µg fentanyl through a 26-gauge Quincke needle. Adequate sensory block to T4 dermatome was achieved. Intraoperative hemodynamics remained stable with goal-directed fluid therapy. A healthy neonate weighing 2.5 kg with APGAR score 8/10 was delivered. The perioperative course was uneventful. Written informed consent was obtained from the patient for publication of this case report.

- ***Conclusion***

Spinal anesthesia may be safely administered for cesarean section in selected parturients with multiple myeloma when coagulation parameters are normal and there is no evidence of spinal involvement. Careful perioperative evaluation and multidisciplinary management are essential.

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I. INTRODUCTION

Multiple myeloma is the most common primary malignant tumor of bone and accounts for approximately 10% of hematological malignancies. The disease is characterized by proliferation of monoclonal plasma cells in bone marrow and abnormal production of immunoglobulins or light chains.[12] Multiple myeloma predominantly affects individuals older than 60 years, and its occurrence during pregnancy is extremely uncommon.[14] The clinical manifestations arise from bone marrow infiltration, bone destruction, and abnormal immunoglobulin production. Common features include anemia, bone pain, osteolytic lesions, renal dysfunction, and hypercalcemia.[4]

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Patients with multiple myeloma may present several anesthetic challenges including anemia, renal impairment, hyperviscosity syndrome, skeletal fragility, and possible coagulation abnormalities.[24] Vertebral collapse or spinal cord compression due to osteolytic lesions may also complicate the use of neuraxial anesthesia.[56]We report a case of successful spinal anesthesia for emergency cesarean section in a parturient with recently diagnosed multiple myeloma.

II. CLINICAL FEATURES OF MULTIPLE MYELOMA

The clinical manifestations of multiple myeloma can be categorized based on the underlying pathological processes.

➢ *Bone Involvement*

Bone destruction may lead to

- Bone pain
- Osteolytic lesions
- Pathological fractures
- Vertebral collapse and spinal cord compression.[56]

➢ *Bone Marrow Infiltration*

Bone marrow involvement may result in:

- Anemia
- Neutropenia
- Thrombocytopenia.[4]

➢ *Systemic and Metabolic Manifestations*

Systemic manifestations include:

- Hypercalcemia
- Renal dysfunction
- Hyperviscosity syndrome
- Increased susceptibility to infections.[4]

➢ *Investigations in Multiple Myeloma*

Diagnosis of Multiple myeloma involves a combination of laboratory investigations and imaging studies.

Table 1 Typical Investigations Include

Investigation	Typical Finding
Hemoglobin	Reduced due to bone marrow infiltration
ESR	Elevated
Serum calcium	May be elevated
Renal function tests	May show renal impairment
Serum protein electrophoresis	Monoclonal immunoglobulin band
Peripheral blood smear	Rouleaux formation
Urine examination	Bence-Jones protein
Skeletal survey	Osteolytic bone lesions

Radiological skeletal survey is commonly used to detect bone lesions in multiple myeloma.[7]

➢ *Staging of Multiple Myeloma*

The **International Staging System (ISS)** is widely used to determine disease severity and prognosis.[3]

Table 2 Staging of Multiple Myeloma

Stage	Criteria
Stage I	β2-microglobulin <3.5 mg/L and albumin >3.5 g/dL
Stage II	β2-microglobulin 3.5–5.5 mg/L or albumin <3.5 g/dL
Stage III	β2-microglobulin >5.5 mg/L

III. CASE PRESENTATION

A 28-year-old Indian primigravida at 37 weeks gestation presented in the late stage of labor and was scheduled for emergency lower segment cesarean section (LSCS) due to fetal distress. The patient had no other comorbidities. During antenatal evaluation for anemia, further hematological investigations were performed. Peripheral blood smear showed rouleaux formation, and urine analysis detected Bence-Jones proteins, suggesting multiple myeloma. The patient was subsequently evaluated by the hematology department.

➢ *Preoperative Evaluation*

Preoperative laboratory investigations revealed a hemoglobin level of 8 g/dL, platelet count of $1.2 \times 10^5/\mu L$, and a coagulation profile within normal limits with a PT of 11.2

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seconds and an INR of 0.8. Serum creatinine was mildly elevated at 1.4 mg/dL, suggesting possible renal involvement, while serum calcium levels were within the normal range. Clinical examination revealed a normal airway assessment and normal spine examination with no evidence of spinal deformity or neurological deficit. Baseline vital parameters showed a heart rate of 101 beats per minute and blood pressure of 110/77 mmHg. Oxygen saturation was 97% on room air. Urine output was adequate at approximately 1 mL/kg/hour. Based on the systemic condition and underlying hematological disorder, the patient was classified as American Society of Anesthesiologists (ASA) physical status III. After a detailed discussion regarding the anesthetic plan and associated risks, written informed consent for anesthesia and publication was obtained.

➢ *Anesthetic Management*

Upon arrival in the operating room, standard monitoring was instituted including electrocardiography, pulse oximetry, and non-invasive blood pressure monitoring. Intravenous access was secured and 500 mL of Ringer's lactate was administered prior to performing spinal anesthesia. Under strict aseptic precautions, spinal anesthesia was performed in the sitting position at the L4–L5 interspace using a 26-gauge Quincke spinal needle with a single-shot technique. Intrathecal administration consisted of 12.5 mg (2.2 mL) of 0.5% hyperbaric bupivacaine combined with 20 µg fentanyl. Following the injection, the patient was positioned supine with left uterine displacement to prevent aortocaval compression. Adequate sensory blockade up to the T4 dermatome level was achieved prior to surgical incision.

➢ *Intraoperative Management*

Hemodynamic parameters remained stable throughout the surgical procedure. The lowest intraoperative blood pressure recorded was 90/60 mmHg, which did not necessitate the use of vasopressor support. Goal-directed fluid therapy was employed intraoperatively, with approximately 1 liter of Ringer's lactate administered during the procedure. A live neonate weighing 2.5 kg was delivered with an APGAR score of 8 at one minute. Estimated intraoperative blood loss was approximately 250 mL. Following delivery of the neonate, oxytocin was administered as a slow intravenous bolus of 3–5 IU, followed by a maintenance infusion diluted in crystalloid solution to maintain uterine tone. Prophylactic antibiotic coverage was provided with ceftriaxone 1 g administered intravenously. The total duration of surgery was approximately 60 minutes.

➢ *Postoperative Course*

The patient remained hemodynamically stable throughout the postoperative period. Postoperative pain was assessed using a numerical rating scale and was recorded as 6 out of 10. Analgesia was provided with intravenous paracetamol 1 g administered every eight hours. No postoperative complications such as neurological deficit, excessive bleeding, or hemodynamic instability were observed. The neonate did not require admission to the neonatal intensive care unit. The patient was subsequently referred for continued follow-up with the hematology team for further management of multiple myeloma.

IV. DISCUSSION

Multiple myeloma presenting during pregnancy is rare and may present several anesthetic challenges.[24]Bone marrow infiltration may lead to anemia and thrombocytopenia, while osteolytic lesions may cause vertebral collapse and spinal cord compression.[5] Renal impairment due to light chain deposition or hypercalcemia is also a recognized complication and requires careful perioperative fluid management.[4] Neuraxial anesthesia may be contraindicated in patients with coagulopathy, spinal cord compression, or vertebral instability. However, in carefully selected patients with normal coagulation parameters and no spinal pathology, regional anesthesia may be safely administered.[15]

In the present case, spinal anesthesia was chosen because:

- Coagulation profile was normal
- Platelet count was adequate
- Spine examination was normal
- Rapid onset anesthesia was required for emergency cesarean delivery.

The patient demonstrated **anemia and possible renal involvement**, which are known complications of multiple myeloma. Careful intraoperative monitoring and fluid management were therefore employed to maintain adequate hemodynamic stability and renal perfusion.

V. CONCLUSION

Spinal anesthesia may be safely administered in selected parturients with multiple myeloma undergoing cesarean section when coagulation parameters are normal and there is no evidence of spinal pathology. Multidisciplinary collaboration and thorough perioperative evaluation are essential for optimal maternal and fetal outcomes.

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