Case Report

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Ultrasound-guided Femoral Nerve Block for Positioning in a Parturient with Sickle Cell Disease and Hip Fracture: A Case Report

Anaesthesia Section

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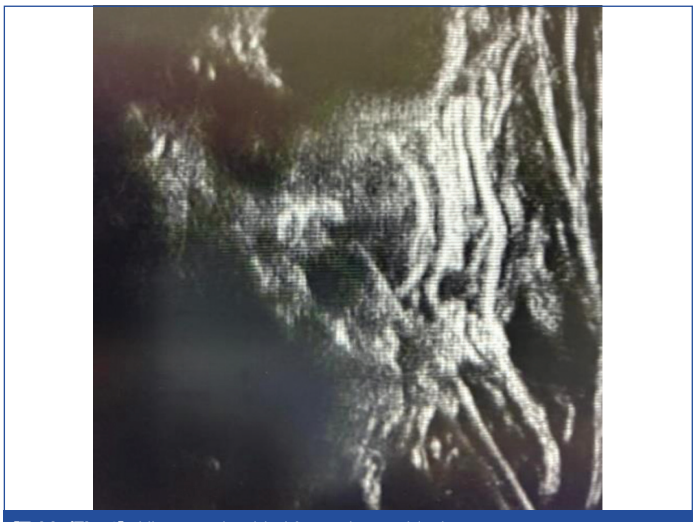
ABSTRACT

The anaesthetic management of parturients with sickle cell disease is fraught with significant challenges, with an increased perioperative risk of complications such as vaso-occlusive crisis, acute chest syndrome, and thromboembolism. An associated orthopaedic injury adds another layer to perioperative planning, demanding an individualised approach to maximise analgesia, enable appropriate positioning for anaesthesia, and ensure haemodynamic stability. This case discusses the anaesthetic management of a 22-year-old primigravida with sickle cell disease and hypothyroidism and a right femoral neck fracture who underwent elective caesarean section. Since positioning for neuraxial anaesthesia would be problematic due to pain and limited mobility, an ultrasound-guided femoral nerve block was performed using 15 mL of 2% lignocaine. This permitted the patient to be positioned in the sitting position for spinal anaesthesia without discomfort. Spinal anaesthesia was administered with 1.6 mL of 0.5% hyperbaric bupivacaine and 25 µg fentanyl, achieving a sensory block up to T6. The intraoperative course was uneventful, and haemodynamics were stable. A healthy newborn was delivered with good Apgar scores. Postoperative care involved adequate analgesia, hydration, oxygenation, and early prophylaxis for thromboembolism. The postoperative course was uneventful, with no sickle cell-related complications, and both mother and infant were discharged in stable condition. The case demonstrates the effectiveness of a combined regional anaesthesia technique in enhancing perioperative management in high-risk obstetric patients. The use of a femoral nerve block as an adjunct to spinal anaesthesia was a valuable, efficient, and safe procedure that minimised pain and enhanced the patient's comfort, contributing to a favourable surgical outcome.

Keywords: Multimodal analgesia, Obstetric anaesthesia, Peripartum sickle cell management, Peripheral nerve block

CASE REPORT

A 22-year-old, American Society of Anaesthesiologists (ASA) II, 36-week gestational age primigravida was admitted with complaints of right hip pain and inability to stand or walk after a slip-and-fall injury at home the day before. X-ray revealed a fracture of the right femoral neck and bipolar hemiarthroplasty was advised. Obstetric examination revealed a single live intrauterine foetus in cephalic presentation with a foetal heart rate of 152 bpm. The patient was diagnosed with sickle cell disease (SS pattern) during pregnancy and had been transfused two units of packed red blood cells in the antenatal period. She had a history of hypothyroidism for 12 years but had discontinued thyroxine during pregnancy. She had no history suggestive of vaso-occlusive crises in the recent past. The patient was scheduled for elective caesarean section. During the preanaesthetic evaluation, her vital parameters were normal. Electrocardiography revealed T-wave inversion in V2, and echocardiography revealed a mildly dilated left ventricle with an ejection fraction of 60%. Laboratory investigations showed a haemoglobin level of 8.5 g/dL, a total leukocyte count of 14.0×10^9/L, and a platelet count of 192×10^9/L. Coagulation profile (INR 1.04) and thyroid function (TSH 2.12 mU/L) were normal. Multidisciplinary clearance was obtained from obstetrics, medicine, cardiology, and respiratory departments. She was on prophylactic Low Molecular Weight Heparin (LMWH) 40 mg subcutaneously during her in-hospital stay, which was stopped 12 hours before the scheduled procedure. Because of the patient's orthopaedic injury and accompanying pain, we anticipated that positioning her for spinal anaesthesia would be challenging and painful. Poor positioning would jeopardise the success of the neuraxial block. Therefore, a right femoral nerve block under ultrasound guidance [Table/Fig-1], with the patient in the supine position, was administered as an initial preemptive measure to make positioning easier. Using an in-plane technique, 15 mL of 2% lignocaine were injected around the femoral nerve in the inguinal region. The patient reported significant pain relief within minutes and could tolerate passive leg movement and sitting positioning without discomfort, enabling smooth and timely administration of spinal anaesthesia. Spinal anaesthesia was given in the sitting position at the L3-L4 interspace with a 25-G Quincke needle. 1.6 mL of 0.5% hyperbaric bupivacaine, along with 25 µg of fentanyl, was injected intrathecally. A sensory block to the T6 level was achieved. The surgery was uneventful, and a healthy baby was delivered with Apgar scores of 8 and 9 at 1 and 5 minutes, respectively. Oxytocin 20 IU was administered intravenously. No vasopressor was needed, and the patient's haemodynamics were stable during the procedure. Normothermia was maintained using warming devices and warm intravenous fluids. Fluids were administered at 120 mL/h to maintain intravascular volume and reduce the risk of sickling.



[Table/Fig-1]: Ultrasound-guided femoral nerve block.

Postoperatively, the patient was observed in the obstetric high-dependency unit. Analgesia was sustained with intravenous paracetamol for two days and oxygen therapy (2 L/min through a nasal cannula for six hours), and hydration was maintained with intravenous fluids at 80 mL/h to avert sickling crises. The femoral block provided good analgesia during the early perioperative period. LMWH was resumed 12 hours postoperatively, and the patient was restarted on thyroxine therapy (thyroxine 100 mcg OD). The mother and baby had an uneventful recovery and were discharged on postoperative day 4.

DISCUSSION

Anaesthetic management of a parturient with sickle cell disease is a unique challenge, arising from augmented perioperative complications such as vaso-occlusive crisis, acute chest syndrome, thromboembolism, and haemodynamic instability. The accompanying femoral neck fracture in the present case heightened this challenge and called for a well-planned approach to anaesthetic management to reduce perioperative morbidity. In present case, management was guided by the need to optimise pain management, allow safe positioning for neuraxial anaesthesia, and reduce the risk of sickle cell complications and orthopaedic injury.

Spinal anaesthesia is the preferred anaesthetic modality for caesarean section in patients with sickle cell disease since it yields rapid onset, adequate anaesthesia with no airway instrumentation, and fewer physiological disturbances compared with general anaesthesia. General anaesthesia, by increasing metabolic demand, oxygen consumption, and drug requirements and by carrying hypoxic risk, has the potential to precipitate vaso-occlusive crises. Hence, regional anaesthesia is a more suitable alternative, as suggested by Bakri MH et al., [1].

The femoral neck fracture presented a significant impediment to attaining an ideal sitting position for spinal anaesthesia, since improper positioning would compromise the neuraxial block success. A preemptive ultrasound-guided femoral nerve block is an excellent adjunct in such patients, in the sense that it facilitates analgesia before positioning, thereby providing a painless and successful neuraxial block, as suggested by Sia S et al., and Hsu YP et al., [2,3]. Using a short-acting local anaesthetic in the femoral nerve block helps reduce movement-related discomfort, promotes greater patient cooperation, and enhances the spinal anaesthesia experience. Additionally, adequate pain relief prevents the physiologic stress response, mitigating catecholamine spikes that may lead to increased oxygen demand and ensuing sickling attacks [4].

In sickle cell disease, intraoperative patient care must provide normoxia and normothermia by using warming blankets and fluid warmers, and hydration since any fluctuation can trigger a vaso-occlusive crisis. Supplemental oxygenation ensures the highest level of tissue oxygen delivery, which minimises hypoxic polymerisation of haemoglobin. Fluid resuscitation should be used to maintain intravascular volume and reduce blood viscosity, minimising microvascular occlusion. Temperature control is equally essential since hypothermia provokes vasoconstriction, which compounds red blood cell sickling and diminishes peripheral oxygen delivery [5].

Thromboprophylaxis also plays a critical role in intraoperative care among such patients due to hypercoagulability from both pregnancy and sickle cell disease. Pregnancy induces a prothrombotic state owing to increased coagulation factors, elevated platelet activity, and reduced fibrinolysis. In sickle cell disease, there is an added risk of chronic endothelial dysfunction, increased blood viscosity, and recurrent microvascular occlusion, contributing to thromboembolism. Coagulation status can be monitored with investigations such as PT/INR, aPTT, and D-dimer. Immobility in the postoperative period and other risk factors, such as recent transfusion or associated cardiac dysfunction, further increase the risk of thrombosis. LMWH initiated early reduces the risk of deep vein thrombosis and pulmonary embolism, thereby reducing maternal morbidity and mortality [6]. Multidisciplinary management is essential in optimising perioperative care in high-risk obstetric patients. The anaesthesiology team must collaborate with other teams to offer comprehensive preoperative optimisation, individualised intraoperative care, and postoperative care [7].

Combining regional anaesthesia techniques, aggressive multifaceted intraoperative monitoring, and thromboprophylaxis is the cornerstone of preventing complications and providing quality maternal and neonatal outcomes. This case reiterates the importance of tailoring anaesthetic care to the unique pathophysiology of sickle cell disease, emphasising the application of multimodal approaches including adequate hydration, proper nutrition, effective analgesia, and thromboprophylaxis to optimise perioperative safety and recovery. The use of regional anaesthesia techniques to facilitate positioning for spinal anaesthesia is described in [Table/Fig-2] [3,8,9].

Study (Year)	Type of nerve block and purpose	Technique description	Conclusion
Present study, 2025	Ultrasound-guided femoral nerve block to facilitate positioning for spinal anaesthesia in a parturient with sickle cell disease and right femoral neck fracture undergoing elective caesarean section	Ultrasound-guided femoral nerve block with 15 mL of 2% lignocaine allowed a comfortable sitting position for spinal anaesthesia; spinal anaesthesia was given with hyperbaric bupivacaine and fentanyl	Femoral nerve block as an adjunct to spinal anaesthesia minimised pain, improved comfort, and enabled safe positioning with an uneventful perioperative course and good maternal and neonatal outcomes.
Ali FM et al., (2024) [8]	Ultrasound-guided suprainguinal fascia Iliaca block to facilitate positioning for combined spinal epidural anaesthesia in acetabular fracture surgery	Ultrasound-guided suprainguinal fascia iliaca block provided analgesia and eased positioning for neuraxial block compared with systemic fentanyl	Suprainguinal fascia iliaca block provided better analgesia, improved sitting angle and positioning quality, enabling a more comfortable and practical neuraxial block than fentanyl.
Hsu YP et al., (2019) [3]	Femoral nerve block for positioning femur fracture patients before spinal anaesthesia	Analysis of observational studies comparing femoral nerve block versus intravenous analgesics for positioning before spinal anaesthesia	Femoral nerve block was effective and safe, significantly reducing pain during positioning, shortening time for spinal anaesthesia, increasing anesthesiologist satisfaction and patient acceptance, especially for patients in the sitting position.
Iamaroon A, (2010) [9]	Nerve stimulator-assisted femoral nerve block versus intravenous fentanyl for positioning femur fracture patients before spinal anaesthesia	Femoral nerve block with 20 mL bupivacaine 0.5%+saline compared to i.v. fentanyl doses before spinal block; pain scores and fentanyl requirement assessed	No significant difference in pain scores or positioning satisfaction between groups; femoral nerve block useful for postoperative pain.

[Table/Fig-2]: Studies that utilised regional anaesthesia techniques for spinal anaesthesia positioning [3,8,9].

CONCLUSION(S)

The anaesthetic management in this patient underscores the pivotal role of pain management for positioning, regional anaesthesia, and multidisciplinary teamwork in maximising perioperative care in high-risk obstetric patients. Using an ultrasound-guided femoral nerve block played a critical role in facilitating positioning for spinal anaesthesia, achieving successful neuraxial blockade, and ensuring an uneventful intraoperative course. Incorporating a multidisciplinary approach, including early thromboembolism prophylaxis and thyroid hormone reintroduction, was necessary

to reduce complications. This case affirms the importance of anaesthetic planning on an individual basis in pregnant patients with sickle cell disease, particularly when additional orthopaedic trauma is present.

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