Case Report

Indian Journal of Anesthesia and Analgesia
Volume 11 Number 1 January - March 2024
DOI: http: //dx.doi.org/10.21088/ijaa.2349.8471.11124.6

Continuous Spinal Anaesthesia for Below Knee Amputation in High Risk Case: A Case Report

Haritha Paranji[1], Ishita Raj[2], Ravi Madhusudhana[3]

How to cite this article:
Haritha Paranji, Ishita Raj, Ravi Madhusudhana. Continuous Spinal Anaesthesia for Below Knee Amputation in High Risk Case : A Case Report. Indian J Anesth Analg. 2024;11(1) 33-35.

Abstract

Introduction: Lower limb ischemia, peripheral arterial disease, and diabetes mellitus are considered the major cause for limb amputations in more than 50% of cases. These patients have increased risk of perioperative mortality and morbidity due to additional comorbidities, such as cardiac diseases.

Continuous spinal anaesthesia (CSA) provides better cardiovascular stability, less local anaesthetic requirement, better control of anaesthesia level and lower risk of local anaesthetic toxicity were reported in the CSA technique compared with a single-dose spinal anaesthesia technique. We reported a high-risk patient who underwent below knee amputation surgery under CSA.

Case Report: This is a 50-year-old male, American Society of Anaesthesiologists (ASA) III, dilated cardiomyopathy admitted for below knee amputation surgery. Preop vitals are stable. Blood investigations are normal. Chest radiography showed cardiomegaly, and echocardiography revealed sinus tachycardia with poor R wave progression and low ejection fraction (EF) of 20%. Continuous spinal anaesthesia was planned for the procedure, during the surgery total amount of fluid given was 40 mL of crystalloids at the rate of 20ml/hr. Intra-op vitals stable. The patient was transferred to post op ward following the removal of spinal catheter. No anaesthetic complications noted.

Conclusion: We reported the successful anaesthetic management of a patient with coronary artery disease and low ejection fraction undergoing below knee amputation surgery. CSA technique with low dose hyperbaric bupivacaine provided safe and effective ananaesthesia with minimal haemodynamic changes for this case.

Keywords: Below knee amputation; Continuous spinal anaesthesia; High-risk patient.

Key Messages: Elderly patients have increased risk for perioperative mortality and morbidity due to additional comorbidities, such as cardiac diseases. Regional anaesthesia techniques are usually preferred in high-risk patients due to some advantages, such as the maintenance of cardiovascular stability and

Author's Affiliation: [1]Second year Postgraduate Resident, [3]Professor, Department of Anesthesiology, Sri Devaraj Urs Medical College, SDUAHER, Kolar 563101, Karnataka, India, [2]Senior Resident, Department of Anaesthesiologist, Jawaharlal Nehru Medical College, Belgaum 590010, Karnataka, India.

Corresponding Author: Ravi Madhusudhana, Professor, Department of Anesthesiology, Sri Devaraj Urs Medical College, SDUAHER, Kolar 563101, Karnataka, India.

E-mail: ravijaggu@gmail.com

Received on: 21.09.2023 **Accepted on:** 01.11.2023

early post-operative mobilisation. This case presents the anaesthetic approach in a 55-year-old male patient with low ejection fraction that underwent below knee amputation. In this present case, continuous spinal anaesthesia with low-dose hyperbaric bupivacaine provided safe and effective anaesthesia during surgery with minimal haemodynamic changes.

INTRODUCTION

Lower extremity amputation is planned to address non-viable lower extremity tissue for many reasons, including ischemia, infection, trauma, or malignancy. Lower extremity amputation serves as a life-saving procedure. Lower limb ischemia, peripheral arterial disease, and diabetes mellitus are considered the major causality of limb amputations in more than 50% of cases. Trauma is the next leading cause of lower extremity amputations.[1]

These patients have increased risk of perioperative mortality and morbidity due to additional comorbidities, such as cardiac diseases, endocrine, respiratory problems. Spinal anaesthesia provides nerve blockade in a large part of the body during surgery with a smaller dose of local anaesthetic and shorter surgery onset time. However, spinal anaesthesia may lead to adverse haemodynamic changes, such as severe and prolonged hypotension in high-risk patients.[2]

Continuous spinal anaesthesia (CSA) provides extending blockade during surgery and versatile pain management during the postoperative period via an indwelling catheter, allowing intermittent injection of local anaesthetic into the subarachnoid space. Better cardiovascular stability, less local anaesthetic requirement, better control of anaesthesia level and lower risk of local anaesthetic toxicity were reported in the CSA technique compared with a single dose spinal anaesthesia technique.[3]

CASE REPORT

A 50-year-old male, 75 kg, 168 cm, American Society of Anaesthesiologists (ASA) III, dilated cardiomyopathy was admitted for below knee amputation surgery: haemoglobin 11.9 g dL, platelets 295,000/mm, prothrombin time 18 seconds, partial thromboplastin time 30 secs, and international normalised ratio 1.30. Preoperative other laboratory findings, including urine examination, blood urea, blood sugar and serum electrolytes, were within normal limits. His blood pressure was 106/80 mmHg, and heart rate was 94 bpm. In general physical examination exertional dyspnea and pedal edema was present for 3 months. Chest radiography showed cardiomegaly, and echocardiography revealed sinus tachycardia with poor R wave progression in V1-V5 and low ejection fraction (EF) of 20%. The cardiologist treated him with Tab. Spirinolactone 25Mg Tab. Atorvastatin 20 Mg, Tab. Carvedilol 3.125 Mg, Inj. Frusemide 0.5 ML/HR medication was provided prior to surgery with repeated doses every 12 hours.

Continuous spinal anaesthesia was planned for the procedure, and written informed consent was obtained from the patient after informing him in relation to the high-risk anaesthetic procedure. Before the procedure of anaesthesia, the patient was given intravenous Ringer's lactate solution at 20ml/ hour via an 18-gauge cannula in a forearm peripheral vein, and standard monitoring, electrocardiography and pulse oximetry, was established in the operating room. His baseline blood pressure was 108/70 mmHg, pulse was 90/ minute and SpO_2 was 97%. The patient was placed in the supine position, and CSA was performed in the L3 -L4 interspace after cleaning and draping. The epidural space was identified with a tuohyneedle, and was advanced through the epidural space until cerebrospinal fluid was observed. Then, the spinal catheter was advanced into the intrathecal space and fixed using sterile tape. After the cerebrospinal fluid was aspirated, 1.5 mg hyperbaric bupivacaine was injected while the patient was in a supine position. The sensory block level was tested using pinprick tests, and motor block level was evaluated with the Modified Bromage scale. Level of T10 was achieved within 10 minutes, and surgery was initiated. The patient was haemodynamically stable during surgery. The operation continued for 120 minutes without complication, During the surgery total amount of fluid given was 40 mL of crystalloids at the rate of 20ml/hr. Intra-op BP was maintainening at 110/80mmHg and Pr between 90-100bpm. At the end of surgery, the patient's blood pressure was 115/75 mm Hg and pulse was 96 bpm; the patient was conscious without pain. The patient was transferred to the intensive care

unit following the removal of spinal catheter. No anaesthetic complications, including postdural puncture headache (PDPH), were observed in the patient during surgery and postoperative period. After he was observed for 24 hours in the intensive care unit, the patient, with a stable clinical status, was transferred to the post op ward. He was discharged from hospital 10 days after his surgery.

DISCUSSION

This case report demonstrates that CSA with low doses of hyperbaric bupivacaine may be safe and effective for below knee amputation surgery in a patient with an ejection fraction of 20%. Patients undergoing below knee amputation have increased morbidity and mortality for surgery due to co-morbidities, such as cerebral, cardiac, renal and respiratory diseases.[1] CSA was preferred in this present case with an ejection fraction of 20% because CSA allows the administration of local anaesthetics in small incremental doses titrated to the patient's requirements, has minimal cardiovascular and respiratory side effects and provides postoperative analgesia, allowing the application of intrathecal local anaesthetics postoperatively.[4] This case report was done to test the safety and efficacy of CSA for elderly high-risk surgical patients.[6] During surgery and the procedure of CSA, hypotension and bradycardia may be observed due to a reduction in systemic vascular resistance and central venous pressure caused by sympathetic blockade.[2] In this present case, we did not observe hypotension or bradycardia during the anaesthesia and surgery procedure. Because, hyperbaric bupivacaine was used in a lower amount; normovolemia was maintained and CSA was applied in the supine position in this present case. Moreover, Lux *et al*.[5] analysed 1212 cases who underwent surgery of the lower extremities with continuous spinal anaesthesia using a 28-gaug microcatheter. They reported no major complications in any of these patients, and they concluded that continuous spinal anaesthesia using a 28-gauge microcatheter appears to be a safe and appropriate anaesthetic technique in lower leg surgery for aged patients. In this presented high-risk patient, CSA was applied using a 18-gauge touhys, and no major complications or puncture headaches were observed.

CONCLUSION

We reported the successful anaesthetic management of a patient with coronary artery disease and low ejection fraction undergoing below knee amputation surgery. CSA technique with lowdose hyperbaric bupivacaine provided safe and effective ananaesthesia with minimal haemodynamic changes for below knee amputation for this case.

Conflict of Interest: None

REFERENCES

1. Adams CT, Lakra A. Below-knee Amputation. In: Stat Pearls Publishing; 2023:PMID:30521194.
2. Moore JM. Continuous spinal anesthesia. Am J Ther. 2009; 16(4):289-94.
3. Maurer K, Bonvini JM, Ekatodramis G, Serena S, Borgeat A. Continuous spinal anesthesia/analgesia vs. single-shot spinal anesthesia with patient-controlled analgesia for elective hip arthroplasty. Acta Anaesthesiol Scand 2003; 47: 878-83.
4. Lux EA. Continuous spinal anesthesia for lower limb surgery: a retrospective analysis of 1212 cases. Local Reg Anesth 2012; 5: 63-7.
5. Kilinc LT, Sivrikaya GU, Eksioglu B, Hanci A, Dobrucali H. Comparison of unilateral spinal and continuous spinal anesthesia for hip surgery in elderly patients. Saudi J Anaesth 2013; 7: 404-9.
6. Sen S, Aydin K, Discigil G. Hypotension induced by lateral decubitus or supine spinal anaesthesia in elderly with low ejection fraction undergone hip surgery. J Clin Monit Comput 2007; 21: 103-7.