

# Popliteal Nerve Block as an Alternative to Spinal Anaesthesia for Ankle Surgery in Co-morbid Patient- A Case Report

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## ABSTRACT

In high-risk patients with significant cardiovascular and other systemic disorders, administration of central neuraxial block or general anaesthesia is usually associated with adverse haemodynamic effects and high perioperative mortality. This case report is about a 57-year-old male patient with known case of Diabetes Mellitus (DM) posted for lower limb debridement. He had comorbidities like cellulitis, sepsis, uncontrolled diabetes, multiorgan dysfunction and was haemodynamically unstable. Peripheral nerve blockade keeps the haemodynamic more stable as compared to central neuraxial blockade and general anaesthesia. Therefore, popliteal nerve block was given to the patient in prone position. Peripheral nerve locator was used and after eliciting the response of foot twitch local anaesthetic drug was deposited. Adequate sensory motor block was achieved and surgery was carried out uneventfully. Patient was vitally stable throughout the surgery. Thus, it was seen that peripheral nerve blocks are an effective alternative to central neuraxial blockade and general anaesthesia in high risk patients undergoing below knee surgeries.

**Keywords:** Debridement, Haemodynamic, Lower limb, Multiorgan dysfunction

## CASE REPORT

A 57-year-old male patient, a known case of uncontrolled DM was on oral hypoglycaemics since two years and defaulted medications, since six months, diagnosed of having DM foot was scheduled for lower limb debridement. His weight was 56 kg and had chronic liver disease since 10 years.

Laboratory investigations showed Hb 8 g/dL, WBC count 24000 cells/ $\mu$ L, Fasting Blood Sugar (FBS) 326 mg/dL, total bilirubin 6 mg/dL, direct 4 mg/dL and indirect 2 mg/dL, Serum Glutamic-Pyruvic Transaminase (SGPT) 1146 units/litre and Serum Glutamic-Oxaloacetic Transaminase (SGOT) 112 units/litre and creatinine 3 mg/dL. Electrocardiogram (ECG) showed T inversion in leads II, III, avF and Chest X-Ray (CXR) showed right-sided middle lobe consolidation.

On shifting to operating room vital recordings were noted; BP was 96/60 mmHg, Heart Rate was 120 bpm, and SpO<sub>2</sub> 94% at room air. Premedications of Inj. Ondansetron 4 mg and Inj. midazolam 1 mg intravenously were given and Inj. Ringer Lactate was started at 100 mL/hr.

Therefore, as the pre-operative workup of the patient suggested severe sepsis and altered renal profile with haemodynamic instability. Administration of central neuraxial block or general anaesthesia is usually associated with adverse haemodynamic effects and high perioperative mortality, so authors decided to give popliteal nerve block instead of conventional central neuraxial blockade or general anaesthesia.

The patient was then positioned prone on the Operation Theatre (OT) table and the legs were fully extended with the long axis of the foot perpendicular to the horizontal plane [Table/Fig-1].

**Procedure:** The skin was cleaned with a betadine solution and local anaesthesia was given with 3 mL of 1% lignocaine with 25G needle at the site of prick for block. Landmarks were located as the tendons of biceps femoris and semitendinosus, the midpoint was taken and 7 cm above the popliteal crease a 50 mm insulated needle attached to the nerve locator was inserted perpendicularly under all aseptic and antiseptic precautions. The desired response was to obtain either planter flexion or lateral inversion with dorsiflexion in response to the stimulation of tibial and common peroneal



[Table/Fig-1]: Landmark and technique of popliteal block in prone position.

nerve respectively. Initially, the current was kept 0.8 mA and then gradually reduced till 0.4 mA after the twitches were achieved. At this point, after negative aspiration for blood, 30 mL of solution consisting of 14 mL of lignocaine with adrenaline 2% solution and 16 mL of bupivacaine 0.5% was injected. Patient was assessed for adequate loss of sensory and motor function and establishment of block by needle prick technique.

The patient was again made supine and femoral area was prepared with aseptic and antiseptic precautions. After palpating and medialising femoral artery the 50 mm nerve stimulator needle was inserted at midpoint of inguinal crease 1 cm below and 1 cm lateral to the pulsation of the femoral artery. Typical response of patellar twitches, also called dancing patella was elicited and 10 mL of solution consisting of 5 mL of lignocaine with adrenaline 2% solution and 5 mL of bupivacaine 0.5% was deposited.

Surgery was uneventfully carried out for 1.5 hours and patient remained haemodynamically stable throughout the surgery with non-significant fluctuations. Later, the patient was shifted to Post-Anesthesia Care Unit (PACU). In PACU also, there was no haemodynamic instability seen in the vitals and average duration of sensory and motor blockade was found to be around 2.45 $\pm$ 0.5 hours and 3.15 $\pm$ 0.8 hours, respectively.

## DISCUSSION

Regional anaesthesia has known to have lesser side effects as compared to general anaesthesia and central neuraxial blockade hence more haemodynamic stability can be achieved with peripheral nerve blocks and found to be useful in patients in whom slightest vital derangements can be deleterious [1,2].

Diabetic patients as in the present case are prone to myocardial, renal ischemia and cerebrovascular infarction, particularly important are coronary heart disease, diabetic nephropathy and autonomic neuropathy; because these may have a direct effect on the development of perioperative complications [3]. Also, the main concern for anaesthetist is to avoid hypoglycaemia perioperatively which usually presents as altered sensorium and drowsiness. With regional nerve blocks, it is easy and convenient to assess the consciousness of the patient [4]. Therefore, with regional nerve blockade it is easier to ensure the consciousness compared to general anaesthesia. Also, patients can resume oral intake sooner with peripheral nerve blocks.

Spinal anaesthesia can cause profound hypotension and lead to hazardous consequences. Also, the risks of infection and vascular damage are more with the use of central neuraxial techniques in diabetic patients [4]. Therefore, peripheral nerve block is promising with lesser complications and more dynamic stability. Tsoutsou MA and Singh SK, have described in their study that using ultrasound guided sciatic popliteal nerve block for emergency forefoot amputation facilitated the emergency procedure with a view to minimising risk to the patient with a previous history like in our case of requiring prolonged vasopressor support and unplanned High Dependency Units (HDU) admission after general anaesthesia [5].

In diabetic patients infection leads to severe sepsis which affects haemodynamics as well as cardiac function causing disturbed vitals

and reduced contractility of heart causing fall in ejection fraction [6]. Anaesthetic drugs worsen this condition by causing vasodilation and thus further reduce cardiac output [7]. In central neuraxial blockade (spinal and epidural) there is sympatholysis which causes hypotension that can deteriorate already existing cardiac dysfunction and it cannot be easily reversed [8].

## CONCLUSION(S)

Patients having co-morbidities like uncontrolled diabetes presenting with septicaemia like in our case are not haemodynamically stable, giving spinal or general anaesthesia in such patients may lead to further derangements in the vitals of the patient. Hence, in such patients peripheral nerve blocks are more promising over general anaesthesia or central neuraxial blocks as regional nerve blocks do not significantly alter the vitals of the patient.

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