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Case Report

Ultrasound-Guided Sciatic and Femoral Block in Patient with Recent Embolism Stroke Undergo Amputation Above the Knee

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ABSTRACT

Background: Patients undergoing amputation of the lower extremities usually have poor circulation and other comorbidities and, therefore, present a challenge to the anesthesiologist. The combination of sciatic and femoral nerve block is reported to be an effective anesthetic technique for patients undergoing knee surgery, and it is known to be an effective method of postoperative analgesia in patients undergoing major surgery on the subject's lower extremities.
Case: A 70-year-old man with a recent embolism stroke, death of his limb on the right cruris region, and underwent an amputation above the knee. Preoperative physical examination showed GCS E4 V, motor aphasia M6, blood pressure 131/82 mmHg, pulse 114 bpm, RR 20 times/minute with bodyweight 70 kg, height 160 cm, SpO_2 97%. There was cyanosis in the right cruric region with motor power of 1/5 1/5. The value of leukocytes 18,600/ul, platelets 309,000/ul, Prothrombin Time (PT) 15.8 seconds, Activated partial thromboplastin time (APTT) 25.9 seconds, International normalized ratio (INR) 1,330, neutrophils 81.7%, lymphocytes 12.6%, creatinine 1.8 mg/dl, urea 137 mg /dl, blood sugar at the time 258 mg/dl, Cl 95 mmol/l. This case report suggests that ultrasound-guided peripheral nerve blocks may be useful for major lower extremity surgery in patients with severe hemodynamic impairment.
Conclusion: Perioperative management of embolism stroke patients undergoing above-knee amputation requires special attention in selecting anesthetics. Ultrasound-guided peripheral nerve blocks minimize patient hemodynamic changes and provide better postoperative pain control.

Keywords: ultrasound-guided, femoral nerve block, sciatic nerve block, embolism stroke, amputation above the knee

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INTRODUCTION

Patients undergoing amputation of the lower extremities usually have poor circulation and other comorbidities and, therefore, present a challenge to the anesthesiologist.[1] Neurocardiovascular disorder in geriatric patients becomes a risk of complications from anesthesia. A peripheral nerve block can provide more stable hemodynamics during surgery than general anesthesia or neuraxial block. The combination of sciatic and femoral nerve block is reported to be an effective anesthetic technique for patients undergoing knee surgery and effective for postoperative analgesia in patients undergoing major surgery on the lower extremities.[2]

The sciatic nerve is formed from the anterior branch of the L4-S3 spinal nerves. Sciatic nerve block creates anesthesia to the skin on the back of the thigh, hamstrings, biceps, parts of the hip and knee joints, and the entire leg below the knee, except for the skin on the medial side of the bottom of the lower limb.[3,4] The femoral neuron fiber is the largest distributary of the lumbar plexus. This nerve is formed by the dorsal portion of the anterior branch of the L2-L4 spinal nerves. Femoral neuron fiber blocks produce anesthetic effects on the thigh anterior and medial, also including the knees. These nerves also innervate the hip, knee, and articulation of the ankle. Sciatic and femoral nerve blocks can block most of the foot. [3,4]

Recently ultrasound-guided regional nerve blocks have become approved and are often used for anesthesia and postoperative pain control. Ultrasound has the advantage of providing satisfactory intraoperative anesthesia results similar to prolonged postoperative analgesia that can last approximately 20 hours. [3] In this case reported, the patient required amputation of the limb above the knee due to of death of the lower limb in the right cruris region. Patients also require continuous anticoagulant treatment for high-risk thrombo-embolism and

poor cardiovascular condition after the recent stroke. Ultrasound-guided peripheral nerve blocks (PNB) can be done as an anesthetic technique to achieve the level of anesthesia with the goal of minimal hemodynamic alteration.

CASE

A 70-year-old man with death on the right cruris region and underwent an amputation above the knee. A patient was recently suffering an embolism stroke. Preoperative physical examination showed GCS E4 V motor aphasia M6, blood pressure 131/82 mmHg, pulse 114 beat per minute, RR 20 times/minute with bodyweight 70 kg, height 160 cm, SpO_2 97%, temperature 36.6ºC. Pupil examination isochore 3mm/3mm, obtained three-finger mouth opening, mallampati second degree, decreased speech articulation, right hemiparesis, motor strength for right superior and inferior was 2222 and left superior and inferior was 5555. There was cyanosis in the right cruris region (Figure 1).

Laboratory examination showed the value of Hemoglobin 16.4 g%, hematocrit 49%, leukocytes 18,600 / ul, platelets 309,000/ul, Prothrombin time (PT) 15.8 seconds, Activated partial thromboplastin time (APTT) 25.9 seconds, International normalized ratio (INR) 1,330, neutrophils 81.7%, lymphocytes 12.6%, creatinine 1.8 mg/dl, urea 137 mg / dl, blood sugar at the time 258 mg / dl, Cl 95 mmol / l. GDS examination on August 27 2020 at 5 am 120 mg / dl, HbSAg nonreactive, Covid-19 rapid test non-reactive. Thorax X-ray showed bilateral pneumonia, aortosclerosis, and cardiomegaly. Head multislice computed tomography (MSCT) without contrast on 13 August 2020 showed lacunar right basal ganglia infarction with prominent calcification of bilateral basal ganglia and cerebellum nuclei dentata suspected Fahr's syndrome and normal intracranial calcification (Figure 2). Electrocardiography on 27 August 2020 showed atrial flutter rapid ventricular response with variable conduction, heart rate 120 bpm, right axis deviation, right ventricular hypertrophy.

Figure 1. Clinical presentation-death of the limb on the right cruris region

Patient with American Society of Anesthesiology (ASA) scores 4 planned for amputation of the limb above the knee due to death of the lower extremity in the right cruris region under ultrasound-guided sciatic and femoral block regional anesthesia. After receiving the family's agreement and ensuring that there are no contraindications above-knee amputation, preoperative treatment during fasting ensures that the 60 cc/hour intravenous supply of Ringer's fluid and oxygenation is sufficient. In the operating room, the patient is placed on his back, and the thighs are slightly turned outward. The standard monitor was installed in accordance with the ASA recommendations. Patient's condition with a blood pressure of 130/82 mmHg, SpO_2 100%, and pulse rate 110 x/minute.

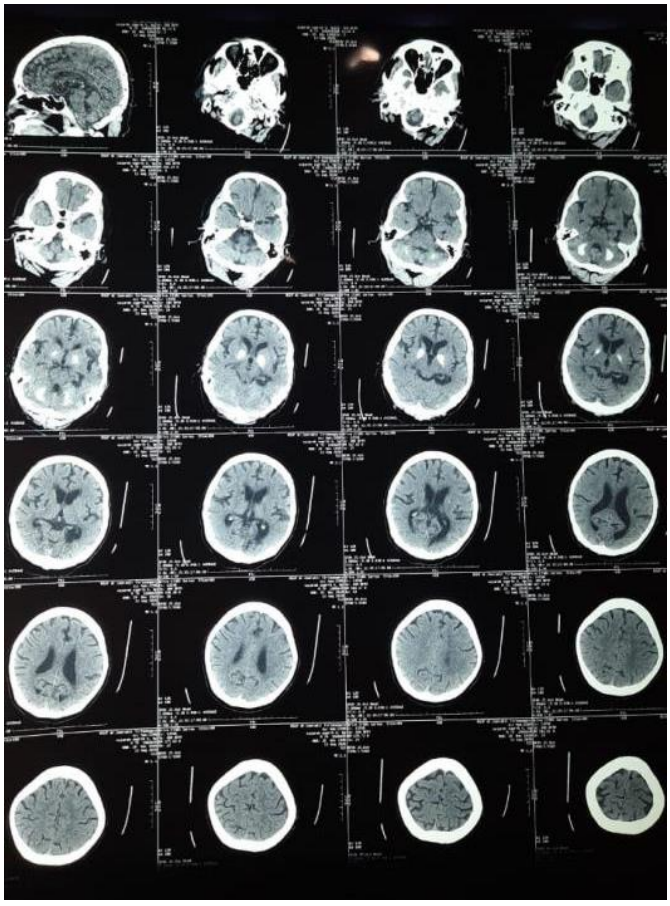

Figure 2. CT scan examination showed lacunar right basal ganglia infarction with prominent calcification of bilateral basal ganglia and cerebellum nuclei dentata

Under ultrasound guide, the transducer is placed transversely withinside the femoral crease, over the femoral artery pulse, and moved slowly lateral-medial to identify the artery. After the femoral nerve is identified, a local anesthetic is carried out 1 cm away from the lateral edge of the transducer. The needle is inserted into the plane with a lateral to medial orientation and advances toward the femoral nerve. After ultrasound identification of the femoral nerve, 20 mL of 1.5% lidocaine was administered to encircle the nerve. The sciatic nerve block is performed lateral to the decubitus position, and the knee is flexed. The sciatic neuron fiber is traced using a transducer and ultrasound (Figure 3). Tilting the transducer in a proximal or distal direction can help improve contrast and bring the nerve into view. Once identified, The needle is usually inserted from the lateral side of the transducer and advanced towards the sciatic nerve. After ultrasound identification of the sciatic neuron fiber, 0.375% ml levobupivacaine was injected. Fifteen minutes after the regional block, the patient no longer felt pain in the extremities and did not show needling sensitivity.

In the recovery room, the patient is given oxygen supplementation, head-up position, monitoring of vital signs, and general condition. There is no complaint of discomfort, and the analgesic effect still works well. After the operation, the patient is admitted to the Intensive care unit (ICU).

DISCUSSION

The appropriate anesthetic technique must be considered in treating a hemodynamically unstable patient. The

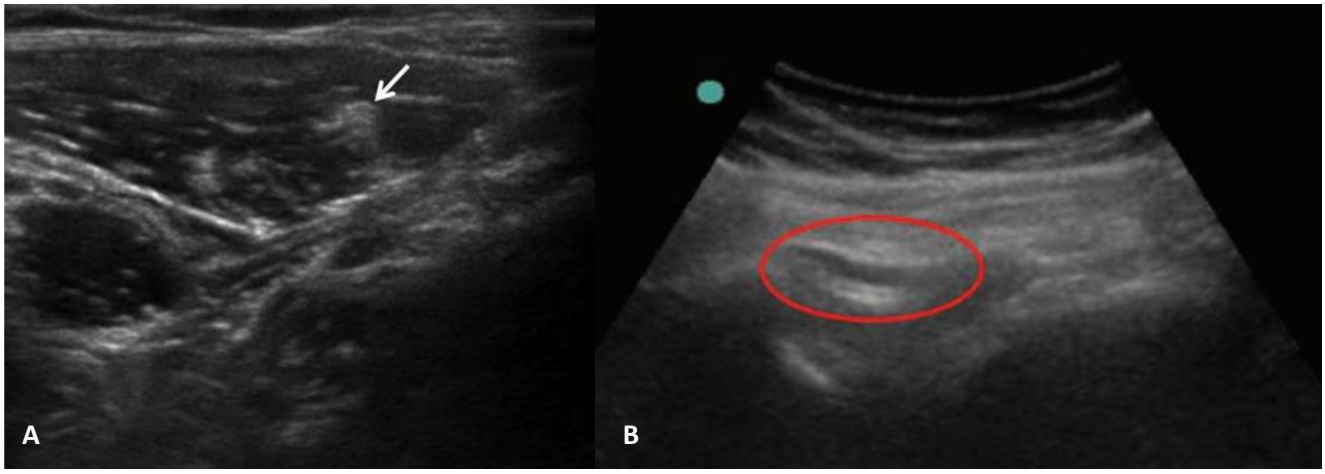

Figure 3. A) Ultrasound guiding femoral nerve (left), B) Ultrasound guiding sciatic nerve (right) [2]

ultrasound-guided peripheral nerve blocks may be helpful for major lower extremity surgery in a patient with severe hemodynamic impairment. Ultrasound-guided peripheral nerve blocks can produce perioperative hemodynamic stability in patients with known poor cardiovascular illness. Additionally, ultrasound help anesthetist to visualize vascular structures, making this method reasonable for patients with coagulopathy and those getting anticoagulation.

Regional anesthetics, including peripheral nerve blocks, are correlated with better pain control, hemodynamic stability, and functional recovery during the perioperative period.[5] Its association with decreased release of pro-inflammatory cytokines such as IL-6, TNF, IL-1, IL-10,[5,6] decreased postoperative venous thrombosis and lower incidence of respiratory complication.[7,8] The study showed that mortality at 30 days was significantly higher in patients who underwent a major lower limb amputation under general anesthesia than regional anesthesia.[9] In addition, two studies showed that general anesthesia is associated with a higher perioperative cerebrovascular incidence than regional anesthesia in orthopedic surgery.[10]

General anesthesia is associated with hemodynamic changes during intubation, possible delay in recanalization time, pulmonary aspiration, and the need for extra medical personnel. Most inhalation of anesthetics is correlated with abnormal heart rhythms. The use of halothane during anesthesia induction and maintenance has been associated with various arrhythmias, including nodal, atrial, and ventricular tachycardia.[11] Duma et al. suggested that corrected QT interval (QTc) prolongation occurs after both spinal and general anesthesia have continued postoperatively. Sevoflurane anesthesia has also been correlated with QTc interval prolongation.[12]

Local anesthesia or sedation can maintain better hemodynamics due to less pharmacological vasodilator administration and allows intra-procedural clinical neurological evaluation, including a lower incidence of after-operative nausea also vomiting, increased postoperative pain relief, early ambulation, and decreased blood loss during surgery. [13]

Ultrasound guidance lowers the incidence of failure, shortens the time required and the latency, longer blockade duration, and reduces the possibility of accidental vascular puncture. Ultrasound is an excellent tool for guiding peripheral nerve blocks, especially in patients taking anticoagulants or in bleeding disorders that become particular challenges to regional anesthesia due to the risk of bleeding complications from vascular lesions, particularly in sites that obstruct compression of the blood vessels. A meta-analysis that compared PNB using ultrasound guidance with classical techniques (paresthesia and neurostimulation) showed a lower occurrence of vascular punctures in cases of ultrasound guidance.[14]

Therefore, most patients taking anticoagulants and/or antiplatelets are admitted for emergency surgery in the operating room. Stopping antiplatelet medication such as clopidogrel and aspirin can lead to complications. Studies show that aspirin withdrawal increases the occurrence of thrombotic events by 3.4%.[15]

This patient has a history of diabetes mellitus and hyperglycemia, which can exacerbate the severity of cerebral ischemia or hypoxia. Intensive intraoperative insulin therapy has been associated with an escalated risk of stroke and death after cardiac surgery, also increased frequency of hypoglycemia post-acute stroke. Lower glucose levels in the acute phase of stroke are related to lower cognitive outcomes. It is suggested that blood sugar levels remain 60-180 mg/dL in patients at high risk for undergoing an operative stroke.

Patients with neurological severe deficits or after major surgery ought to be monitored in the intensive care unit. Postoperative electrolyte disproportion and intravascular volume change can cause arrhythmias. The patient must be observed for electrolyte volume and status, cardiac arrhythmias, systolic disorder, and infection. Prophylactic consideration should be taken to prevent profound vein thrombosis, and if the patient is obtaining anticoagulant or antiplatelet therapy before surgery, it ought to proceed as early as achievable.[12]

CONCLUSION

Perioperative management of recent embolic stroke patients undergoing above-knee amputation requires special attention in selecting anesthetics techniques. Ultrasound-guided PNB minimizes patient hemodynamic changes and produce better postoperative pain control.

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CONFLICT OF INTEREST

None

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