Successful Sciatic Nerve Block for a Patient with Severe Coronary Artery Disease Who Underwent Arterial Thrombectomy

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[Abstract] Few studies have examined the frequency or severity of hemorrhagic complications following plexus or peripheral block in patients on anticoagulant therapy. We report successful anesthetic management by sciatic nerve block (SNB) of a patient with severe coronary artery disease who underwent lower-limb arterial thrombectomy and revascularization. A 72-year-old female with arteriosclerosis obliterans was diagnosed with acute arterial thrombosis and scheduled for emergency surgery. She had heart failure caused by three-vessel coronary artery disease and was taking anticoagulant therapy of warfarin and cilostazol. We performed SNB (popliteal approach) using a single injection of 20 ml 0.5% ropivacaine guided by ultrasound echography. There were no hemodynamic or respiratory disturbances during the operation. She had no local hematoma or neural disturbances during the clinical course, although heparin infusion was initiated perioperatively. Anesthetic management using SNB was successful. Ultrasound-guided SNB could be a useful technique in patients receiving anticoagulant therapy.

Key Words: Sciatic nerve block, Peripheral nerve block, Arterial thrombosis, Lower extremity vascular surgery, Anticoagulant therapy

Introduction

It can be difficult to decide which type of anesthesia to use with high-risk vascular surgery patients receiving anticoagulant therapy. Here, we report a patient who underwent lower-limb arterial thrombectomy and revascularization under sciatic nerve block (SNB).

I Case presentation

A 72-year-old female was admitted to the emergency unit of our hospital with a 2-week history of increasing dyspnea, coughing, and lower-extremity edema. She had a history of arteriosclerosis obliterans, diabetes mellitus, and hypertension. Her medications were warfarin, cilostazol, candesartan cilexetil, lansoprazole, and subcutaneous insulin infusion. She was diagnosed with arterioscle-
Rossi obliterans at the age of 71, and had undergone successful surgical vascular reconstruction (right femoropopliteal bypass surgery with a prosthetic graft) 4 months before admission.

On admission she was diagnosed with acute heart failure, and diuretics were administered. By the 24th postoperative day, all the symptoms of heart failure had disappeared, but she suddenly developed right leg pain with pallor, cyanosis, and lack of pulse. Vascular echography showed total occlusion of the prosthetic graft and the distal artery despite the anticoagulant therapy, so emergency arterial thrombectomy was scheduled. Warfarin and cilostazol were administered until the day of the surgery.

The relevant preoperative laboratory data included a platelet count of $258 \times 10^3/\mu l$, an International Normalized Ratio of prothrombin time (PT-INR) of 1.62, a blood potassium concentration of 5.2 mEq/l, a creatine kinase count of 2,038 IU/l, and a brain natriuretic peptide level of 1,797 pg/ml. A coronary angiography showed severe three-vessel disease accompanied by impaired left ventricular function (ejection fraction of 25%) and moderate mitral regurgitation.

SNB was planned so as to avoid postoperative mechanical ventilation management, the worsening of the heart failure, and hemodynamic instability caused by general anesthesia. The patient was not premedicated before the surgery. She was placed in the left decubitus position and received SNB (popliteal approach) guided by a LOGIQ e unit (GE Healthcare, Tokyo, Japan) and a linear 6-13 MHz probe (12L-RS, GE Healthcare) with a peripheral nerve stimulator. The sciatic nerve was scanned in a transverse plane and followed distally until its bifurcation into the tibial and common peroneal nerves. Nerve blockade was performed immediately proximal to its bifurcation. After negative aspiration, a single injection of 20 ml 0.5% ropivacaine was used for SNB after stimulation at 0.4 mA with a 21-gauge, 100-mm insulated needle (Hakko disposable monopolar nerve blockade needle type CCR: Hakko, Nagano, Japan) through the local anesthetic opening in the skin along the long axis of the probe and in the same plane as the ultrasound beam (in-plane approach). We assessed the progress of the sensory blockade by the pinprick method in the tibial and common peroneal territories. A topical anesthesia was performed before the surgery because the skin incision site was at the medial superior and inferior side of the knee joint.

Intraoperative monitoring was done by continuous electrocardiography, invasive radial arterial tonometry, and pulse oximetry. During the surgery, the patient received 75 μg fentanyl, 3 mg/kg/h propofol for sedation with 5 l/min of oxygen via a face mask, and 1 μg/kg/min nicorandil for prevention of myocardial ischemia. There were no hemodynamic or respiratory disturbances during the 203-min operation. Electrocardiography showed no ST-segment changes. Hyperpotassemia and severe acidosis were not observed after reperfusion. Heparin infusion was initiated at 4,000 U at 30 min and 400 U/h at 3 h 30 min after the SNB. The total blood loss was 610 ml, and 2 units of packed red cells were transfused.

After surgery, the patient was transferred to intensive care. Her hemodynamic status was stable and she was sent to a general ward the following day. The first analgesic was administered 30 hrs after the end of surgery. She had no local hematoma or neural disturbance during the clinical course.
II Discussion

Acute arterial thrombosis is a life-threatening disease. Morbidity and mortality rates are high, particularly in patients requiring significant operative intervention\(^1\). Anticoagulant and antiplatelet therapy is common in the vascular surgery population and often precludes the use of spinal and epidural techniques for anesthetization. In this case, the patient was treated with warfarin and cilostazol, and also needed perioperative heparinization. The safest anesthetic management for this patient was considered to be a combination of an ultrasound-guided SNB and topical anesthesia.

Many anesthetic choices are available for lower-extremity revascularization surgery. Asakura et al. reported successful anesthetic management using an ultrasound-guided SNB combined with a lumbar plexus block\(^2\), and Basagan-Mogol et al. reported the combination of a psoas compartment block, SNB, and T12–L1 paravertebral block for femoropopliteal bypass surgery\(^3\). Our patient needed anesthesia of the medial superior and inferior side of the knee joint, and therefore a lumbar plexus nerve block and a T12–L1 paravertebral block were not required. The popliteal approach we chose may be technically easier than anterior, posterior, and subgluteal blocks, and the needle depth is shallower, making it more comfortable for the patient. In addition, we chose the in–plane approach to avoid involuntarily injury of vessels. We did not perform a femoral nerve block so as to avoid injury of the prosthetic graft.

Few reported investigations have examined the frequency or severity of hemorrhagic complications following plexus or peripheral block in patients on anticoagulants\(^4\). But hemorrhagic complications after deep plexus/peripheral techniques (eg, lumbar sympathetic, lumbar plexus, and paravertebral), particularly in the presence of antithrombotic therapy, are often serious and a source of major patient morbidity. For example, several investigators have reported retroperitoneal hematoma formation after psoas compartment block, and recommend avoidance of deep blocks (such as of the lumbar plexus) in patients on anticoagulants out of concern for incompressible arterial bleeding\(^5\). For anticoagulated patients, the American Society of Regional and Pain Medicine (ASRA) and the American College of Chest Physicians (ACCP) recommend that deep plexus or peripheral blocks be managed similarly to neuraxial techniques (such as spinal/epidural anesthesia). More data are required to determine the safety of popliteal SNB in anticoagulated patients. To prevent hemorrhagic complications, an experienced person performing the procedure as well as post-procedure observation are needed.

The goal of anesthesia in peripheral vascular surgery is to maintain the hemodynamic state and to avoid myocardial ischemia. The incidence of perioperative cardiac morbidity is 10 times greater in vascular surgery patients than in non-vascular surgery patients\(^6\). To the best of our knowledge, no study has assessed the impact of peripheral regional anesthesia on postoperative myocardial ischemia and adverse cardiac events in peripheral vascular surgery in a large number of subjects. Yazigi et al.\(^6\) compared the frequency of intraoperative myocardial ischemia in elective lower-extremity vascular surgery between general anesthesia and regional anesthesia via combined sciatic and femoral nerve blocks, and found that combined sciatic and femoral nerve blocks reduced
the frequency of intraoperative myocardial ischemia. Further studies are needed to determine the usefulness of peripheral nerve block in patients receiving lower-limb revascularization.

We successfully achieved anesthesia by using popliteal SNB for acute arterial thrombectomy of a patient with severe coronary disease. The ultrasound-guided in-plane approach could be a useful technique in patients receiving anticoagulant therapy. An carefully performed procedure by an experienced person as well as post-procedural observation are needed to prevent hemorrhagic complications.

References