

CASE REPORT

Management Anesthesia of Lumbar Plexus Block and Sacral Plexus Block for Hip Disarticulation Due to ALI Rutherford IIB with Severe Cardiac and Pulmonary Problems

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ABSTRACT

Background : Acute limb ischemia (ALI) is a vascular emergency associated with a high risk for limb loss and death. Peripheral artery disease is responsible for 12 to 15% of deaths in Europe. The spectrum ranges from asymptomatic or intermittent claudication to necrosis and limb loss².

Case Illustration : A 68 year old man with a diagnosis of Rutherford IIB acute limb ischemia (ALI) in the left leg presented with complaints of blackening extending to the upper lower extremity. The patient was admitted to the cardiac HCU with a diagnosis of low EF 24%, severe segmental kinetic disorder, LV apical thrombus, LV sec, grade 3 pulmonary edema, pulmonary consolidation sinistra, pneumonia dextra and sepsis. The patient was scheduled for left hip disarticulation. Anesthesia management involved a lumbar plexus block with isobaric bupivacaine 0.5% 20 mL (100 mg) and a sacral plexus block with isobaric bupivacaine 0.5% 15 mL (75 mg). After the hip disarticulation procedure, the patient desaturation until 88%, supplementation oksigen with non rebreathing mask (NRM) at 15 lpm, improving to 95%. The patient was admitted to the ICU. In the ICU, the saturation was 90% with NRM at 15 lpm, so non invasive ventilation (NIV) was used with a pressure support of 5, PEEP of 5 and FiO2 of 100%. The patient also hypoglycemia (23 g/dl). After evaluation with GDS and weaning off NIV, the patient was transferred to the ward with a Numeric Rating Score (NRS) of 1-2. **Conclusion** : The operation lasted for 3 hours with no pain during the procedure and stable vital signs monitoring. Pain evaluation after the operation showed a score of 1-2 using the Numeric Rating Score (NRS).

Keywords : Acute limb ischemia; Hip disarticulation; Lumbar plexus block sacral plexus block.

INTRODUCTION

Acute limb ischemia (ALI) is defined as a disruption of arterial blood flow to an extremity occurring within the previous 14 days and is usually caused by thromboembolic pathology³. ALI results from an acute (<2 weeks), abrupt decrease in arterial perfusion of the limb, and can lead to tissue loss and threaten limb viability¹.

ALI is a vascular emergency and requires quick revascularization by endovascular, surgical, or a hybrid approach to avoid limb loss. About 8 to 10 million Americans suffer from peripheral arterial disease (PAD) with an overall prevalence rate of around 12% in the adult population. Incidence of ALI is rare with 1 to 2 cases per 10,000 persons per year in the general population with higher incidence rates (~1.7%) noted in patients with preexisting advanced PAD. However, prognosis is uniformly poor despite early revascularization with amputation rates around 10 to 15%¹. The incidence of ALI is approximately 1.5 cases out of 10,000 people per year. Complications among ALI patients are high and despite early revascularization, 30 day mortality and amputation rates are between 10 and 15%. Also, ALI patients experience increased in hospital major adverse events including myocardial infarction, congestive heart

failure exacerbation, deterioration in renal function and respiratory complications².

Peripheral regional anaesthesia for hip surgery is related to improved haemodynamic stability and fewer complications compared with general or spinal anaesthesia. Peripheral regional anaesthesia also provides effective perioperative analgesia with minimal use of opioids. Complete anaesthesia of the three main lumbar plexus nerves that innervate the hip region (the femoral, obturator, and lateral femoral cutaneous nerves) can be achieved with a single lumbar plexus block. Combined with an iliohypogastric nerve block and a sacral plexus block, Lumbar plexus block provides effective anaesthesia for hip surgery⁴.

CASE ILLUSTRATION

We report a 68-year-old male patient diagnosed with Rutherford grade IIB ALI at the left lower extremity.

From the medical history, Complaints include blackened foot extending to the upper part of the lower extremity for less than 2 weeks. Current pain or numbness is denied. The patient denies cough, shortness of breath, fever, and runny nose. The patient feels more comfortable sleeping on the left side. Chest pain is denied. The patient has a

history (July 12th, 2023) of shortness of breath, especially during activities, cough, and fatigue. The patient was treated for pneumonia and has a history of Congestive Heart Failure (CHF) with low EF (30%), LV apical thrombus and LV sec with complaints of shortness of breath.

Physical examination revealed a body weight of 60 kg and a height of 165 cm, resulting in a body mass index (BMI) of 20.94 kg/m² (normal weight). Blood pressure was measured at 103/65 mmHg on support NE with dose 0.05 mcg/mnt. with a pulse rate of 72 beats per minute. Respiratory rate was 20 - 22 breaths per minute. The patient's temperature was 36,7 degrees Celsius and oxygen saturation was 98 - 99% on nasal canul 3 lpm (Figure 1)

Examination of the left lower extremity, which had turned black up to the thigh, revealed an absence of pain sensation. No edema was detected, the extremity felt cold, and pulses were not palpable. Lung examination showed diminished breath sounds on the left and vesicular breath sounds on the right. Heart sounds S1-S2 were regular. No swelling was observed in the lower extremities. MET score patient > 4.

Blood laboratory hemoglobin of 10.0 mg/dl, PTT 10.8, APTT 30.6, INR 0.98, albumin 2.23, OT 213, PT 105 and

other laboratory results were within normal limits. On chest X-ray examination, there was grade 3 pulmonary edema, pulmonary parenchymal consolidation, pneumonia dextra and cardiac evaluation was not valid. On the latest echocardiogram, the results showed an apical LV thrombus, LV sec, reduced global systolic function with an EF of 24%, grade 1 diastolic dysfunction, decreased RV systolic function, severe segmental kinetic impairment, mild mitral regurgitation and mild aortic regurgitation.



Figure 1. Chest X-ray examination

The patient was assessed as ASA (American Society of Anesthesiologists) physical status class III with sepsis, pulmonary edema grade 3, pulmonary parenchymal consolidation, pneumonia dextra, EF 24%, apical LV thrombus, LV sec, severe segmental kinetic impairment, mild mitral regurgitation, mild aortic regurgitation, Increased transaminase enzymes, hypoalbuminemia and anemia.

The patient will undergo HIP disarticulation.

DISCUSSION

These plexuses, closely related to one another, are formed by the ventral branches of the lumbar, sacral, and coccygeal spinal nerve⁵.

The most important branches of the plexus are located in a fascial compartment that is enclosed ("sandwiched") by the quadratus lumborum, psoas major, and iliacus muscles. The first lumbar nerve, which contains a branch from the twelfth thoracic nerve, divides into an upper branch (iliohypogastric nerve and ilioinguinal nerve) and a lower branch (genitofemoral nerve). Most of the second, third, and parts of the fourth lumbar nerves form ventral branches, from which the femoral nerve and obturator nerve branch off. The lateral femoral cutaneous nerve is formed from fibers of the ventral branches of L2/L3. The caudal parts of the ventral branches of L4 and L5 combine to form the lumbosacral trunk. Together with the ventral branches of the first three sacral nerves and the upper part of the ventral branch of the fourth sacral nerve, the lumbosacral trunk forms the sacral plexus, the largest branch of which is the sciatic nerve⁵.

Lumbar plexus block has been

used for a number of lower extremity procedures. It has been shown to be particularly useful for femoral shaft and neck fractures, knee procedures, and procedures involving the anterior thigh. However, lumbar plexus block alone cannot provide adequate anesthesia for major surgery of the lower extremity because of the contributing innervation by the sciatic nerve⁶. Complete anaesthesia of the three main lumbar plexus nerves that innervate the hip region (the femoral, obturator, and lateral femoral cutaneous nerves) can be achieved with a single lumbar plexus block. Combined with an iliohypogastric nerve block and a sacral plexus block, Lumbar plexus blok provides effective anaesthesia for hip surgery⁴.

Regional anesthesia allows for specific and long-lasting anesthesia and analgesia at particular locations. It is suitable for many surgical patients and can enhance analgesia while reducing morbidity and mortality after major surgical procedures⁷.

In this case, the patient underwent anesthesia with lumbar plexus block and sacral plexus block. At the beginning of the anesthesia procedure in the operating room, the patient was equipped with standard ASA monitoring, including invasive blood pressure, pulse, oxygen saturation and electrocardiography

monitoring. The patient received oxygen via nasal cannula at a rate of 2 liters per minute, along with sedation using 2 mg of midazolam and intravenous analgesia with 50 mcg of fentanyl.

The patient was then positioned lateral and the lumbar plexus block was performed under ultrasound guidance by placing landmarks for the lumbar plexus block : midline (spinous processes), iliac crest, needle insertion labeled 4 cm lateral to the intersection of landmarks midline (spinous processes), iliac crest. Using a 10 mm nerve stimulator needle inserted perpendicular, using an in plane technique, negative aspiration revealed no blood at the needle tip and hydrolocation was confirmed using 2-3 cc of 0.9% NaCl to ensure needle position and visualize the direction of 0.9% NaCl spread. Subsequently, 20 ml (100 mg) of isobaric 0.5% bupivacaine local anesthetic.

Then to sacral plexus block place a probe of the medial half of a line connecting posterior spina iliaca superior to greater trochanter, slide the probe sideways, in an inferomedial direction towards the natal cleft (parallel shift) a few cm until a break in the continuous bony contour of the ilium is seen. Slide slightly further until the lateral side of the hiatus is formed by the posterior boarder of the ischium, tilt the probe slightly

caudally to image the sacral plexus. Confirmed using 2-3 cc of 0.9% NaCl to ensure needle position and visualize the direction of 0.9% NaCl spread. Subsequently, 15 ml (75 mg) of isobaric 0.5% bupivacaine local anesthetic.

After 15 minutes of local anesthetic administration, the onset of local anesthesia was checked using a pinprick test, resulting in motor and sensory block in the operative area consistent with the anesthesia target.

The surgical procedure HIP disarticulation with a procedure duration of approximately 3 hours. Throughout the operation, the patient's vital signs remained stable on the monitor with sadation dexmetomidine 0.2 mcg/kg/hr durante operation and ketamin intermitten 0.5 mg/kg.



Figure 2. Monitoring vital sign
intraoperative

After the surgery, the patient desaturation down to 88% with crackling sounds in the right lung. Oxygenation was

switched to a non-rebreathing mask (NRM), which improved saturation to 95-97%, and the patient was admitted to the ICU. In the ICU, the patient desaturation down to 90% again, and it was decided to use non invasive ventilation (NIV) with pressure support (Ps) of 5, positive end expiratory pressure (PEEP) of 5 and 100% oxygen (FiO2) (Figure 2). The patient also had hypoglycemia (23 mg/dL). After glucose levels were corrected and normalized, the patient was successfully weaned off NIV and switched back to a nasal cannula. The patient was transferred to the ward after 1 day of ICU care. The patient received paracetamol therapy at a dose of 1g/8h.



Figure 3. Photo pre operative and post operative

Post operation HIP disarticulation the patient's pain score was evaluated using the Numeric Rating Scale (NRS) with a score of 1-2. The analgesic effect of the local anesthetic drug lasted for 15

hours post lumbar plexus block and sacral plexus block without the addition of any other analgesic drugs (Figure 3).

CONSLUSION

The lumbar plexus block and sacral plexus block can be used for procedures for a number of lower extremity procedures. It has been shown to be particularly useful for femoral shaft and neck fractures, knee procedures. In this case, the lumbar plexus block and sacral plexus block provided effective anesthesia and analgesia both during and after surgery, with no hemodynamic fluctuations during the operation. The Numeric Rating Scale (NRS) score was 1-2 post operation with the addition of paracetamol 1g/8h as part of multimodal pain management. The lumbar plexus block and sacral plexus block reduced the use of opioid analgesics and the incidence of nausea and vomiting during the ward stay. It is very important to adhere to the recommended fasting duration to prevent postoperative hypoglycemia. Desaturasi occurs due to suspicion aspiration after sedation is stopped.

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