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REGIONAL BLOCKADES AS A COMPONENT OF MULTIMODAL ANESTHESIA AND ANALGESIA IN AXILLOBIFEMORAL SHUNTING

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РЕГІОНАРНІ БЛОКАДИ ЯК КОМПОНЕНТ МУЛЬТИМОДАЛЬНОЇ АНЕСТЕЗІЇ ТА АНАЛГЕЗІЇ У РАЗІ АКСИЛОБІФЕМОРАЛЬНОГО ШУНТУВАННЯ

Сухонос Р., Суслов О., Осадчук В.

Основним методом лікування пацієнтів з тяжкою ішемією кінцівок є хірургічна реваскуляризація, метою якої є обхід закупорки оклюзованої великої судини шляхом створення альтернативного шляху кровотоку за допомогою штучного трансплантата. Хірургічна реваскуляризація, в тому числі аксилобіфеморальне шунтування (AXFBG) має на меті полегшення симптомів, зниження ризику несприятливих серцево-судинних подій і збереження функції кінцівок. Сучасний розвиток регіонарної анестезії під УЗД-контролем дозволяє ефективно знеболювати пацієнтів в інтра- та післяопераційному періоді та знизити або зовсім відмовитись від використання наркотичних аналгетиків, що прискорює період відновлення пацієнта після оперативного втручання. З огляду на анатомічні ділянки – зони проведення оперативного втручання AXFBG видом анестезії може бути вибрана регіонарна анестезія: блокада грудного нерва Pecs II, Fascia iliaca compartment block, що показала себе ефективною як компонент мультимодальної анестезії та аналгезії.

Ключові слова: Pecs II, Fascia iliaca compartment block, мультимодальна анестезія, регіонарні блокади, судинна хірургія.

REGIONAL BLOCKADES AS A COMPONENT OF MULTIMODAL ANESTHESIA AND ANALGESIA IN AXILLOBIFEMORAL SHUNTING**Sukhonos R., Suslov O., Osadchuk V.**

The main method of treatment for patients with severe limb ischemia is surgical revascularization, the purpose of which is to bypass the blockage of an occluded large vessel by creating an alternative path of blood flow with the help of an artificial graft. Surgical revascularization, including axillobifemoral bypass (AXFBG), aims to relieve symptoms, reduce the risk of adverse cardiovascular events, and preserve limb function. The modern development of regional anesthesia under ultrasound control allows to effectively anesthetize of patients in the intra- and postoperative period and for the reduction or completely abandon the use of narcotic analgesics, which speeds up the patient's recovery period after surgery. Taking into account the anatomical sites-areas of AXFBG surgery, regional anesthesia can be chosen as the type of anesthesia: Pecs II thoracic nerve block, and Fascia iliaca compartment block, which have proven to be effective as a component of multimodal anesthesia and analgesia.

Key words: Pecs II, Fascia iliaca compartment block, multimodal anesthesia, regional blocks, vascular surgery.

Introduction. When plaques accumulate in peripheral arteries and obstruct blood flow, a disease occurs that requires surgical intervention. Thus, the narrowing of the abdominal aorta and common iliac arteries due to atherosclerosis limits the blood supply to the lower extremities, causing such symptoms as intermittent lameness, discoloration of the toes, and trophic ulcers on the skin. The main method of treatment for patients with severe limb ischemia is surgical revascularization, the purpose of which is to bypass the blockage of an occluded large vessel by creating an alternative path of blood flow with the help of an artificial graft. Surgical revascularization is required when behavioral changes are ineffective [1]. In most cases, angiosurgeons use such open surgical procedures as aorta-femoral bypass grafting (AOFBG) and aortoiliac endarterectomy [2], but when, for some reasons, these surgical interventions are not possible or have proven ineffective after repeated attempts, focus on axillofemoral or axillobifemoral bypass (AXFBG). This is an alternative solution to this problem or a palliative procedure. The goal of AXFBG is to relieve symptoms, reduce the risk of adverse cardiovascular events, and preserve limb function.

The AXbiFBG technique is shown in Fig. 1.

Proximally, a transverse subclavian incision is made approximately two fingers below the clavicle and a small part of the proximal axillary artery is freed from the surrounding tissues. The pectoralis major and minor muscles are split. A vertical incision is made distally under the ipsilateral inguinal ligament. The common femoral artery is freed and inspected together with the superficial and deep femoral arteries. Installation of a bifemoral shunt is done according to the same scheme [3].

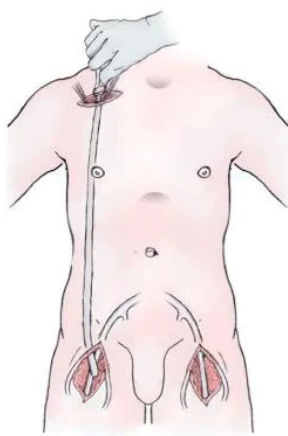


Fig. 1

Taking into account the anatomical sites-areas of surgical intervention, regional anesthesia can be chosen as the type of anesthesia: Pecs II thoracic nerve block, Fascia iliaca compartment block.

The Pecs I and Pecs II thoracic nerve block is a technique for blocking the thoracic nerves, intercostal nerves 3–6, intercostal brachial nerves, and the long thoracic nerve. These blocks can be used for pain relief during various operations on the front chest wall. Pecs I is a large volume interfascial block between the pectoralis major and minor muscles targeting the lateral pectoral nerves [4]. A modified Pecs block or Pecs II block targets the interfascial plane between the pectoralis major and pectoralis minor, just like Pecs I. It also targets the border plane between the pectoralis minor and serratus anterior, to block intercostal nerves 3–6, intercostal brachial, and long thoracic nerves, all of which are necessary for dissection of the axillary node [5]. Local anesthesia is administered between the pectoralis major and minor muscles, as for a Pecs I block, and then between the minor and serratus anterior muscles. The second part of the procedure blocks the anterior cutaneous branches of intercostal nerves 3–6, the intercostal-brachial nerves, and the long thoracic nerve. Pecs I and II units are used to provide regional analgesia for a wide range of surgical procedures, including insertion of breast expanders and inguinal prostheses, ports, pacemakers, implantable cardiac defibrillators, anterior thoracotomy, anterior shoulder surgery, tumor resection, mastectomy [6; 7; 8].

Fascia iliaca compartment block (FICB) is a popular method of regional anesthesia for surgical procedures involving the hip and femur. FICB can be thought of as an anterior approach to the lumbar plexus, where a local anesthetic (LA) is injected proximally under the iliac fascia to block the femoral nerve, obturator nerve, and lateral femoral cutaneous nerve simultaneously. In clinical practice, FICB is a safe and relatively simple alternative to femoral and lumbar plexus blocks. Indications for FICB are perioperative analgesia after femoral neck fracture, hip and knee surgery, and above-knee amputation.

Suprainguinal FICB approach: with the patient supine, a linear high-frequency transducer is placed in the sagittal plane to image the anterior superior iliac spine (ASIS). The probe is moved medially and the fascia of the iliac and tensor's, iliopsoas, and internal oblique muscles is determined. After identifying the "butterfly sign" formed by the muscle fascia, the needle is inserted 1 cm into the inguinal ligament. Using an in-plane approach, the tip of the needle is placed under the iliac fascia and hydrodissection is used to separate the iliac fascia from the iliac muscle. The needle is further advanced in this space in a cranial and slightly dorsal direction. The deep circumflex artery lies superficial to the iliac fascia, and the ascending motion of this artery after injection can be used as a marker of penetration of the iliac fascia [9].

Discussion. A 67-year-old patient has been suffering from Leriche's syndrome for a long time – a blood flow disorder in the lower extremities that appears with severe narrowing or complete blockage of the abdominal aorta at the point where it bifurcates into the iliac arteries. In the anamnesis, there were already attempts to revascularize AOFBG, without the desired effect. The chosen type of surgical intervention is axillobifemoral shunting. The type of anesthesia is multimodal anesthesia, and the type of anesthesia is regional anesthesia: Fascia iliaca compartment block, Pecs II thoracic nerve block.

The general condition at the time of admission is stable and severe. Consciousness is clear. Complaints of pain in the lower limbs, the feeling of numbness in the lower limbs,

and lameness. The skin and visible mucous membranes are pale and dry. Prominent signs of insufficiency of blood flow in the lower extremities were present. Breathing is hard and weakened in the posterior basal parts of the lungs bilaterally. RR= 18/min. SpO2 – 97%. Cardiac activity is rhythmic, heart sounds are muffled. Tachycardia, heart rate = 107 bpm. Hemodynamics is stable. Blood pressure 110/60 mm Hg. The abdomen is not tense, and the symptoms of peritoneal irritation are negative. Urinary system – without features. Comorbidities are hypertensive disease 3 risk 4 crisis course, hypertensive heart 3. Coronary heart disease (CHD): angina pectoris at rest and tension FC 3–4. Atherosclerotic cardiosclerosis. Ventricular extrasystole. Paroxysmal atrial fibrillation. HF2AB. NYHA 3–4.

After induction with Propofol 1% 2 mg/kg, administration of muscle relaxant Atracurium 0.4 mg/kg, and tracheal intubation, followed by mechanical ventilation and transition to inhalation anesthesia with Sevoran, blockades were performed. For blockades, the following were used: Chlorhexidine gluconate, sterile gloves, a high-frequency linear ultrasound sensor with a sterile probe cover and gel, a regional atraumatic needle 22G, 100 mm, a local anesthetic solution of 0.25% bupivacaine.

The Pecs II block was performed in the supine position, with the patient's arm bent at 90 degrees. The probe was placed at the midclavicular line and angled inferolateral to visualize the axillary artery, axillary vein, and second rib. The probe was then moved laterally until the pectoralis minor and serratus anterior were identified. The sensor moved sideways and the third and fourth ribs were identified. The volume of the first injection injected between the pectoralis major and minor muscles was 15 ml of 0.25% bupivacaine. The needle was then advanced under ultrasound guidance, and a second injection of 15 mL of 0.25% bupivacaine was made between the pectoralis minor muscle and the serratus anterior muscle. An aspiration sample before the administration of bupivacaine and after every 5 ml of the injected solution is mandatory to avoid intravascular injection.

FICB under ultrasound control was performed according to the above-mentioned technique using an atraumatic needle, with a single injection of 30 ml of 0.25% bupivacaine with preliminary aspiration and repeated aspiration every 5 ml of injected LA solution.

Fentanyl was used as a component of multimodal anesthesia and analgesia at the time of intubation and during subcutaneous shunt from the subclavian to the iliac. As for the duration of action of these types of anesthesia, the patient began to experience moderate pain sensitivity in the subclavian region in the pectoral region after 11 hours, and in the iliac region – after 10 hours.

Conclusion: regional blockades have proven to be effective as a component of multimodal anesthesia and analgesia, which allows for a significantly reduce number of opioids administered for analgesia in the perioperative period.

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