METHODS OF POSTOPERATIVE ANALGESIA – DORSAL PENILE NERVE BLOCK IN CHILDREN

MAGDALENA DIACONU¹, MONICA ȚÂNȚU², CRISTINA PLEŞA³

¹Clinical County Emergency Hospital Craiova, ²County Emergency Hospital Pitești, ³“Prof. Dr. D. Gerota” Emergency Hospital București

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Abstract: Acute pain may arise from trauma or surgery, its severity indicating the degree of the lesion.(1) In the postoperative evolution of patients, an important part is played by the postoperative analgesia, which must provide the patients with a high degree of comfort. By controlling pain, the postoperative analgesia contributes to a rapid postoperative recovery, it reduces the hospital length, improves the quality of life and the degree of patients' satisfaction. The dorsal penile block has the following indications: circumcision, meatotomy (4) and hypospadias treatment. Regional anesthesia reduced the need for opioids and inhalation anesthetics and may provide prolonged analgesia.

Rezumat: Durerea acută poate apărea în urma unei traume sau a unei intervenții chirurgicale, severitatea ei indicând gradul leziunii.(1) În evoluția postoperatorie a pacienților, un rol important îl are analgezia postoperatorie, care trebuie să ofere bolnavilor un grad ridicat de confort. Prin controlul durerii, analgezia postoperatorie contribuie la o recuperare rapidă postoperatorie, scade durata de spitalizare, crește calitatea vieții și gradul de satisfacție al pacienților. Blocul dorsal al penisului are următoarele indicații: circumcizie, meatotomie (4) și cura hipospadiasului. Anestezia regională scade necesarul de opioide și anestezice inhalatorii și poate asigura o analgezie postoperatorie prelungită.

A method of postoperative analgesia is represented by regional anesthesia. The main techniques of regional anesthesia are: intrathecal or epidural analgesia, peripheral nerve blocks, parietal infiltrations with local anesthetics.

The most commonly used local anesthetics (LA) are tetracaine, lidocaine and bupivacaine, depending on the duration of the procedure and the need for postoperative analgesia.(3) To ensure good muscle relaxation, we prefer high concentrations of anesthetics. The duration of action may be extended by adding adrenaline (up to 10 micrograms/kg) to the used anesthetic.(3)

The height of the block depends on the used dose.

The most of local anesthetics block the voltage channels which are dependent of sodium in the cells, thus preventing their opening and the sodium influx associated with membrane depolarization.(8) The sensitivity to LA depends on the diameter of the axon and the degree of myelination.(8) The potency depends on the fat solubility and the action of LA, as well as the duration of the action is related to fat solubility. If an LA has a pKa near physiologic pH (8) they have a faster action. The higher the lipophilicity is, the longer duration of the action.(8) The systemic absorption is proportional to the vasculature of the injection site: intravenous>tracheal>intercostal>caudal>paracervical>epidural>brachial>plexus>ciatic>subcutaneous.(8) Before any building, monitoring and peripheral venous approach (4) will be secured.

Absolute contraindications to regional anesthesia in children are: the patient’s refuse and local infections and the relative contraindications include anticoagulants, bilateral and intrafalciclar blocks, in children with respiratory pathology, blocks in tibial and forearm fractures.(2) The pediatric regional anesthesia is almost always performed under general anesthesia.(2) According to a study by Oxford University, out of 24,000 of central and peripheral blocks in pediatric patients, the complication rate was of 1,5/1000 (associated to central blocks), with no permanent neurologic damage.(2)

Regional anesthesia techniques:

1. Intrathecal or epidural analgesia.

Spinal analgesia can be achieved by a single injection or by placing a subarachnoid catheter for repeated injections. It is nowadays rarely used because of its associated risks, especially of acute meningitis.

Epidural analgesia consists of placing a catheter into the epidural space where we can continuously administer anesthetics. It is very effective in fighting postoperative pain by blocking all nociceptive afferents. The epidural block blocks Agama and Adelta fibres and C fibres (under pain), without affecting Alfa and Abeta fibres (under motor function, sense of touch and pressure).(5,6)

Administration can be done upon the patient’s request, by continuous infusion or patient controlled administration PCEA (Patient Controlled Epidural Analgesia).

2. Peripheral nerve blocks

They involve the issuing of peripheral nerve blocks (axillary, brachial, intercostal, ilionghinal, dorsal penile, plexus, interpleural), respectively the interruption of sensory conduction (axillary, brachial, intercostal, ilionghinal, dorsal penile, plexus, interpleural), respectively the interruption of sensory conduction in neuroanatomy distal territory well-defined by administering the local anesthetic to the corresponding nerve trunk or in the close properly neighbourhood. This includes intra-articular analgesia and opioid or local anesthetics.

Corresponding author: Diaconu Magdalena, Str. Ion I. Argeșoara, Nr. 6, Bl. C2, Sc. 1, Ap. 11, Craiova, România, E-mail: diaconumagda@yahoo.com, Tel: +40722 297755

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It is to be avoided:
- The blocks in forearm or tibial fractures – which may mask a possible compartment syndrome;(2)
- Bilateral blocks;(2)
- Supraclavicular and infraclavicular blocks in a respiratory compromised patient;(2)
- Block of the sciatic and femoral block with bupivacaine, for example, for knee arthroscopy in an one day stay;(2)

To achieve a peripheral nerve block, they use a nerve stimulator (e.g. brachial plexus block, axillary), thereby reducing the risk of nerve damage.

The dorsal penile block has the following indications: circumcision, metotomy (4) and hypospadias treatment. Penile innervation is provided by the dorsal penile nerve, which originated in the shameful nerve, plus the branches of ilioinguinal nerve, genitofemoral and posterior coetaneous thigh nerve. Dorsal nerves and blood vessels are located deep midline.(3) Anatomically, the child is similar to the adult, except that the distance between the skin and the nerves, epidural space and subdural varies with the body size.(3)

The technical performance of penile block in children: the child is placed in the supine position. The pubic symphysis is felt above the penile root.(2) By means of a 22-233 G needle, the skin in punctured on the midline (4), below the symphysis pubis, it advances easily and vertically until it exceeds the Bucks fascia. Continuous suction is required to avoid intravascular injection. After overcoming the Bucks fascia, the local anesthetic is injected.(4)

To avoid hematoma and intravascular injections, lateral approach is practiced, requiring two seats injections at 0.5 cm lateral to the midline for each point.(4)

The amount of anesthetic is 2 ml in the neonate while in infant and child, there will be added 1 ml per 10 kg, for either side, up to 7 ml.(3) Adrenaline is never used to extend the block duration (4), because the penis has terminal type vascularisation, which may suffer ischemic events.

Penile block in children is performed under superficial general anesthesia or sedation.

3. Parietal infiltration with local anesthetics

Parietal infiltration involves the administration of local anesthetic solution at the level of the nerve endings interested by the surgical wound or at the emerging of the nerves emitting parietal branches. This strategy may allow the development of a small-scale operator gesture at the tummy level, but it is part of the strategy of multimodal analgesia, a concept that involves optimizing postoperative analgesia in patients through combinations of techniques and pharmacological substances designed to bring maximum therapeutic effect with reduced side effects.(7)

Conclusions:

Although regional anesthesia is performed under sedation or superficial general anesthesia, correctly used, it decreases the need for opioids and inhalation anesthetics and may provide prolonged postoperative analgesia.(3) Dorsal penile nerve block provides a sensory block of the penis, it is easy to perform and, at the same time, it is comfortable for the patient.

REFERENCES