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Pediatric use of Pericapsular Nerve Group (PENG) block for hip surgical procedures

Postoperative pain management after open hip surgery in pediatric patients is a challenge. Several nerve blocks have been used with variable results in terms of sustained analgesia and side effects [1,2]. One of the reported regional anesthesia techniques for prolonging analgesia around the hip joint in the pediatric population with good results is the lumbar plexus block [1,2]. However, due to the potential complications such as intestinal and renal puncture, as well as total spinal block, many anesthesiologists avoid its use [1,2].

In a recent study, a new technique for regional analgesia that extensively blocks the anterior hip capsule innervation intended for pain control in hip fractures was described [3]. This state of the art ultrasound-guided technique includes the blockade, in a single-injection, of sensitive branches of the femoral nerve and accessory obturator nerve; the authors named it as the PENG (Pericapsular Nerve Group) block [3].

Ueshima and Otake [4,5] have published their successful and effective clinical experience using the PENG technique in four adult patients for perioperative pain management in hip joint dislocation reduction [5] and total hip replacement surgery [4].

Here, we present our successful experience in perioperative pain control using the PENG block technique as an auxiliary to other regional blocks in one pediatric patient undergoing open hip surgery for osteosynthesis material removal.

An eight years old patient suffered a left femoral fracture secondary to a big metaphyseal cyst. Ten months after the corrective surgery with bone graft and hip osteosynthesis, the patient underwent open hip surgery for removal of osteosynthesis material (OSM).

The patient was placed in supine position and under general anesthesia sustained only with sevoflurane at 0.7 MAC (minimum alveolar concentration), without intraoperative use of opioids neither in infusion nor in boluses.

Then, the PENG block was performed by positioning a high-frequency ultrasound linear probe over the anterosuperior iliac spine and then rotating it 45 degrees to acquire images from lateral to medial of the anterior inferior iliac spine, iliopubic eminence, psoas tendon, and the femoral artery (Fig. 1A). In this case, a linear high-frequency probe was used instead of the curve low-frequency one used by Girón et al. [3] given the characteristic lower depth of the anatomical structures in a child. Then, using a 100 mm and 20 gauge needle and after testing for negative aspiration, 10 ml of a 0.5% solution of bupivacaine containing epinephrine was injected in the space between the psoas tendon and the iliopubic eminence (Fig. 1B).

The femoral and lateral femoral cutaneous (LFC) nerve blocks were

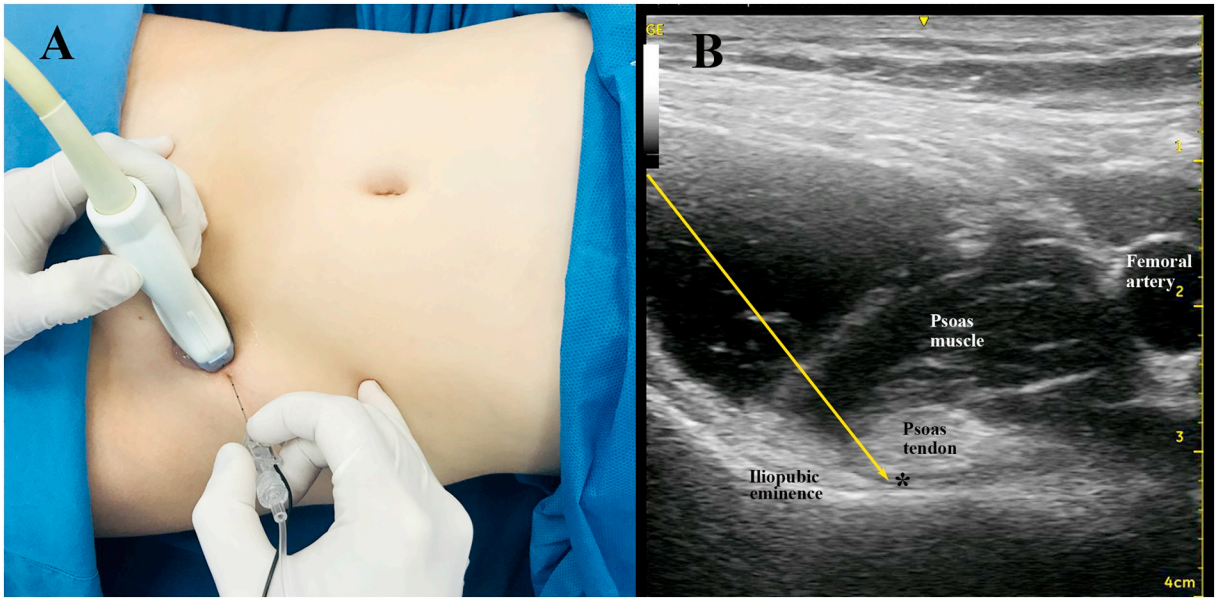

Fig. 1. Probe position and ultrasound image of PENG block. The image shows the position of the ultrasound probe over the anterosuperior iliac spine and the insertion angle of the needle (A) and the landmark structures involved in the PENG block (B). The yellow arrow shows the path of the needle into the space between the psoas tendon and the iliopubic eminence where the solution is injected (marked with an asterisk *). (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

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also performed under ultrasound guidance as follows: the femoral block with 15 ml of a solution containing lidocaine 1% (75 mg) and levobupivacaine 0,75% (55 mg) without epinephrine, and the LFC block with 5 ml of lidocaine 1% (25 mg) plus levobupivacaine 0,75% (20 mg) without epinephrine.

The OSM was retrieved with no complications. The patient did not experience pain at the postoperative recovery area. Up to 72 h after surgery, the reported pain level was 2 out of 10. There was no need for additional analgesia.

In this case, the use of the new PENG block technique for perioperative hip pain control showed to be an effective and satisfactory method for sustained analgesia in a child undergoing open hip surgery. This first experience in a pediatric patient encourages the use of the PENG technique in other hip procedures and conditions in this specific population.

For this case, we obtained written consent from parents and assent from the minor patient. There are no conflicts of interest.

Disclosures

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