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BJAN_2019_567_Case Report

Erector spinae plane block in pediatric orthopedic surgery: two case reports[†]

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Abstract

The erector spinae plane block is a safe and effective regional anesthesia technique, which has earned new indications perioperatively since its description. We introduce two pediatric anesthesia cases in which we performed the erector spinae plane block during intermediate/major orthopedic surgeries. The first patient is a 2 year-old girl submitted to surgical treatment of developmental dysplasia of the hip. The second patient is a 14 year-old boy submitted to surgical treatment of bilateral clubfoot. This last patient is potentially the first published case in which the erector spinae plane block was performed for ankle and foot surgery. Both cases experienced excellent analgesia, avoiding opiate requirement completely.

KEYWORDS

Case report;

Regional anesthesia;

Anesthesia and analgesia;

ESP block

Bloqueio do plano eretor da espinha em cirurgia ortopédica pediátrica: dois relatos de caso

Resumo

O bloqueio do plano eretor da espinha guiado por ultrassonografia é uma técnica segura e eficaz de anestesia regional, que apresenta novas indicações no perioperatório. Apresentamos dois casos de bloqueio do plano eretor da espinha realizados para analgesia de cirurgia ortopédica pediátrica de médio/grande porte. O primeiro: menina de 2 anos submetida a tratamento cirúrgico de displasia do desenvolvimento do quadril. O segundo: menino de 14 anos submetido a correção de pé valgo bilateral. Este último, no melhor do nosso conhecimento, é o primeiro caso de bloqueio do plano eretor da espinha em cirurgia de tornozelo/pé descrito na literatura. Os casos tiveram analgesia pós-operatória adequada, sem necessidade de opioides.

PALAVRAS-CHAVE

Relato de caso;

Anestesia regional;

Anestesia e analgesia;

Bloqueio ESP

Introduction

Regional anesthesia is widely used in pediatric surgery to prevent postoperative pain. Ultrasound-guided peripheral nerve block is a safe regional anesthesia technique and when combined with general anesthesia can provide intra and postoperative analgesia, decreasing or eliminating opioid consumption.

Erector spinae plane block (ESP) is a new regional anesthesia technique that provides analgesia covering the dorsal and ventral rami of spinal nerves. There are few case reports in the literature on the use of ESP block for lower limb surgery, for which it has a promising potential for future indication. We report ESP block in two patients with excellent postoperative analgesia: the first patient was submitted to hip/femur surgery and the second bilateral foot and ankle surgery. Informed consent for publication was obtained from guardians of both children.

Clinical case 1: hip and femur surgery

Female patient, 2 years and 10 months old, 12 kilos, with hip developmental dysplasia, without other comorbidities, no previous surgeries, or use of continuous medication. Clinically, she presented changes in the range of movement and discrepancy in the length of the lower limbs, pain, and limited activity. Surgical repair was proposed. Intraoperative monitoring included ECG, non-invasive pressure, pulse oximetry, capnography and bispectral index. Anesthetic induction started with sevoflurane and after obtaining venous access with a 20G cannula, 36 mcg fentanyl, 1.2 mg cisatracurium and 12 mg propofol were administered. Orotracheal intubation was performed with a 4.0 mm ID cuffed tracheal tube. General anesthesia was maintained with 2% sevoflurane associated with $0.2 \text{ mcg.kg}^{-1}.\text{min}^{-1}$ remifentanyl continuous infusion. Then, the patient was positioned in left lateral decubitus and the ultrasound-guided ESP block was performed at the T12 level on the left side. A 22G Tuohy needle was inserted with the bevel in cephalocaudal direction and 12 mL of 0.3% ropivacaine were injected. The patient underwent open reduction via anterolateral, shortening osteotomy of the proximal left femur and Dega osteotomy of the left iliac. The surgery lasted four hours. During this time, 360 mg cefazolin, 3.6 mg dexamethasone, 360 mg dipyrone, 24 mg ketoprofen, and 1.8 mg ondansetron were administered. The patient remained stable during the procedure, without clinical signs of inadequate anesthesia depth. No other opioid was administered during surgery for postoperative analgesia. In the first 24 hours postoperatively, dipyrone (360 mg every 4h) and ketoprofen (12 mg every 12h) were administered, and no opioid was required. The patient scored 0 on the FLACC scale (Face, Legs, Activity, Cry, Consolability; Note: plastered lower limbs) for pain in the immediate postoperative period, 12 and 24 hours after surgery, and upon discharge. During this period, she was stable, comfortable and without complaints or clinical signs of pain or discomfort.

Clinical case 2: ankle and foot surgery

Male patient, 14 years old, 36 kilos, with cerebral palsy, mild mental disability and bilateral valgus foot, making continuous use of risperidone and valproic acid. Clinically, the patient presented pain and visible and progressive deformity. The proposed treatment was bilateral calcaneus-navicular arthrodesis for valgus foot surgical repair. The patient was medicated with 15 mg midazolam syrup orally and anesthesia monitoring included ECG, oximetry, non-invasive pressure, capnography and bispectral index. Anesthesia was induced with sevoflurane and after obtaining peripheral venous access with a 20G cannula, we administered 108 mcg fentanyl, 3.6 mg cisatracurium and 36 mg propofol. We proceeded with orotracheal intubation using a 6.5 mm ID cuffed tracheal tube. General anesthesia was maintained with 2% sevoflurane associated with $0.2 \text{ mcg.kg}^{-1}.\text{min}^{-1}$ remifentanyl continuous infusion. The patient was positioned in left lateral decubitus and the

bilateral ultrasound-guided ESP block was performed at the L4 level using a Tuohy 18G needle in craniocaudal direction. We injected 10 mL of 0.4% ropivacaine, bilaterally. Adjuvants drugs: 1g dipyrone, 10 mg dexamethasone, 1g cefazolin, 30 mg ketocorolac, 4 mg ondansetron and 35 mcg dexmedetomidine. The surgery lasted 3 hours and was uneventful. The patient remained stable during the procedure, without clinical signs of inadequate anesthesia depth. No other opioid was administered during the surgery or in the first 48 postoperative hours. The patient received only 1g dipyrone every 4 hours. for postoperative analgesia. The FLACC scale score was 0 in the immediate postoperative period 12, 24 and 48 hours after surgery and the patient, remained stable, comfortable and with no signs or symptoms of pain upon hospital discharge.

Discussion

Postoperative pain management in children is challenging. After ultrasound became available, peripheral regional anesthesia has been used more frequently in this setting, often combined with general anesthesia and multimodal venous analgesia.

ESP block is a new technique described by Forero et al.[1] for the treatment of chronic chest pain. The approach blockades somatic and visceral fibers after the injection of local anesthetic between the erector spinae muscle and the vertebral transverse process. Studies on corpses demonstrate a cephalocaudal spread of the injectate towards several dermatomes. It is considered a safe technique, as the injection site is distant from vascular and nervous structures.

We present two cases of medium/large orthopedic surgeries with considerable potential for postoperative pain, in which ESP block in association with multimodal intravenous analgesia provided effective pain control without requiring opioids. The FLACC scale is used to measure pain in children aged 2 months to 7 years and takes into account facial expression, leg movement, activity, crying and consolability. Both patients scored 0, on the 0 to 10 FLACC scale within 24 and 48 hours postoperatively, which associated with no need for opioids, demonstrates the analgesic effectiveness of the block.

In both cases, an epidural block with morphine was considered. However, it was not performed for the potential side effects of morphine on the central nervous system, such as nausea, vomiting, urinary retention and itching. Epidural block with local anesthetic and no adjuvants was not considered because duration of analgesia would be shorter compared to the ESP block. Indeed, as observed in the present report, the ESP block resulted in analgesia for at least 24 hours postoperatively. We also considered other peripheral nerve blocks. In the first case, we opted for ESP block because a single puncture technique would enable us to provide analgesia for both diaphysis and neck regions of the femur, but also to cover the iliac crest, explaining why we chose

the T12 level puncture. In the second case, sciatic nerve and femoral or saphenous nerve blocks were considered. We opted for the ESP block due to the possibility of local anesthetic dispersion to lumbar and sacral roots, the smaller number of punctures and the distance of the needle from nerve structures, when compared to the aforementioned blocks.

The indications of ESP have expanded as successful cases are reported and reproduced in the literature. The first publication reporting the use of ESP block for hip and femur surgery was in adult patients.[2] There are also reports of ESP block in the pediatric population for hip[3,4] and femur[5] surgery with successful analgesia outcome. However, we are not aware of any cases of ESP block performed for ankle/foot surgery, the present being possibly the first. ESP block appears, then, as a potential alternative for analgesia for this type of surgery in the pediatric population, when combined with general anesthesia and multimodal analgesia.

Conclusion

The ESP block provides effective analgesia when associated with other analgesics, without requiring opioids. The patients remained comfortable and without pain in the first 24 and 48 hours after surgery. Both cases add to the literature favoring the potential use of ESP block for hip and lower limb surgery. Moreover, to the best of our knowledge, this is the first case report describing ESP for foot/ankle surgery.

Conflicts of interest

The authors declare no conflicts of interest.

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