(Acta Anaesth. Belg., 2019, 70, 91-93)

Bilateral popliteal and saphenous nerve block for osteotomy and tendon release in a cerebral palsy patient with intrathecal baclofen pump : a case report

S. Coppens (*), D. Hoogma (*), S. Rex (*,**), M. Van de Velde (*,**)

Abstract : We report the use of a bilateral popliteal and saphenous nerve blockade in a patient with cerebral palsy and an intrathecal baclofen pump requiring extensive tenotomies and osteotomies on both feet and ankles.

Keywords : cerebral palsy (CP), epidural anesthesia, baclofen pump, bilateral popliteal, saphenous block.

Introduction

The use of ultrasound guided regional anesthesia techniques compared to nerve stimulator guided techniques allows us to significantly reduce the dose of local anesthetic necessary to achieve an effective nerve block (1). This reduction of dose permits the combination of different blocks in a single patient without reaching toxic concentrations of local anesthetics. This reduction may be of particular interest in patients with contraindications to central neuraxial blocks and/or general anesthesia. We report the case of a patient with an intrathecal baclofen pump who required extensive surgery of the lower limbs in whom we performed a bilateral popliteal and saphenous block for osteotomy and tendon release.

Case report

A 28-year-old male patient with a weight of 44Kg was scheduled for an extensive bilateral feet and ankle surgery. He suffered from severe cerebral palsy (CP), grade V of the Gross Motor Function Classification System (GMFCS) (2). His medical history revealed the presence of an intrathecal device with baclofen release in order to relieve muscle spasms for 9 years. Previous surgical interventions included multilevel pelvic and femoral osteotomies and tenotomies and were complicated in the postoperative period by severe delirium and restlessness, possibly induced by significant pain requiring the administration of high doses of opioids and sedatives. Because of the previous complicated postoperative courses and the obvious need for efficient pain control, we decided to perform a bilateral ultrasound guided popliteal and saphenous nerve block using very low volumes of ropivacaïne 0.5% under general anesthesia.

At the arrival in the operating theatre, standard hemodynamic and respiratory monitoring werer set up. Anesthesia was induced with inhaled sevoflurane. A large-bore intravenous access was obtained, and an endotracheal tube was placed after intravenous administration of propofol, sufentanil and mivacurium. Anesthesia was maintained with sevoflurane and sufentanil. The patient was then positioned in the dorsal decubitus position with flexed knees.

Under ultrasound guidance with a 12 Mhz linear probe (Sonosite, Fujifilm BV, Amsterdam, The Netherlands) and, using two different Stimuplex A 50 mm, 24 Gauge needles (B. Braun Medicals Inc., Betlehem, USA) with a lateral in-plane approach, we anesthetized both sciatic nerves at their bifurcation into tibial and peroneal nerves with an injection of 7ml of ropivacaïne 0.5% on each leg. The simultaneous use of nerve stimulation showed loss of motor response at a current intensity inferior to 0.4 mA on both sides.

After this step, the saphenous nerve was bilaterally anesthetized via a transsartorial in-plane technique with 4 ml ropivacaine 0.5% under the fascia around the deep femoral artery (Fig. 1). A total volume of 22 ml of ropivacaïne 0.5% was

Steven Coppens MD ; Danny Hoogma MD ; Steffen Rex MD, PhD ; Marc Van de Velde MD, PhD, EDRA
(*) Department of Anesthesiology, University Hospitals of the KU Leuven, Herestraat 49, 3000 Leuven, Belgium.
(**) Department of Cardiovascular Sciences, KU Leuven, Herestraat 49, 3000 Leuven, Belgium.
Corresponding author : Steve Coppens, MD, Department of Anesthesiology, University Hospitals of the KU Leuven, Herestraat 49, 3000 Leuven, Belgium.
E-mail: steve.coppens@uzleuven.be

Paper submitted on Nov 08, 2017 and accepted on Mar 20, 2019.
Conflict of interest : None

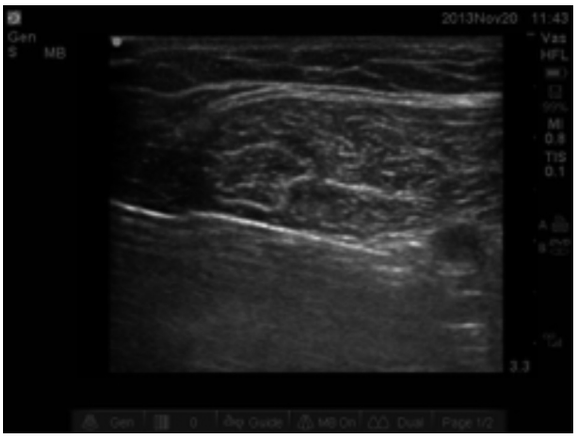

Fig. 1. — Transsartorial approach to the saphenous nerve.

administered for the four blocks, equal to 110 mg of ropivacaïne (2.5 mg/kg).

We did not choose to use continuous infusion because the patient was known to remove IV lines and catheters due to his mental condition and his non-compliance. Considering that all adjuvants usually used in perineural mixture are strictly off-label and should be considered as possible neurotoxic, we opted for adding 10 mg of IV dexamethasone in an attempt to prolong the duration of the peripheral nerve blocks (3). Moreover, acetaminophen (30 mg/kg) and ketorolac (0.5 mg/kg) were administered as part of a multimodal approach for postoperative analgesia. According to our institutional practice in patients with CP, diazepam 0.1 mg/kg was administered prior to the emergence from anesthesia.

General anesthesia was uneventful and the patient seemed very comfortable in the recovery room with no obvious distress or pain. No sedative or opioid was required. During the day-after -surgery visit on the ward, the patient was calm and in non-apparent pain. No opioid was given to the patient during the first 48 hours after surgery .

The patient was discharged at home on day 8 after an uneventful postoperative course.

Discussion

CP patients are known to suffer from significant co-morbidities that complicate the adequate treatment of pain. Respiratory insufficiency, nausea and vomiting and an increased incidence of tracheobronchial aspiration, especially in the presence of known gastro-intestinal reflux and/or dysphagia, are the main reason for which clinicians often hesitate to administer opioids to these patients. Another important aspect in CP is the communication difficulty with the patients due to their mental status. Cognitive impairment and behavioral problems can complicate the objective assessment of pain and its relief.

Baclofen, a $GABA_B$-receptor agonist, limits the afferent input on motor neurons at the dorsal spinal horn and is used for the treatment of muscle spasms. Because of its low permeability through the blood brain barrier, a high dose-therapy is needed in case of oral administration. Dose-dependent side-effects of baclofen, including nausea, vomiting, or sleeping disorders, necessitate in most CP-patients the placement of an intrathecal baclofen pump in order to significantly reduce the administered doses..

Although epidural anesthesia could help to avoid some of the aforementioned problems in patients with CP requiring surgery, the use of epidural anesthesia for patients with a baclofen pump remains controversial. Major complications include epidural/meningeal/device-associated infection, damage to the baclofen pump during the insertion of the epidural catheter, entwining of the catheter with the pump and possible interactions between epidurally administered drugs and baclofen. Even if the safe use of epidural anesthesia in patients with a baclofen pump has been reported by several authors, evidence that could support routine use of epidural analgesia in these patients is scarce (4, 5). In our center, we consider central neuraxial techniques as contraindicated in patients with a baclofen-pump because of the possible complications.

To our knowledge, the use of a combined bilateral popliteal and saphenous nerve block has not been yet described in the literature. Unilateral use of a combined popliteal and saphenous nerve block has been previously described (6). But, these cases are rarely published. The introduction of ultrasound for the placement of the locoregional block allowed us to use 4 blocks in the patient with a total amount of local anesthetic lower than previously used in single nerve block techniques, improving safety and efficacy significantly (7).

Although some publications report that low-volume ultrasound-guided nerve blocks provide inferior postoperative analgesia compared to higher volume landmark techniques, other authors were unable to find a direct link between the duration of action and the total administered dose (8, 9). In fact, we achieved efficient analgesia in our patient for apparently more than 24 hours.

Due to their uncooperativeness, regional anesthesia in CP patients has to be performed under sedation or general anesthesia. Therefore, the use of ultrasound not only increases the likelihood of

success, but also contributes to safety as nervous structures can be directly visualized and nerve injury probably minimized.

One of the main problems in this particular case is the difficulty in objectively assessing comfort and pain. The doses of opioids (and sedatives) administered postoperatively are a surrogate for the quality of the achieved pain relief and allow us to assume that pain relief in our patient was probably adequate, despite the impossibility of a formal assessment of the VAS score.

Conclusion

We describe the case of a patient with CP for whom four separate nerve blocks were effectively and safely placed under ultrasound-guidance. This technique could become an alternative in patients for whom central neuraxial anesthesia is not desirable, or even contra-indicated, provided that it is performed by an experienced operator under direct visualization of the target nerves.

References

1. Latzke D., Marhofer P., Zeitlinger M., Machata A., Neumann F., Lackner E. et al. 2010. Minimal local anaesthetic volumes for sciatic nerve block: evaluation of ED99 in volunteers . Br. J. Anaesth. 104: 239-244.
2. Bodkin AW., Robinson C., Perales FP. 2003. Reliability and validity of the gross motor function classification system for cerebral palsy. Pediatr. Phys. Ther. 15: 247-252.
3. Desmet M., Braems H., Reynvoet M., Plasschaert S., Van Cauwelaert J. and Pottel H. et al. 2013 I.V. and perineural dexamethasone are equivalent in increasing the analgesic duration of a single-shot interscalene block with ropivacaine for shoulder surgery: a prospective, randomized, placebo-controlled study. Br. J. Anaesth. 111: 445-452.
4. Ali Sakr Esa W., Toma I., Tetzlaff JE. and Barsoum S. 2009. Epidural analgesia in labor for a woman with an intrathecal baclofen pump. Int. J. Obstet. Anesth. 18: 64-66.
5. Piper NA., Flack SH., Loeser JD. and Lynn AM. 2006. Epidural analgesia in a patient with an intrathecal catheter and subcutaneous pump to deliver baclofen. Paediatr. Anaesth. 16: 989-992.
6. Donohue CM., Goss LR., Metz S., Weingarten MS. and Dyal LB. Jr. 2004 Combined popliteal and saphenous nerve blocks at the knee: an underused alternative to general or spinal anesthesia for foot and ankle surgery. J. Am. Pediatr. Med. Assoc. 94: 368-374.
7. Marhofer P., Harrop-Griffiths W. and Kettner SC. Kirchmair L. 2010. Fifteen years of ultrasound guidance in regional anaesthesia: Part 1. Br. J. Anaesth. 104: 538-546.
8. Fredrickson MJ, White R and Danesh-Clough TK. 2011. Low-volume ultrasound-guided nerve block provides inferior postoperative analgesia compared to a higher-volume landmark technique. Reg. Anesth. Pain Med. 36: 393-398.
9. Riazi S., Carmichael N., Awad I., Holtby RM. and McCartney CJL. 2008 Effect of local anaesthetic volume (20 vs 5 ml) on the efficacy and respiratory consequences of ultrasound-guided interscalene brachial plexus block. Br. J. Anaesth. 101: 549-556.