

Combination of neuraxial and peripheral regional anaesthetic techniques in a multimodal analgesia regimen – case report

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Dear Editor,

Choosing the right anaesthetic technique and postoperative analgesia after major surgery can be a great challenge for paediatric anaesthetists, especially when younger children are concerned. The simultaneous use of systemic analgesics with adjuncts in combination with single-shot blocks performed at the right time may facilitate the patient's recovery and result in a comfortable postoperative period.

Current guidelines recommend individualised pain management strategies and support the use of multimodal regimens offering effective pain relief, reduced incidence of postoperative respiratory complications, and promoting faster return of gut function and feeding [1–3]. Potentially, these goals can be achieved with the use of continuous epidural anaesthesia. However, in young children, it requires the addition of sedatives. Different combinations of multimodal techniques have been proposed, but only a few have been evaluated

in high-quality trials [1, 4]. Through this paper, we would like to report a successful selection of multimodal therapy for an extensive orthopaedic procedure affecting both legs.

This case report describes an 18-month-old female, weighing 9.2 kg, with bilateral fibular hemimelia Paley type 3c with a fixed equinovalgus deformity and shortening of both lower limbs. The SUPERankle technique, which is a combination of bone and soft tissue procedures, was selected to address all deformities and stabilise the feet. The surgery was performed under tourniquet control and comprised tarsal tunnel decompression and distal tibial osteotomy with shortening osteoplasty and tibiofibular syndesmosis reconstruction to realign the ankle joint. The osteotomy was fixed with a plate and screws (Figure 1), wounds were closed in layers.

After the induction of general anaesthesia, a single-shot caudal epidural anaesthesia was attempted. Following skin disinfection with the patient in the lateral decubitus position, the caudal epidural anaesthesia was accomplished using anatomical landmarks. Nine millilitres of 0.2% ropivacaine was injected via a 22G paediatric needle with a 32° Crawford type bevel. According to the multimodal paradigm, despite the successful neuraxial block, 100 mg acetaminophen, 100 mg metamizole (Metamizole Kalceks, Akciju sabiedrība "Kalceks", Rīga, Latvia), and 2 mg dexamethasone were administered in adjuncts. In total 90 mcg of fentanyl was used

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FIGURE 1. Anteroposterior radiograph of the lower extremities following the SUPERankle procedure

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for induction (30 mcg) and maintenance (60 mcg) of general anaesthesia. Surgery was completed without complications. The duration time of general anaesthesia calculated from tracheal intubation to the removal of an endotracheal tube was 5 hours and 40 minutes.

Before the end of general anaesthesia, a bilateral ultrasound-guided subgluteal sciatic nerve block was attained as described below.

With the patient in the left lateral decubitus position for the right-sided block, and the right lateral decubitus position for the left-sided block, the skin was disinfected.

The linear high frequency transducer (15–7 MHz) was positioned to identify the sciatic nerve. The echogenic needle (22 G × 50 mm with facet tip, dull version) was inserted in-plane from the lateral aspect of the thigh, and advanced towards the sciatic nerve.

The proper position of the needle tip was confirmed by the circumferential perineural spread of the local anaesthetic. Two mL of 0.2% ropivacaine was injected into each side.

After 15 minutes, the patient was extubated and transferred to the Post-anaesthesia Care Unit (PACU).

During the first 24 hours after surgery, the vital signs, respiratory status, sedation, and pain were monitored according to the standard hospital protocols. Acetaminophen and metamizole were administered by the clock, and nurse-controlled opioid analgesia with nalbuphine was commenced. Nurses utilised a descriptive behavioural pain scale assessing facial, vocal, and bodily pain expressions. The scale contains of five different levels of pain intensity. While pain reached the third level (restrained movements, withdrawal movement, restrained interaction with the environment, complaint of pain) the rescue analgesic was administered.

During the first 24 hours after surgery, the patient received 400 mg acetaminophen, 300 mg metamizole, and 4 mg nalbuphine. The patient started to drink 90 minutes after admission to the PACU. Total oral intake

at that time was 230 mL. No episode of nausea or vomiting was observed. In the early postoperative period, the patient remained calm and slept well throughout the night without the need for rescue analgesics or additional sedatives. Satisfaction with pain management, as assessed by the patient's parents, was high.

This case report highlights the strength of the multimodal pain management approach. From the very beginning, a variety of analgesic medications was offered to the patient. Efficient techniques were commenced before tissue injury occurred. Systemic opioid and nonopioid analgesics, as well as adjuvants, were administered. The selection of the regional technique was adjusted to the area of pain sensation at each stage of the treatment.

Because both legs from the thighs to the ankles needed to be covered by regional anaesthesia during the SUPER-ankle procedure, the single-shot caudal epidural anaesthesia was chosen.

After surgery a long-lasting effect in the region below the knees was desired. Analgesia from the sciatic nerve block performed using ropivacaine 0.2% in children aged between 1 and 16 years lasted 17.3 ± 5.4 hours (95% CI: 14.4–20.2) in a report by Dillow *et al.* [5]. For this reason, the more complicated and time-consuming bilateral sciatic nerve block was chosen over the easy-to-perform caudal block.

Due to the presence of dressings reaching up to the mid-thighs, the sciatic nerve block at the popliteal fossa was infeasible. That is why the subgluteal approach was chosen.

As advised in the literature, local anaesthetics were placed where the nerves were best visualised in ultrasound [3].

The total dose of ropivacaine administered in all locations, over the course of five hours, was 26 mg (2.8 mg kg^{-1}). This was less than the maximum recommended safe dose of ropivacaine – 3 mg kg^{-1} .

Continuous epidural anaesthesia that covers all regions affected by the procedure both during and after surgery is frequently chosen for ortho-

paedic surgeries. In an 18-month-old child, the need to maintain an epidural catheter in place usually implies an additional use of sedatives at the risk of consequences such as difficulties with feeding, nursing, delirium, or respiratory complications.

Low requirement for analgesics in the postoperative period probably cannot be explained only by the action of the peripheral nerve block. The long-acting amide local anaesthetic agent – ropivacaine – according to its pharmacokinetics does not cover the whole postoperative period, but in combination with systemic analgesics and adjuvants it might exert a preventive effect. The painstaking multimodal analgesia regimen might prevent central and peripheral sensitisation manifesting as hyperalgesia or allodynia.

Our patient benefited from high-quality pain control, minimal discomfort related to the pain treatment, and the lack of need for sedation. As a consequence, the postoperative period was uneventful, and the patient was discharged home three days after the surgery.

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