



Intermittent bolus via infraclavicular nerve catheter using a catheter-over-needle technique in a pediatric patient

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To the Editor,

Continuous peripheral nerve blocks (PNB) are challenging to administer successfully in the pediatric population due to the general uncooperative nature of pediatric patients. Typically, catheters are placed preoperatively under general anesthesia, putting the anesthesiologist under time pressure to place the catheter successfully and providing only one chance to place the catheter since re-installation of a dislodged catheter following surgery would require additional anesthesia.¹ Postoperatively, there is an increased risk of PNB pump-catheter systems being inadvertently detached upon increased patient activity. A catheter-over-needle technique has been used to place per neural catheters successfully in adult patients.^{2,3} We describe a novel use of the catheter-over-needle technique to administer a PNB successfully in an anesthetized pediatric patient as well as to manage postoperative pain effectively with intermittent boluses of local anesthetic. Consent to describe this case was provided by the patient's parents.

A five-year-old 20-kg female presented for open-wedge osteotomy and excision of approximately one-third of her distal radius. Using an aseptic technique, an ultrasound-guided infraclavicular PNB was administered using an 18G 75-mm catheter-over-needle set (MultiSet UPK NanoLine 21156-40E, Pajunk, Germany) via an in-plane approach (Figure A). Using a dosage regime similar to that

previously reported for single-injection brachial plexus block,⁴ a solution of 0.375% ropivacaine 6 mL was injected between the axillary artery and the lateral cord. After positioning the catheter tip posterior to the axillary artery and the nerve (Figure B), an additional 6 mL of solution were injected. The catheter was then fixed to the patient's anterior chest (Figure C).

Postoperatively, the patient was comfortable and had complete sensory and motor block in all terminal nerve distributions. About seven hours following the initial injection of local anesthetic in the operating room, the patient was comfortable with a visual analogue pain scale score of 2/10 and showed complete sensory block for all peripheral nerves and partial motor blockade of the musculocutaneous nerve. Full motor function of the rest of the peripheral nerves was observed. At this time, a bolus of 0.2% ropivacaine 7.5 mL was given pre-emptively for pain. The patient also received scheduled doses of oral acetaminophen and intravenous ketorolac. Twenty-four hours after the first postoperative bolus, the patient was comfortable with full motor function. A second bolus of 0.2% ropivacaine 3.5 mL was administered, and the catheter was removed. The patient was discharged four hours later without complications.

As shown previously in adults,^{2,3} the catheter-over-needle method offers improved ease of use and increased stability and flexibility compared with traditional designs. Importantly, the catheter-over-needle technique closely resembles the straightforward act of placing an intravenous catheter and features no additional steps compared with the single-injection technique. This is particularly relevant since PNB in anesthetized children usually involves time pressure when performing blocks in the operating room. In this case, the operator (A.S.) had limited experience with the catheter-over-needle assembly yet was able to perform

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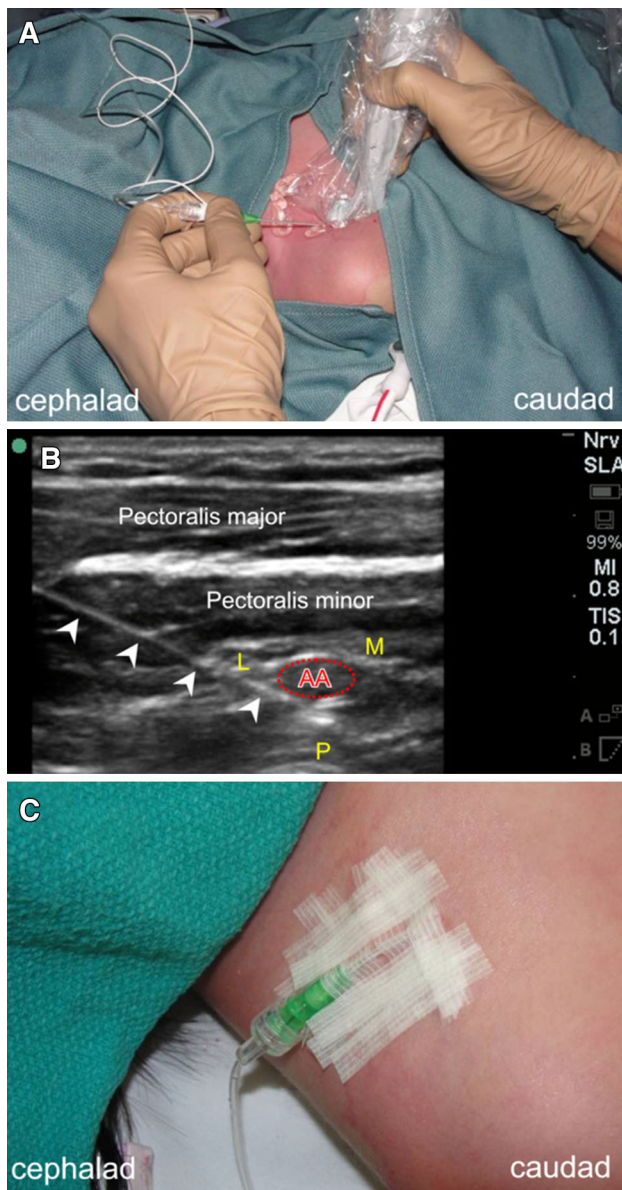


Figure Ultrasound-guided infraclavicular block. A) In-plane insertion of catheter-over-needle unit. B) Catheter position after securing to patient. C) Ultrasound image showing needle position relative to brachial plexus (L = lateral cord; P = posterior cord; M = medial cord) and axillary artery (AA) prior to injection of second 7-mL bolus of local anesthetic (see text). The catheter-over-needle unit is indicated by arrowheads

the PNB quickly (less than ten minutes) and efficiently, avoiding delay of surgery. Due to the fixed length of the outer catheter, it is important to pre-determine the depth of the target structure and to select an appropriate catheter-over-needle set based on the ultrasound finding.

In children, single-injection infraclavicular blocks provide four to six hours of analgesia,⁴ suggesting that an intermittent bolus technique is a viable and feasible option. We have administered successful supraclavicular blocks in adults using this technique,² and intermittent bolusing for axillary block was shown to provide effective analgesia and motor block with lower plasma levels of local anesthetic when compared with continuous infusion.⁵ The intermittent bolus method eliminates the need for physically connecting the catheter to a pump, making this option attractive in pediatric practice since the patients' increased activity heightens the risk of the catheter being pulled out inadvertently.

This case serves to remind clinicians that intermittent bolusing via a perineural catheter can be a plausible and effective alternative to continuous infusion. It also alerts pediatric anesthesiologists to the recent success of the catheter-over-needle method in the adult population and its easy adaptation for pediatric use.

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Conflict of interest The Pajunk MultiSet 211156-40E is modified and re-designed by Ban Tsui. Dr. Tsui also has a patent-licensing agreement with Pajunk.

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