⬠ Letters to the Editor

Ultrasound Guidance for Brachial Plexus Localization and Catheter Insertion After Complete Forearm Amputation

To the Editor:

Brachial plexus block is used commonly for intraoperative and postoperative anesthesia and analgesia for upper-limb surgery. Patients may benefit from superior analgesia and reduced requirements for systemic opioids. Beyond that, the sympatholytic effect of peripheral-nerve block is thought to improve vascular flow and perfusion.[1] This effect may be desirable in patients with vascular anastomoses; for example, after reimplantation of amputated limbs.

We encountered a case in which the use of conventional endpoints (distal muscle twitches, transarterial approach) for a brachial-plexus block was not possible, and successful placement of a brachial-plexus catheter was only feasible through the use of ultrasound.

A patient with complete amputation of the forearm underwent a reattachment procedure. At the end of the procedure, the surgical team and the anesthesiologists agreed that continuous brachial-plexus block would greatly benefit the patient with regard to postoperative analgesia and the potential for improved vascular perfusion, but the procedure was considered to carry significant risks. Potential needle injury to the subclavian or axillary artery during blind insertion was a relevant risk because the patient was coagulopathic after major blood loss. Nerve localization and eliciting a distal motor response with a peripheral-nerve stimulator was impossible because of the forearm amputation. Under ultrasound guidance, placement of an infraclavicular brachial-plexus block catheter posterior to the artery was possible by use of the modified coracoid approach,[2] without any complications. The catheter was successfully used for surgical analgesia when re-exploration of the anastomosis became necessary on the same day and provided good pain relief for the first 8 postoperative days, when it was removed. As perfusion of the arm had deteriorated in the preceding days, a new catheter was inserted as per surgical request. This catheter was repositioned in the axilla for fear of infection developing at the original skin site. Because no palpable axillary arterial pulsation occurred, placement was performed by use of a peripheral-nerve stimulator–guided, ultrasound-assisted technique. Ultrasound imaging allowed for easy visualization of the artery. Five days later, the patient experienced pain, and the catheter was thought to be dislodged. It was safely replaced by an infraclavicular catheter, again under ultrasound guidance and without complications.

Another 2 days later (postoperative day 15), the patient again experienced pain, and local anesthetic leakage, presumed to come from the catheter-insertion site, was noted. After removal of the dressing, no evidence for leakage from this site was seen. Rather than replacement of the catheter, 20 mL of lidocaine 2% was injected under direct ultrasound observation to identify the position of the catheter tip. It was visualized immediately posterior to axillary artery. The injection also demonstrated good spread of local anesthetic posterior to the artery in a pattern previously observed to provide effective anesthesia and analgesia. At the same time, a leak at the distal connector-site end of the catheter was identified. The connector was changed and local anesthetic infusion resumed. The catheter remained in situ for a further 4 days. Continuous brachial-plexus block was finally discontinued on postoperative day 19 and the catheter removed after successful titration of oral analgesic medication.

Despite maximum medical treatment, the perfusion of the distal limb deteriorated further, and signs of infection developed. Unfortunately, on the 12th postoperative day, the forearm had to be amputated at the site of injury under general anesthesia.

In conclusion, ultrasound-guided, brachial-plexus catheter insertion and evaluation repeatedly facilitated accurate continuous deposition of local anesthetic and allowed for an avoidance of complications.

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doi:10.1016/j.rapm.2006.10.003

Lateral Popliteal Sciatic-Nerve Block Made Easy

To the Editor:

The association of sciatic-nerve and saphenous-nerve blocks has proved extremely efficacious in providing sur-

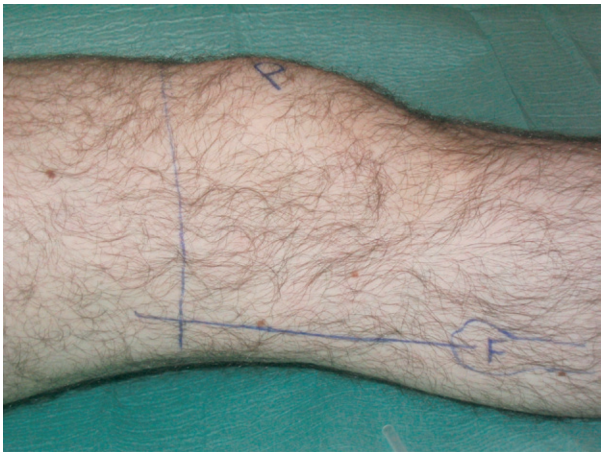

Fig. 1. Surface landmarks for lateral popliteal sciatic-nerve block. The intersection of the 2 lines represents the puncture site. P, patella; F, fibula.

gical anesthesia for foot and ankle surgery. Identification of surface landmarks for the lateral popliteal sciatic-nerve block depends upon the accurate location of the groove between the lateral border of the vastus lateralis muscle and tendon of the biceps femoris muscle.[1-3] This process can be challenging, particularly in the muscular or obese patient, and maneuvers designed to accentuate the groove necessitate mobilization of what might be a traumatized limb. We propose the fibula as a fixed landmark that is easily palpable in all patients, regardless of body habitus, and that, more significantly, does not require limb mobilization for identification.

With the patient in a supine position, the ipsilateral lower limb is placed in the anatomic position with the foot at a 90° angle to the horizontal plane of the table. The head of the fibula is identified, and a line parallel to the long axis of the fibula and horizontal to the plane of the table is traced proximally at this level. A second line is traced laterally from the upper edge of the patella. The needle insertion site is defined as the intersection of these two lines (Fig 1). The stimulating needle is advanced in the same direction and the block performed in the same manner as previously described.[1,2]

This minor modification to the classically described approach of lateral popliteal sciatic-nerve block is a simple technique that relies on clear, easy identifiable landmarks. The need to mobilize the potentially traumatized limb is eliminated, making block performance easier for patient and physician alike.

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doi:10.1016/j.rapm.2006.10.004

Eight Ball, Corner Pocket: The Optimal Needle Position for Ultrasound-Guided Supraclavicular Block

To the Editor:

The supraclavicular approach to the brachial plexus (BP) can provide excellent anesthesia for upper-extremity surgery. When compared with the axillary block, the supraclavicular approach to the brachial plexus offers a distinct advantage, specifically, faster onset of a dense block with a single injection using less local anesthetic.[1] However, many anesthetists prefer not to perform this technique for fear of causing a pneumothorax. To minimize the risks of pneumothorax and vascular puncture, different supraclavicular approaches have been described,[2,3] but concern about pleural injury persists. Ultrasound (US)-guided supraclavicular block has changed this reality. A real-time image of the needle tip, nerves, pleura, and vessels, at least theoretically, increases the safety of this technique. US guidance also improves the quality of the block and shortens the time taken to perform the procedure.[4]

It has been our experience that US-guided supraclavicular block is most easily performed using a 22-gauge, 5-cm needle and advancing it from a lateral to medial direction along the long axis (i.e., in-plane view) of a high frequency (e.g., 10-13 MHz) linear probe placed obliquely in the supraclavicular fossa.[5] To further reduce the risk of pleural puncture, some practitioners in our group advance the needle in a medial to lateral direction, such that the needle tip is oriented away from the cupola of the lung.[6] In this view, the subclavian artery is imaged as a pulsatile hypoechoic round structure, and the divisions of the brachial plexus can be easily visualized immediately lateral to the artery and superior to the first rib. The target for needle tip placement is the corner bordered by the subclavian artery medially, the first rib inferiorly, and the divisions of the brachial plexus superior laterally (Fig 1). Depositing local anesthetic at this point causes the divisions of the brachial plexus to float superiorly (Fig 1B). Our experience suggests that when local anesthetic bathes the inferior-most portion of the BP divisions, a dense and complete block of the entire upper extremity ensues within minutes. Indeed, to date, we have performed more than 200 US-guided supraclavicular blocks using this technique with excellent success. We have found that surgical anesthesia for