Case Report

Supraclavicular continuous peripheral nerve block in a wounded soldier: when ultrasound is the only option


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The complex nature of combat-related injuries requires frequent operative interventions and prolonged analgesic therapy. The application of continuous peripheral nerve block (CPNB) has been an important anaesthetic tool in the management of combat soldiers wounded from the current conflicts. The severe, destructive nature of combat injuries makes placement of CPNB difficult or impossible using more common neurostimulation approaches. The use of ultrasound technology has improved our success in placing CPNB in the presence of such injuries. We report the application of ultrasound technology in placing CPNB in a combat-injured soldier, whose injuries precluded other CPNB options.

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Trauma involving multiple extremities with frequent amputations is common in the current military conflicts. Regional anaesthesia has become an important anaesthetic intervention for both surgical and pain management of these casualties at Walter Reed Army Medical Center (WRAMC). The complex nature of combat injuries often requires frequent operative intervention and prolonged pain control. Regional anaesthesia, particularly continuous peripheral nerve block (CPNB), is appropriate in many combat-related injuries. The use of CPNB allows rapid establishment of analgesia sufficient for surgical interventions and provides excellent pain control while decreasing the need for opioids and other pain medications after operation. The extent and severity of combat injuries can make placement of CPNB catheters challenging. Amputated limbs limit the usefulness of nerve stimulation in confirming correct needle placement. Phantom stimulation can facilitate CPNB catheter placement in amputee patients though this can be difficult for both the patient and physician.

The use of ultrasound technology provides real-time anatomical evaluation and guidance of CPNB needles for catheter placement. Other authors demonstrated decreased block latency and improved sensory and motor block when ultrasound guidance is used compared with other block placement methods. We report the successful use of ultrasound-guided supraclavicular block in a war casualty who sustained multiple combat wounds precluding the use of peripheral nerve stimulation. This case demonstrates the utility of ultrasound-guided peripheral nerve block in managing traumatic injury.

Case report

A 24-yr-old male (ASA I, 150 cm, 82 kg) sustained multiple traumatic injuries from an improvised explosive device (IED) to include a mandibular fracture, a left above the elbow amputation, a left above the knee amputation and significant injury to the right lower extremity to include a peroneal nerve injury. While awaiting air evacuation to WRAMC from Landstuhl, Germany, the patient underwent a closed reduction of his mandibular fracture with fixation and a tracheostomy. Upon arrival to WRAMC, the patient was unable to speak, but was able to indicate with his right hand that he did have significant pain [verbal analogue score (VAS) of 8/10, where 0=no pain and 10=worst imaginable pain] in his left arm. He was undergoing multiple irrigations and debridements of his left upper extremity amputation site along with his other injuries.
We elected to place a left supraclavicular CPNB to facilitate surgical management and provide long-term pain control of the amputated limb. Because of the patient’s amputation and limited communication abilities, peripheral nerve stimulation was felt inappropriate for this patient. The patient was sedated (midazolam 5 mg and fentanyl 250 μg) and the skin cleaned with chlorohexidine solution. Lidocaine 1% was used to anaesthetize the skin in the area of needle insertion. Using the Micromaxx™ (SonoSite Inc., Bothell, WA) with high frequency probe (HFL38/13-6), we saw the supraclavicular brachial plexus divisions lateral to the subclavian artery (Fig. 1). Using an 18 gauge Contiplex® CPNB needle (B. Braun Medical Inc., Bethlehem, PA), we saw the entire length of the needle, passed it parallel to the ultrasound probe, into the centre of the brachial plexus. A total of 40 ml of mepivacaine 1.5% was administered.10 The local anaesthetic was observed to surround all six divisions of the brachial plexus (Fig. 2).

Using hand signals, the patient indicated a post-CPNB placement VAS of 0/10. His initial catheter infusion rate was 10 ml h⁻¹ of ropivacaine 0.2% with a demand dose of 3 ml every 20 min. The following day, the patient’s medical record indicated an average VAS of 2/10 after CPNB catheter placement.

Discussion
This case report demonstrates the value of ultrasound in localizing the supraclavicular brachial plexus in a patient in whom landmark-based nerve stimulation would be difficult or impossible. Using only the ultrasound, the plexus was accurately seen and anaesthetized in an amputated extremity. This patient had multiple morbidities (an amputated extremity, an inability to speak and sedation) that limited the use of nerve stimulation. This case report illustrates the complexity of war-related injuries and the availability of ultrasound-guided nerve localization provided an accurate and effective method for CPNB placement.

Risk associated with the supraclavicular technique should always be considered when contemplating this modality. Some of these risks include, but are not limited to, infection, haematoma, nerve damage, inadvertent intravascular injection and pneumothorax.11–13 The value of direct visualization of the CPNB needle can help to minimize and perhaps eliminate some of these risks.

This case illustrates the potential advantages of ultrasound-guided CPNB in multiple trauma patients who might otherwise not be considered candidates for regional anaesthesia. Recent advances in the portability and cost of ultrasound technology make these devices attractive additions to the peripheral nerve block equipment inventory.

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References