

Delayed Horner's syndrome following ultrasound-guided interscalene brachial plexus block

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ABSTRACT

We describe a case of Horner's syndrome that occurred shortly after post-operative bolus administration of interscalene brachial plexus analgesia.

Key words: *Bupivacaine, interscalene block, ultrasound regional block*

INTRODUCTION

The interscalene approach to the brachial plexus block as described by Winnie,^[1] is a valuable anesthetic technique for shoulder surgery because it can provide intraoperative anesthesia as well as prolonged post-operative analgesia. Performance of these blocks; however, may be associated with side-effects, such as temporary paresis of the phrenic or recurrent laryngeal nerves^[2] or Horner's syndrome,^[2,3] and complications such as pneumothorax,^[3] hematoma,^[2] epidural^[4] or spinal anesthesia,^[5] loss of function of the cervical spinal cord^[6] or injection into the vertebral artery.^[7]

CASE REPORT

A healthy 29-year-old man (weight 75 kg, height 169 cm, American Society of Anesthesiologists class 1) was scheduled for elective arthroscopic repair of a left

shoulder Bankart lesion. Aside from the orthopedic injury, the patient's history, physical examination, and laboratory data were normal. He was given 2 mg of lorazepam orally 2 h before arriving in the operating room. On arrival to the operating room, an 18-gauge venous cannula was inserted and the patient was connected to standard monitoring equipment, an oxygen face mask (5l/min) and was intravenously given 2 mg of midazolam. The patient was positioned supine with his neck extended to the contra-lateral side to facilitate performance of an ultrasound (US) interscalene brachial plexus block (ISBPB). After skin preparation with povidone-iodine and infiltration with lidocaine 1%, US-ISBPB was performed. An 18-gauge, 2-inch insulated needle (B. Braun Medical Inc., Bethlehem, PA, USA) was inserted into the middle scalene muscle immediately superior to and out of the plane with the L38 × 10⁻⁵ MHz transducer linear array. A 9 cm scan depth probe was used to visualize the brachial plexus using an M-Turbo US machine (SonoSite, Bothell, WA, USA). In the middle portion of the scalene muscle, the needle was redirected anteriorly and advanced toward the interscalene space. Normal saline (1-2 ml) was injected in increments into the anterior border of the middle scalene muscle to expand the fascial plane between the brachial plexus and the middle scalene muscle. While intermittently aspirating under direct US visualization, 10 ml of 0.25% bupivacaine was injected into the interscalene space.

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A 20-gauge catheter was then inserted into the skin through the thin-walled needle to a depth of 10 cm. To locate the catheter position before placement of a clear adhesive dressing, 0.5 ml of air was injected after negative aspiration while imaging the interscalene space. The US image clearly demonstrated echogenic contrast entering the interscalene space, thereby confirming appropriate positioning of the catheter. The surgical procedure was performed under general anesthesia using the propofol, fentanyl, and cis-atracurium with the patient in a beach chair position. Following an uneventful two-hour surgery, the patient was extubated and moved to the recovery room. Analgesia was maintained with a top-up of 0.2% bupivacaine every 8 h through the interscalene catheter. Free from pain and resting comfortably, the patient was discharged from the recovery room. Eight hours after the initial bolus (visual analog pain scale 1-2 at rest), the patient received 10 ml 0.2% bupivacaine, which was administered through the interscalene catheter by the on call team. One hour later, the patient developed Horner's syndrome on the ipsilateral side, including meiosis, ptosis, enophthalmia, anhydrosis, and conjunctival hyperemia. No swelling around the site of catheter insertion was noted. The catheter was withdrawn immediately and symptoms of Horner's syndrome disappeared approximately 2 h later. Analgesia was then changed to paracetamol and non-steroidal anti-inflammatory drugs.

DISCUSSION

Transient Horner's syndrome is a well-known side-effect of stellate ganglion block, interscalene block of the brachial plexus and occasionally, epidural analgesia.^[8] However, there are some reports in the literature of long-lasting Horner's syndrome following interscalene plexus anesthesia.^[9,10] Horner's syndrome results from paralysis of the ipsilateral sympathetic cervical chain (stellate ganglion) caused by surgery, drugs (mainly high concentrations of local anesthetics), local compression (hematoma or tumor) or inadequate perioperative positioning of the patient. The location of the lesion along the oculo-sympathetic pathway determines whether the Horner's syndrome is central, pre-ganglionic or post-ganglionic.^[11] Central Horner's syndrome is caused by damage to the first-order neuron within the central nervous system and is usually associated with other neurological signs and symptoms. Pre-ganglionic Horner's syndrome results from a lesion of the second-order neuron that emerges from the spinal cord and ascends the cervical sympathetic chain to synapse in the superior cervical ganglion. Finally, post-ganglionic Horner's syndrome results from damage to the third-order neuron that emerges from the superior cervical ganglion, follows the carotid plexus into the skull and is carried into

the orbit with the ophthalmic division of the trigeminal nerve.

The interscalene catheter has greatly facilitated the management of post-operative pain therapy after major open shoulder surgery. In fact, studies have shown that a continuous infusion of local anesthetic through an interscalene catheter, compared with traditional patient-controlled analgesia with opioids, provides significantly better pain control with a statistically lower incidence of side-effects and greater patient satisfaction.^[12] The recent development of a stimulating needle, a stimulating catheter and the use of US guidance,^[13] may make the placement of continuous catheters less cumbersome. Depending on the type of surgery performed, the catheter may be used for 3-5 days. Complications associated with interscalene catheters that are left in place include ipsilateral Horner's syndrome,^[10] or ipsilateral and contra-lateral Horner's syndrome,^[14] and partial sensory and motor deficit of the ipsilateral lower limb if catheters are misplaced into the epidural space.^[15] In our patient, ipsilateral Horner's syndrome from interscalene block developed 8 h after catheter activation.

CONCLUSION

To minimize the risk of such a complication during continuous interscalene block, we recommend that regardless of whether catheters are inserted with US or nerve stimulator guidance, they should be activated in the operating room immediately after insertion to help in earlier identification of undesirable side-effects.

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