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Case Report
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Prolonged Interscalene Blockade for 30 Hours with 0.5% Plain Bupivacaine in a Case of Shoulder Arthroscopy

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Abstract

We present a case of unusually prolonged motor and sensory block for 30 hours after a successful single injection of ultrasound-guided interscalene block with 0.5% plain bupivacaine. All safety measures such as negative aspiration of blood injection at every 3 mL of drug with usual resistance, slow rate of injection and ultrasound documentation of spread of drug around C 5 and C 6 were followed. There was no evidence of neurological injury, but we should always be prepared to consider the possibility of nerve injury and take appropriate measures to prevent them.

Keywords: Interscalene block, prolonged block, ultrasound-guided

Introduction

Regional nerve blocks have great importance in anaesthesia practice. They can provide safe and effective anaesthesia with long-lasting analgesia (1). Interscalene block represents a safe and reliable approach for the shoulder surgeries. Bupivacaine hydrochloride, a long acting local anaesthetic agent, has been extensively used for brachial plexus block. Various additives are used as adjuvants to prolong blockade. Dexamethasone has been used as an adjuvant to local anaesthetics in peripheral nerve blocks (2).

We describe a case of a patient whose shoulder arthroscopy was performed under ultrasound-guided interscalene blockade using bupivacaine. No additives were added to bupivacaine for the block. He had a prolonged sensory and motor blockade for 30 hours. His recovery was uneventful.

Case Presentation

A 46-year-old male was scheduled for arthroscopic shoulder surgery for right-sided rotator cuff tear. Physical examination was normal. The patient did not have any past surgical, medical or anaesthetic history. Investigations were all within normal limits, and the patient was scheduled for shoulder arthroscopy under regional anaesthesia blockade. On the day of surgery, informed written consent was taken. A 20G intravenous cannula was inserted; and standard monitoring including non-invasive blood pressure recording, pulse oximetry and electrocardiography were applied. A single injection ultrasound-guided interscalene block was implemented for the procedure. Midazolam 1 mg and IV fentanyl 50 mcg was given 10 minutes before the start of the block.

We used Sonosite edge II Ultrasound machine and a linear probe. Patient was in supine position with head turned to left side. Under strict aseptic precautions, the transducer was placed just above the right clavicle to see the divisions of brachial plexus superolateral to the subclavian artery. Then the transducer was backtracked to visualise C5–C6

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between anterior and middle scalene muscles. The needle was then inserted in plane in a lateral to medial direction till it reached between C5 and C6 (Figure 1), 15 ml of 0.5% bupivacaine was then injected after negative aspiration of blood every 3 cc of the local anaesthetic and checking that there is no resistance to injection. The drug spread was seen around the C5–C6. During injection, patient did not complain of any pain or paraesthesia in the right upper arm.

Five minutes after the injection, sensory and motor loss of right upper arm was noted. After 15 minutes, left lateral position was given and surgery was allowed to start. IV injection dexmedetomidine was started to maintain Ramsay sedation score from 3 to 4 during the procedure. The surgical procedure lasted for 90 minutes, and patient was monitored for an hour in the recovery room and then transferred to the ward.

The next morning, we observed that the patient had not recovered from the motor and sensory blockade; examination of the patient proved the same. There was no significant change in patient's condition up to 18 hours of performance of blockade, and possibility of nerve damage emerged. A neurological examination was requested, and the patient condition was evaluated. After 20 hours of original injection, the patient felt occasional tingling and stabbing pain in his fingers; sensations improved at 21 hours; and motor power started improving at 26 hours. Complete recovery of motor and sensory functions required 30 hours.

Discussion

Bupivacaine is a congener of mepivacaine. Longer duration of action together with its high-quality sensory blockade, relative to its motor blockade, has established bupivacaine as the most commonly used local anaesthetic (3). A very wide range of duration of action from 5 to 16 hours has been proposed for bupivacaine. Bromage (4) found the mean duration of sensory block was 10.5 hours. Many additives are used for regional anaesthesia blockade to quicken onset, prolong duration and improve analgesia. Adjuvants include epinephrine, clonidine, opioids, midazolam, ketamine and more recently dexamethasone. The use of dexamethasone is interestingly increasing; clinically dexamethasone usage seems to lengthen the motor and sensory block time of peripheral nerve blocks (5). However, we did not find a reason that could explain this prolonged sensory and motor block in our patient. The dose of drug given was 75 mg of 0.5% bupivacaine. The block was performed under direct visualisation of C5–C6 and the spread was seen. Ultrasound-guided single injection, lack of paraesthesia and pain during injection was further proof of no direct trauma to the cords. It is believed that the incidence of neuronal injury in ultrasound-guided regional anaesthesia procedures is around 0.04% (6). There are some reports of prolonged blockade after seemingly flawless technique of performing block. Complete recovery in those case reports varied from 40 to 84 hours after the block (7, 8).

Luduena believed that causes of prolonged blockade are often unknown; and if the duration is longer than 24 hours, then probability of nerve damage should be considered (9). Brockway et al. (7) reported a case of prolonged brachial plexus block after administration of 30 mL 0.42% plain bupivacaine for 26 hours after injection, and complete recovery occurred at 40 hours. Sites et al. (11) reported an abnormal clinical course of an ultrasound-guided supraclavicular brachial plexus block using 0.375% bupivacaine, supraclavicular nerve block reappeared after the apparent initiation of its resolution in their patient; and after 7 hours, the patient lost all motor and sensory function in his arm. The block completely resolved after 23 hours.

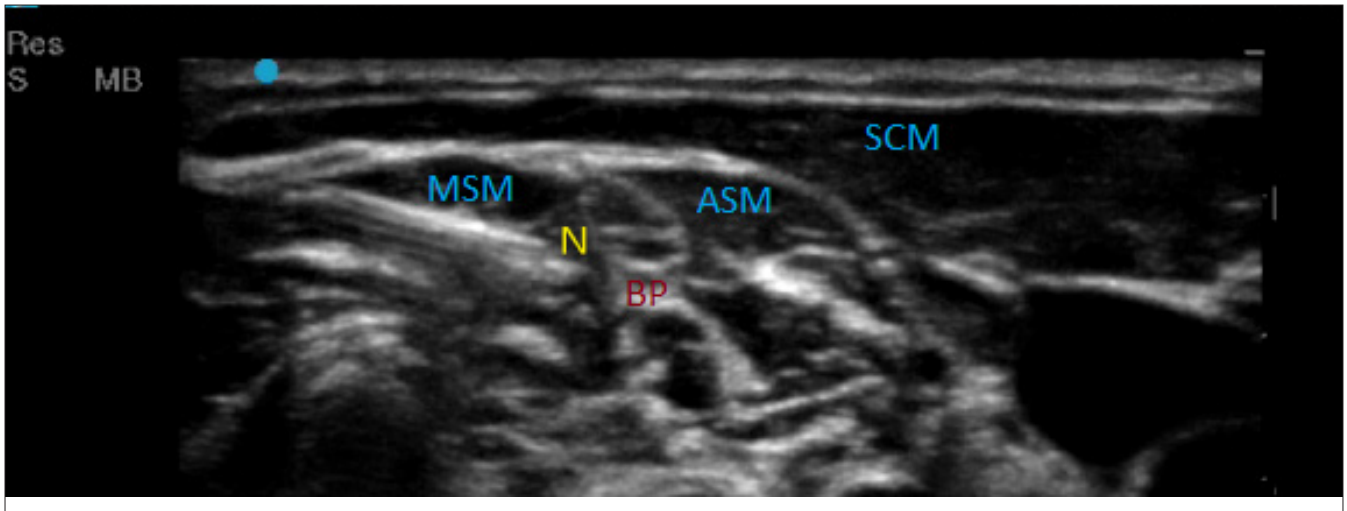

Figure 1. Position of the needle for the USG Guided interscalene brachial plexus block using an in-plane approach. The needle tip (N) is seen in contact with the elements of brachial plexus (BP), present between middle scalene muscle (MSM) laterally and anterior scalene muscle (ASM) medially. SCM- Lateral border of the sternocleidomastoid (SCM) muscle

Brachial plexus injury after interscalene block is infrequent, and its intensity may vary. However, the orthopaedic literature has reported a higher incidence in patients that undergo general anaesthesia without interscalene block (12). Perioperative risk factors for peripheral nerve injury includes paraesthesia during needle placement, pain during injection, prolonged tourniquet time, compression or stretch related to position, sedated patient during regional block, hypothermia and prolonged hospitalisation. There are also patient-related factors such as diabetes, pre-existing neurologic disease, smoking, extreme body mass index and patients being male and elderly (13).

In our case, tourniquet was not used. The position of the patient was left lateral, and the traction was given to the right arm. The most commonly reported complication of the lateral decubitus position is neuropraxia, with a reported incidence of 10%–30%, which has been attributed to excessive strain on the brachial plexus due to intraoperative rotation (14). Hence, it is important to minimise the traction during the procedure to decrease the forces on the neurovascular structure. Ellman (15) reported a neuropraxia rate of 7.5% that was attributed to poor padding during the setup of lateral decubitus position. In our case, all the bony prominences were padded to prevent neuropraxia and excessive skin pressure.

Irrigation fluids used in arthroscopy can cause severe oedema in cervical region. Oedema may compress the brachial plexus leading to neuropraxia.

This case represents a prolonged blockade of 30 hours. It is difficult to explain why the patient had developed such a prolonged block with 0.5% bupivacaine without any adjuvants. Thus after any block, patients should not be discharged until nerve function has returned.

Conclusion

Injury to the nerve following peripheral nerve blocks can be a potentially devastating complication that can result in permanent disability. Exact aetiology of neurological injury related to peripheral nerve blocks remains unclear in many instances. Suggested reasons include mechanical trauma from the needle, nerve oedema or haematoma, pressure effects and neurotoxicity of the local anaesthetic injectate solutions. Other factors can be pre-existing neuropathies, prolonged tourniquet pressure, post-operative casting compression or surgical manipulation. Pressure effects on neurovascular bundle caused by oedema due to irrigation fluids may be a potential risk factor for neuropraxia. Further studies are required to prove the pressure effects of irrigation fluid on the brachial plexus during shoulder arthroscopic surgeries.

Informed Consent: Written informed consent was obtained from patient who participated in this case.

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Conflict of Interest: The authors have no conflicts of interest to declare.

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References

1. Faiz SHR, Mohseni M. The Potential Role of Regional Anesthesia in Perioperative Anti- Inflammatory Treatments. Anesth Pain 2012; 2: 1-2. [CrossRef]
2. Shrestha BR, Maharjan SK, Tabedar S. Supraclavicular brachial plexus block with and without dexamethasone - a comparative study. Kathmandu Univ Med J 2003; 1: 158-60.
3. Imani F, Safari S. "Pain Relief is an Essential Human Right", We Should be Concerned about It. Anesth Pain 2011; 1: 55-7. [CrossRef]
4. Bromage PR, Gertel M. Improved brachial plexus blockade with bupivacaine hydrochloride and carbonated lidocaine. Anesthesiology 1972; 36: 479-87. [CrossRef]
5. Cummings KC, 3rd, Napierkowski DE, Parra-Sanchez I, Kurz A, Dalton JE, Brems JJ, et al. Effect of dexamethasone on the duration of interscalene nerve blocks with ropivacaine or bupivacaine. Br J Anaesth 2011; 107: 446-53. [CrossRef]
6. Etezadi F, Karimi Yarandi K, Ahangary A, Shokri H, Imani F, Safari S, et al. The Effect of Needle Type, Duration of Surgery, and Position of the Patient on the Risk of Transient Neurologic Symptoms. Anesth Pain 2013; 2: 154-8. [CrossRef]
7. Brockway MS, Winter AW, Wildsmith JA. Prolonged brachial plexus block with 0.42% bupivacaine. Br J Anaesth 1989; 63: 604-5. [CrossRef]
8. Dureja J, Kad N, Lal J, Thakur A, Johar S, Malik P, editors. Extraordinary prolonged blockade following supraclavicular brachial plexus block with bupivacaine. 2009.
9. Ludena FP. Duration of local anesthesia. Annu Rev Pharmacol 1969; 9: 503. [CrossRef]
10. Sites BD, Bertrand ML, Gallagher JD. An abnormal clinical course of an ultrasound-guided supraclavicular brachial plexus block using 0.375% bupivacaine. J Clin Anesth 2006; 18: 449-51. [CrossRef]
11. Wirth MA, Rockwood CA Jr. Complications of total shoulder-replacement arthroplasty. J Bone Joint Surg Am 1996; 78: 603-16. [CrossRef]
12. Watson JC, Huntoon MA. Neurologic evaluation and management of perioperative nerve injury. Reg Anesth Pain Med 2015; 40: 491-501. [CrossRef]
13. Li X, Eichinger JK, Hartshorn T, Zhou H, Matzkin EG, Warner JP. A comparison of the lateral decubitus and beach-chair positions for shoulder surgery: Advantages and complications. J Am Acad Orthop Surg 2015; 23: 18-28. [CrossRef]
14. Ellman H. Arthroscopic subacromial decompression: Analysis of one- to three-year results. Arthroscopy 1987; 3: 173-81. [CrossRef]