

Safe Conduct of Supraclavicular Brachial Plexus Block for Arteriovenous Fistula Creation in Multiple Sclerosis Patient: A Case Report

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Abstract

Multiple sclerosis (MS) is an autoimmune disease characterized by demyelination of mainly central nervous system (CNS). However, several reports have demonstrated involvement of peripheral nervous system (PNS) as well. Generally, neuraxial blocks are avoided in patients with MS and safety of peripheral nerve blocks (PNBs) are not clearly established. Unfortunately, the literature available on PNBs in MS patients is limited. We report a case of 33 years old patient, a known case of End Stage Renal Disease (ESRD) and MS, scheduled for arteriovenous (AV) fistula creation under successful supraclavicular Brachial Plexus block without any post-operative residual neurological deficit.

Keywords: Multiple Sclerosis; Regional Anesthesia; Supraclavicular Block; Double-crush Phenomenon

Abbreviations: MS: Multiple Sclerosis; CNS: Central Nervous System; PNS: Peripheral Nervous System PNBs: Peripheral Nerve Blocks; ESRD: End Stage Renal Disease; AV: Arterio Venous.

Introduction

MS is an inflammatory autoimmune disease of the CNS. Characterized by focal demyelination which results in fluctuating conduction block that causes a classic “relapse and remission”. Signs and symptoms include sensory and motor deficits, diplopia or vision loss, bowel or bladder dysfunction, and ataxia. The use of neuraxial blocks and PNBs in MS patient is a controversial topic. The central demyelination may leave the spinal cord susceptible to

the neurotoxic effects of local anesthetics. Although, PNBs are considered safe several investigators have demonstrated evidence of peripheral demyelination (sensory more than motor) in patients with MS.

Case Report

Our patient was scheduled for AV fistula creation. He was a known case of type 1 Diabetes Mellitus, hypertension, ESRD and MS. Upon history and examination his comorbidities were controlled and MS was in remission phase. We planned to perform supraclavicular brachial plexus block with sedation for scheduled AV fistula surgery. Vitals and blood investigations were within normal level.

Morning of surgery after consent surgical site confirmed for anesthetic block and surgery. Routine monitors according to (Association of Anaesthetists of Great Britain and Ireland) AAGBI guide lines were applied. The patient was sedated with Midazolam 2 mg intravenous. After aseptic measures supraclavicular area prepared with anesthesia assistant and emergency drugs standby. High frequency linear transducer 6-13 MHz (SonoSite) positioned in transverse plane proximal to midpoint of clavicle, slightly tilted caudally to get a cross-sectional view of the subclavian artery. The brachial plexus (BP) seen as a collection of hypoechoic oval structures posterior and superficial to the artery. Color Doppler used prior to needle insertion to rule out the passage of large vessels (dorsal scapular, transverse cervical, suprascapular arteries) in the anticipated trajectory of the needle.

The skin infiltrated with 1% Lidocaine 2 ml 1 cm lateral to the transducer. From the same point 50 mm, 22 G (Pajunk, Germany) block needle inserted in plane toward the brachial plexus. Bupivacaine 0.4% 15 ml used and adequate spread of local anesthetic noted around the plexus (Figure- 1). The patient was assessed for pin prick and motor block. About 30 minutes after the block surgical incision given for left radio-cephalic artery-venous fistula. The surgery took about 120 minutes. Overall the procedure and anesthetic block were uneventful. The patient was monitored in post anesthesia care unit (PACU) for 30 minutes then discharged to the ward. The next day patient was assessed for paraesthesia, weakness, diplopia, ataxia which were negative on examination.

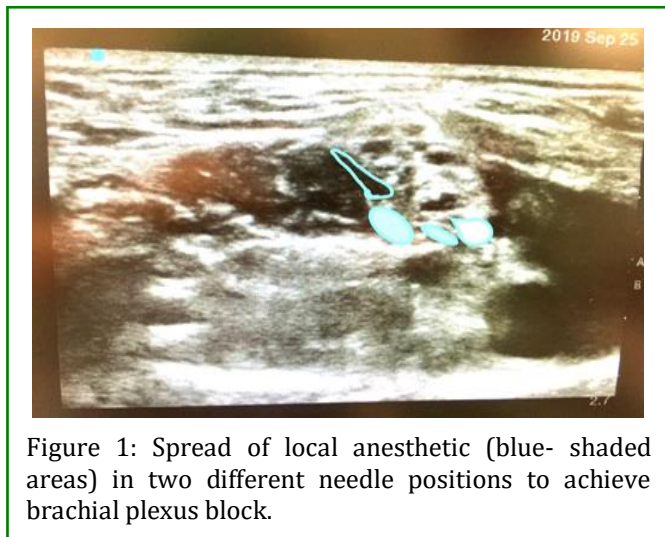


Figure 1: Spread of local anesthetic (blue- shaded areas) in two different needle positions to achieve brachial plexus block.

Discussion

Preexisting central neurological disorders is a unique challenge for anesthesiologists. The fear of worsening preexisting condition due to surgery, anesthesia or stress can result to a prolong postoperative neurological deficit. Both genetic and environmental factors may play a role in etiology. About 25% of MS patients are essentially asymptomatic, and their daily life is unaffected. However, up to 15% likely have significant sensorimotor deficits [1].

The “double-crush phenomenon” suggests that patient with preexisting neural compromise may be more susceptible to injury at another site when exposed to a secondary Insult [2]. This could be due to surgery or anesthesia and it need not be along peripheral nerve trunk itself, but rather at anywhere along the neural transmission pathway. Several factors can aggravate MS, including infection hyperpyrexia, emotional stress [3]. The mechanism of worsening neurologic function is unclear and may occur coincidentally in the postoperative period independent of anesthetic technique.

Despite some evidence for demyelination of the peripheral nerves in MS, peripheral nerve blockade has traditionally been considered safe [4]. However, a recent report of severe brachial plexopathy following an ultrasound-guided interscalene block has raised the concern that some of MS patients may have subclinical peripheral neuropathy [5]. Several investigators have reported up to 5% of demyelinating peripheral lesions in patients with MS [6]. Another Study by Pogorzelski et al. [7] noted both sensory and peripheral motor nerve lesions of a demyelinating-axonal character. They also noted that sensory abnormalities were more pronounced than motor ones. Despite this evidence, the overall incidence and clinical relevance of underlying peripheral neuropathy remains undefined in performing peripheral nerve blockade in MS. The potential risk of progressive neurologic deficits in MS patients after spinal anesthesia was first described in 1937. Critchley et al. described 3 patients with disseminated MS who experienced aworsening symptoms after spinal anesthesia, concluding that spinal anesthesia may be a precipitating agent in the evolution of disseminated MS [8].

Epidural has been studied exclusively within the MS obstetric population, which may not accurately represent the non- pregnant MS patients. Pregnancy is frequently associated with disease remission, whereas the postpartum period is often associated with an increased risk of relapse. The transition from cellular immunity to

humeral immunity required for the mother's immune system to tolerate the fetus is thought to be protective during pregnancy. However, as cell-mediated immunity rebounds during the postpartum period, patients will often experience a transient worsening of neurologic symptoms that could be falsely attributed to recent regional anesthetic techniques [9].

One of the few prospective studies evaluating risk factors associated with disease relapse during the postpartum period concluded that epidural analgesia during labor and delivery did not contribute to a higher risk of relapse compared to patients who did not receive it [10]. Epidural is safer than spinal anesthesia in MS patients because the concentration of local anesthetic in the white matter of the spinal cord is one-fourth the level after epidural compared to intrathecal injection. With regard to the obstetric patient, the risk of neuraxial anesthesia or analgesia needs to be weighed against the increased risk of general anesthesia.

Conclusion

We report that brachial plexus block can be performed safely in MS patient. It should not be considered an absolute contraindication. However, reducing the local anesthetic concentration and total dose to the lowest effective levels may be prudent for safe conduct of the block [11]. All decisions regarding the use of regional anesthesia and analgesia in patients with MS need to be made after careful consideration of the potential risks and benefits. Regardless of the anesthetic technique chosen, patients should be informed of the risk of new or worsening neurologic symptoms during the postoperative period because of exposure to multiple exacerbating factors.

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