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CASE REPORT PAIN MANAGEMENT

Effectiveness of ultrasound-guided stellate ganglion block in a patient with Dejerine-Roussy syndrome

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ABSTRACT

Dejerine-Roussy syndrome or Central Post-Stroke Pain (CPSP) is one of the most debilitating complications of cerebrovascular accidents. Sympathetic block such as stellate ganglion block (SGB) is one of the modalities used for this condition. Ultrasound guidance provides advantages for these procedures by increasing accuracy and practicality with lower exposure to radiation. A 43-year-old man came to our clinic with chronic pain which started nine years earlier after an episode of hemorrhagic stroke. The pain was refractory to analgesics, which were prescribed by healthcare facilities he visited. Further examination revealed a burning sensation and allodynia on the left side of his body. We then proceeded to perform ultrasound-guided SGB using 8 ml of 1% lidocaine along with dexamethasone 5 mg as an adjuvant agent. After two procedures within two months, SGB decreased the patient's pain by 50−85%. Ultrasound-guided stellate ganglion appears to be safe and effective as a treatment for Dejerine-Roussy syndrome.

Abbreviations: CPSP: Central Post-Stroke Pain; IPM: Interventional Pain Management; NRS: Numeric Rating Scale; SGP: Stellate Ganglion Block

Key words: Case report, Dejerine-Roussy syndrome, Pain, Stellate ganglion block, Ultrasound

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1. INTRODUCTION

Dejerine-Roussy syndrome is a feared complication of cerebrovascular accidents and has been described by Tasker as "among the most spectacular, distressing, and intractable of pain syndromes". It is a rare central neuropathic pain and affects approximately 8% of patients after a stroke, but is more common after strokes involving the lateral medulla and infero-lateral thalamus, with a prevalence of 25% and 17−18%, respectively.[1]

When treating these patients, there are few evidence-based non-pharmacological and non-interventional options. If pharmacological or therapeutic modalities are ineffective at managing the patient's symptoms, a sympathetic blockade may be indicated to provide initial pain relief that generally recurs. The overall course and prognosis for these patients are poor. Treatments that offer adequate analgesia are necessary to treat many people for many years to come.[1]

Stellate ganglion block (SGB) is a common treatment method for sympathetic-mediated pain of the head, neck, and upper extremities. The stellate ganglion is formed by the fusion of the inferior cervical ganglion and the first thoracic ganglia. It is located in the interspace between the C7 and T1 vertebral bodies with the first rib lying behind it. The conventional method for SGB is a blind technique in which the tip of the needle is targeted to the C6 transverse process. However, this technique has low reliability and is associated with adverse effects such as hematoma formation, or unintentional epidural, subarachnoid or intravascular injections, and esophageal or vascular punctures.[2]

2. CASE REPORT

We present a case report of a 43-year-old man with chronic pain throughout the left side of his body. The

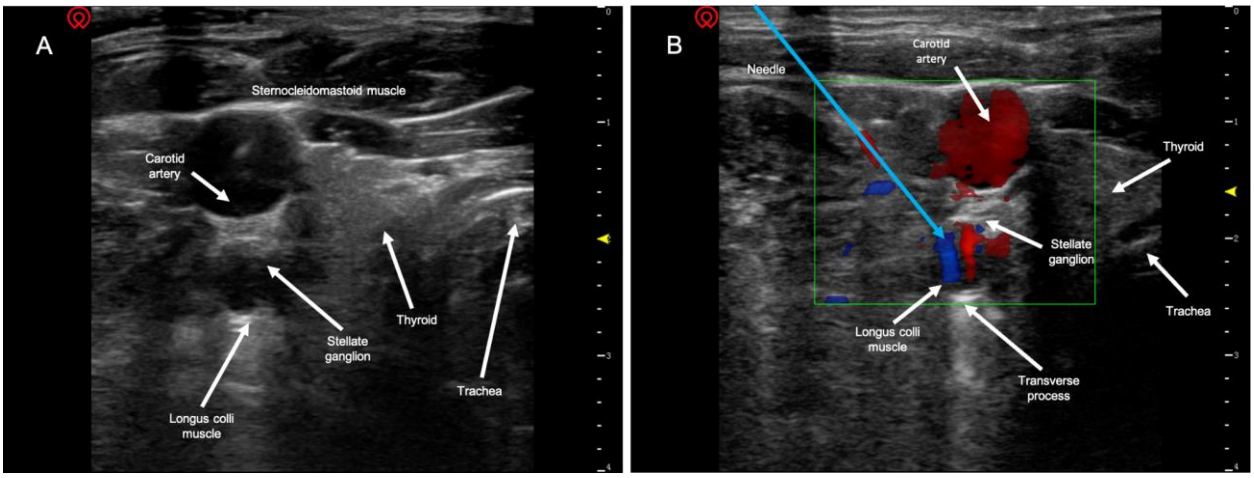

Figure 1: Visualization of the stellate ganglion block using (A) USG and (B) Doppler USG

We present a case report of a 43-year-old man with chronic pain throughout the left side of his body. The patient had a history of hemorrhagic stroke about ten years back and continued to felt pain after it. He tried multiple doctors and multiple hospitals due to his pain and burning sensation and was treated with pharmacologic agents such as tramadol, baclofen, gabapentin, and amitriptyline etc. The symptoms were only mildly reduced in pain intensity. He got no improvement until he came to our center in September 2019. He stated that the intensity of pain was 15, even though he knew the maximum numeric rating scale (NRS) was only 10. After evaluating the history taking and physical examination, we diagnosed him with Dejerine-Roussy Syndrome. We then performed interventional pain management (IPM) procedures on the patient as seen in Table 1. In all of the procedures, we used ultrasonography (USG) to obtain more accuracy to reach the stellate ganglion (Figure 1). We followed a lateral approach, from the posterolateral to the anteromedial plane of the stellate ganglion on the C6−C7 level using 8 ml of 1% lidocaine. To prolong the effect, we used dexamethasone 5 mg as the adjuvant agent. He continued to take analgesic drugs with tapering down doses.

After the first SGB, the NRS reduced from 10 to 7, and after the second SGB two months later the NRS came to be 1/10. Only after two visits of SGB procedures, the patient's pain reduced by 53.3% and 85.7% respectively. The pain of the upper extremity recurred after 1 month of stellate ganglion block.

3. DISCUSSION

Pain is often the most limiting symptom after an episode of stroke.[1] Dejerine-Roussy syndrome, also called Central Post-Stroke Pain (CPSP) is hypothesized to originate from the central nervous system, particularly the thalamus.[3] This usually manifests as burning, freezing, squeezing, electric, or pressure sensation, either continuously or intermittently. The syndrome is often accompanied by sensory abnormalities, such as hyperalgesia, hypoesthesia, paresthesia, dysesthesia, or hyperpathy.[4] Our patient presented with continuous pain after an episode of stroke. Physical examination revealed allodynia and burning sensation on the left side of his body.

Therapeutic options for Dejerine-Roussy syndrome include pharmacological and non-pharmacological treatments. Pharmacological agents include NMDA receptor antagonists (ketamine and memantine), anticonvulsants (gabapentin and carbamazepine), and antidepressants.[5] Our patient had received gabapentin and amitriptyline from previous centers he visited. However, he did not have any improvement. As stated by Urits et al., antidepressants and anticonvulsants can adjust hypersensitivity of nerves, but do not selectively act on damaged nerves.[3] When the pain is refractory to medications, or when the patient is intolerant to the drugs, the physicians may have to use several non-pharmacologic treatment options. Neurosurgical approaches such as deep brain stimulation (DBS), cingulotomy, and motor cortex stimulation (MRS) have been used to treat CPSP. The results are effective but these methods are costly, invasive and require specialized equipment and expertise.[3,5]

Sympathetic blockade has been advancing as a treatment for CPSP. This block is done by injecting around the stellate ganglion on the deep surface of the anterior vertebral fascia at the level of C6−C7 vertebrae, aiming to regulate the autonomic nervous and cerebrovascular systems to relieve vasospasm.[5,6] There are different reports regarding the appropriate type and dosage of local anesthetic for SGB. While in many countries most

commonly used drug is 0.25–0.375% bupivacaine, we used 1% lidocaine, which is widely used in China. The volume of injectant used in previous studies varies between 2−8 ml.[6] In our case, the doses of 8 ml for SGB showed satisfying results.

In recent years, imaging guidance for sympathetic blockade has been emerging to improve accuracy. The stellate ganglion is surrounded by important structures such as the vertebral artery, vertebral vein, phrenic nerve, and recurrent laryngeal nerve.[6] Blind technique blocks can injure one of the structures, causing fatal adverse effects. Fluoroscopy has been widely used in routine practice for SGB. However, the safety of this technique has been in concern for exposure of radiation to the patient.[7] Although CT has been mentioned as providing excellent results, this technique requires an equipped operating room or the aid of a radiology department, with radiation exposure at a higher level with repeated use.[8]

The use of ultrasound in pain management procedures is rapidly growing interest for the advantages it offers. Ultrasound is able to visualize both soft tissue structures and bony surfaces. In sympathetic blocks, ultrasound can help confirm the spread of anesthetic agents and avoid injuries to the surrounding tissues without exposing healthcare providers to the risks of radiation.[9] Up until now, no side effects of ultrasound are known. Additionally, ultrasound also provides practicality and possibility for use in primary care settings.[8]

Ultrasound-guided SGB has been introduced since 1995. This technique helps for the accurate needle placement and visualization of the injectants during SGB.[2] The use of this technique in similar cases to ours has been described in a case report by Liu et al. in 2020. Their patient was a 67-year-old woman with severe paroxysmal pain on the right side of the body, which started 5 years earlier after an episode of hemorrhagic stroke. The patient benefited from ultrasound-guided SGB with 2 ml of 2% lidocaine for only a week. Nine months after the procedure, the patient was pain-free.[10] Meanwhile, in our case, after two visits of SGB, our patient had an NRS of 1/10, significantly reduced from 15/10 on the first visit. Although the effectiveness of ultrasound-guided SGB was proven in our case, further studies with larger sample size are still needed to confirm the efficacy and safety of this technique and whether repeated procedures are needed.

4. CONCLUSION

Ultrasound-guided stellate ganglion block is safe and effective for patients with Dejerine-Roussy syndrome. This treatment is worth considering because it has less risk and economic burden, compared with neurosurgical approaches such as motor cortex stimulation and deep brain stimulation.

5. Conflict of interest

No potential conflict of interest relevant to this article was reported.

6. Funding

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7. Author's contribution

TCTN is the sole author of this paper.

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