

Complex regional pain syndrome should be aggressively treated as soon as it is diagnosed

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SUMMARY

Complex regional pain syndrome is a chronic pain condition characterized by regional pain without a dermatomal distribution. The primary goal of treatment is to alleviate pain and restore function in the affected limb. Multimodal therapeutic methods are adopted, including stellate ganglion block, with favorable outcomes such as pain score reduction and increased mobility in affected patients. This case presentation aims to describe the importance of early stellate ganglion block in the management of CRPS.

Keywords: Complex regional pain syndrome; stellate ganglion blockage; ultrasound.

Introduction

Complex regional pain syndrome (CRPS) is a chronic pain condition that presents with regional pain without a dermatomal distribution. It is characterized by symptoms of varying severity, including skin changes, autonomic dysfunction, abnormal sensorimotor changes, and trophic changes.^[1] There are two sub-categories of CRPS: CRPS type I, in which no nerve lesion is present, and CRPS type II, which is characterized by the presence of a coexisting nerve lesion. CRPS type I, which is the more common form, often develops after trauma or surgery.^[2–4] The primary goal of treatment is to alleviate pain and restore function in the affected limb. Although the progression of the disease may vary and there is no conclusive evidence that it can be modified through treatment, therapy should not be postponed, as patients with a more chronic course tend to have a poorer prognosis. While conservative treatment may be sufficient for acute

CRPS cases, chronic CRPS is recognized as a complex and challenging biopsychosocial syndrome. Managing chronic CRPS necessitates a comprehensive multidisciplinary approach encompassing medical, psychological, physical, and occupational therapies.^[5]

In the existing literature, numerous studies have investigated the pharmacological management of CRPS, including the use of nonsteroidal anti-inflammatory drugs, glucocorticoids, bisphosphonates, calcitonin, vitamin C, opioids, anticonvulsants (such as gabapentin and pregabalin), free radical scavengers, and vasoactive mediators. Physical and occupational therapy, either alone or in conjunction with medical therapy, are recognized as initial treatment options for CRPS, with the objective of addressing kinesiophobia. While initiation of physiotherapy in the early stages of the disease has been shown to confer greater benefits, it may also yield positive outcomes in cases of chronic CRPS.^[6]

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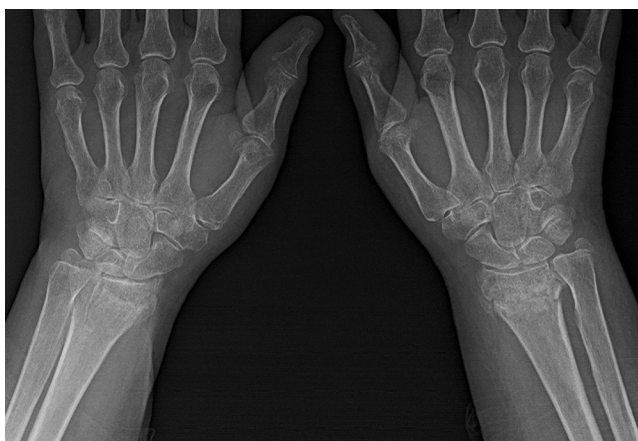


Figure 1. Direct graphy showing healed fracture, patchy osteopenia and mild soft tissue swelling.

Interventional modalities, such as stellate ganglion block (SGB) for upper extremity CRPS and lumbar sympathetic block (LSB) for lower extremity CRPS, have been shown to yield favorable outcomes. Sympathetic blockade can also be achieved via local anesthetic administration in the epidural space. In addition, spinal cord stimulation and dorsal root ganglion stimulation are viable therapeutic options for CRPS when conservative measures have failed to provide satisfactory results.^[7] In this case report, we present the treatment of a patient who developed CRPS following a fracture using a stellate ganglion block.

Case Report

A 57-year-old woman sustained a fracture of the distal radius in her right forearm after slipping on ice. Her arm was immobilized in a cast for six weeks, during which time the fracture healed uneventfully. However, at the end of the six-week period, she began to develop pain in her right hand and wrist. Radiographic evaluation confirmed appropriate fracture healing. When evaluated two months after the initial injury, she complained of widespread pain and swelling in her hand and wrist. Radiographic examination revealed uneven reduction in bone density (osteopenia) and mild soft tissue swelling (Fig. 1).

She had difficulty making a full fist with her right hand, with limited joint extension. Her fingers were flexed at rest. She exhibited increased sensitivity to touch, along with marked temperature sensitivity, perceiving both hot and cold sensations. The most severe pain was elicited by joint compression, particularly in the finger joints. She reported a pain intensity of 7/10 on the VAS, described as sharp,



Figure 2. The image showing the recovery process of a patient diagnosed with CRPS before and after treatment. Note that the edema and gloss of the right hand decrease with treatment.

heavy, and shock-like, accompanied by warmth and numbness in the right hand. Laboratory findings were within normal limits, including the CRP level (CRP=0.6 mg/L).

After excluding cellulitis, infection, osteomyelitis, and rheumatic diseases, a diagnosis of CRPS was established. Due to the patient’s advanced age and to avoid potential side effects, oral steroid therapy was not considered. The patient was initiated on physical therapy in combination with a stellate ganglion block to alleviate symptoms and prevent disease progression. Marked clinical improvement was observed within two weeks, and hand function normalized (Fig. 2).

The stellate ganglion block was performed as follows. The patient was placed in the supine position with the head slightly turned to the contralateral side of the injection site. The skin over the injection site at the C7 level was prepared with an antiseptic solution. An ultrasound probe was positioned perpendicular to the long axis of the neck at the level of the C7 vertebra. After identification of the thyroid gland, carotid artery, and sternocleidomastoid muscle, the probe was moved laterally to visualize the scalene muscle. Using an in-plane approach, the needle was advanced from lateral to medial at a 45-degree angle, passing through the scalene muscle. The injection was administered into the sympathetic trunk region anterior to the longus colli muscle (Fig. 3). Correct needle placement was confirmed

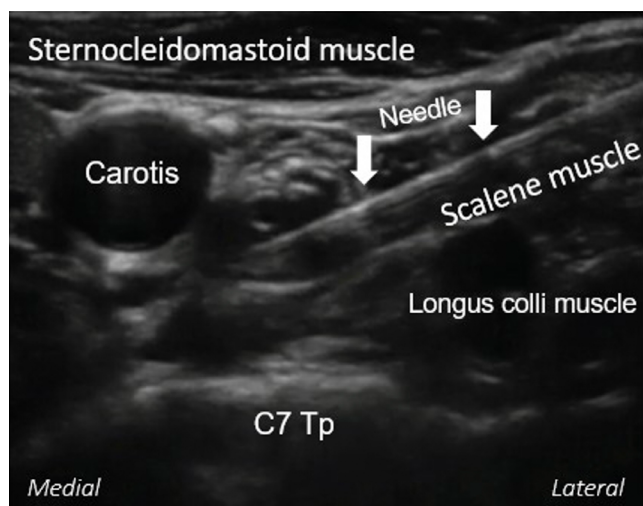


Figure 3. Ultrasound-guided stellate ganglion blockage.

by visualization of local anesthetic spread around the ganglion under real-time ultrasound guidance. Following confirmation, a mixture of local anesthetic and steroid was injected to achieve pain relief and reduce inflammation. The patient was monitored for immediate complications, including respiratory distress or hematoma formation.

Written informed consent was obtained from the patient included in this case for publication of her clinical data.

Discussion

There are several treatment options available for complex regional pain syndrome (CRPS). Treatment modalities include physical therapy; medications such as pain relievers, corticosteroids, and anticonvulsants; sympathetic nerve blocks; graded motor imagery; and cognitive behavioral therapy. New treatments are continuously being developed and evaluated; however, the current level of evidence is generally low to moderate.^[8-10] Some of the more recent treatment options for CRPS include the following.

Ketamine is a potent anesthetic and analgesic agent that has been shown to be effective in the treatment of CRPS. It is most commonly administered via intravenous infusion. Ketamine exerts its effects through multiple pathways, with its primary mechanism being noncompetitive antagonism at the phencyclidine-binding site of N-methyl-D-aspartate receptors in the central nervous system. Inhibition of these receptors results in reduced neuronal excitability and pain transmission.^[8]

Calmare therapy, also known as scrambler therapy, is a noninvasive technique that uses an external device to stimulate peripheral nerves and reduce pain signals. Theoretically, calmare therapy delivers “non-pain information” to the central nervous system via surface C fibers through electrodes placed in a dermatomal distribution pattern individualized for each treatment session. This process replaces aberrant “pain information” with synthetic “non-pain information.”^[10]

Virtual reality-based therapies have been explored in patients with CRPS to reduce pain-related anxiety and kinesiophobia and to support graded motor imagery. However, current evidence is derived mainly from small experimental or feasibility studies.^[9-11]

Neuromodulation involves the application of electrical or magnetic stimulation to disrupt pain signaling pathways and provide analgesia. These interventions are categorized as noninvasive or invasive and are typically reserved for patients who do not respond adequately to long-term conservative treatments. Invasive neuromodulation techniques include peripheral nerve stimulation, dorsal root ganglion stimulation, spinal cord stimulation, motor cortex stimulation, and deep brain stimulation. The most commonly used noninvasive modalities include transcutaneous electrical nerve stimulation, transcranial direct current stimulation, and repetitive transcranial magnetic stimulation.^[11]

Immunomodulation represents another emerging therapeutic strategy. Immunomodulatory agents exert their effects by altering the expression and activity of key inflammatory mediators, including cytokines, neuropeptides, eicosanoids, and amino acids. Given the potential role of inflammation in the pathophysiology of CRPS, immunomodulatory therapies may offer clinical benefit for selected patients.^[9]

It should be noted that treatment efficacy varies among individuals, and an optimal management strategy for CRPS often requires a multimodal approach combining several therapeutic modalities. Treatment planning should be individualized and guided by clinical evaluation.

Sympathetic nerve blocks, including stellate ganglion block, are interventional procedures used in the

management of CRPS, sympathetic dystrophy, and posttraumatic stress disorder. These procedures involve injection of a local anesthetic into the stellate ganglion, a sympathetic nerve structure in the cervical region that regulates functions such as vascular tone and pain modulation. By blocking sympathetic outflow to the affected limb, these interventions can reduce pain and improve functional mobility.^[11]

Once CRPS is diagnosed, prompt and aggressive treatment is essential. The condition can significantly impair quality of life, contribute to depression, and lead to loss of work capacity due to chronic pain. Therefore, accessible and effective treatment modalities should be implemented in combination. In this report, we emphasized the importance of early intervention in a patient who developed CRPS following a fracture. In conclusion, while the diagnosis of CRPS may be relatively straightforward, its treatment remains challenging. Early and aggressive multimodal management is critical to prevent disease progression. Stellate ganglion block is a valuable therapeutic option that may accelerate recovery, shorten the duration of physical therapy, and facilitate an earlier return to work.

Conclusion

Early diagnosis and prompt initiation of a multimodal treatment approach are essential to prevent the progression of complex regional pain syndrome and to improve functional outcomes. Stellate ganglion block, particularly when integrated early into a multidisciplinary rehabilitation program, appears to be an effective intervention for achieving rapid pain relief and restoring limb mobility.

Ethics Committee Approval: This is a single case report, and therefore ethics committee approval was not required in accordance with institutional policies.

Informed Consent: Written informed consent was obtained from the patient included in this case for publication of her clinical data.

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