

Sympathetic blocks for the treatment of complex regional pain syndrome

A case series

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Abstract

Rationale: To present the successful treatment of complex regional pain syndrome type -1 utilizing sympathetic blocks.

Patient concerns: Severe pain interfering with activities of daily living and temporary disability secondary to complex regional pain syndrome.

Diagnoses: Complex regional pain syndrome type-1 with involvement of lower extremity (2 patients), and upper extremity (1 patient).

Interventions: We report the management of 3 patients with diagnosis of complex regional pain syndrome type-1 by early institution of sympathetic blocks for diagnostic and therapeutic purposes. All 3 patients were able to tolerate physical therapy only after adequate pain relief had been achieved with institution of sympathetic blocks.

Outcomes: All 3 patients responded very favorably to sympathetic blocks with dramatic reversal of pathology. All patients reported almost complete resolution of pain, symptoms, and signs within 6 months duration after diagnosis of complex regional pain syndrome. All 3 patients were able to wean their pain medications and achieve normal activities of daily living without any significant limitations. All patients were able to return to full-time employment.

Lessons: Treatment options are limited and there is lack of high quality research regarding the efficacy of sympathetic blocks in the treatment of complex regional pain syndrome. As presented in this case series, sympathetic blocks maybe very effective in the treatment of complex regional pain syndrome in a subset of patients. Thus, early institution of sympathetic blocks should be considered in complex regional pain syndrome prior to physical therapy and consideration of more invasive pain management interventions.

Abbreviations: CRPS = complex regional pain syndrome, HADS = Hospital Anxiety and Depression Scale, LSB = lumbar sympathetic block, MPQ = McGill Pain Questionnaire, NPSI = Neuropathic Pain Symptom Inventory, SGB = stellate ganglion block, SNS = sympathetic nervous system, TSB = thoracic sympathetic block.

Keywords: complex regional pain syndrome, Sympathetic block, treatment

1. Introduction

Complex regional pain syndrome (CRPS) is a chronic pain condition characterized by spontaneous and regional pain that is disproportionate in magnitude or duration to the typical course of pain after similar tissue trauma.^[1] The Budapest criteria were created in 2003 to help clinicians make a diagnosis of CRPS.^[2] These criteria, composed of 4 components, have proven to greatly improve the specificity of diagnosing CRPS.^[2]

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The sympathetic nervous system (SNS) is a part of the autonomic nervous system that controls the body's main involuntary activities.^[3] It has been implicated in neuropathic pain, vascular, and visceral pain. Sympathetic ganglia have been the target of local anesthetic block to assess the role of the SNS in transmission of pain.^[3]

We present a retrospective case series of 3 patients with diagnosis of CRPS type I based on the Budapest Criteria.^[2] One patient underwent stellate ganglion block (SGB) and the other 2 patients underwent lumbar sympathetic block (LSB) for the upper and lower extremity CRPS type-1 respectively. All patients were diagnosed to have sympathetically mediated/maintained pain by diagnostic sympathetic blocks followed by series of sympathetic blocks for treatment purposes with almost resolution of pain, as well as other symptoms and signs of CRPS type I. Despite optimization of multimodal pain medications, the patients were not able to tolerate the physical therapy secondary to pain prior to initiation of sympathetic blocks. Following the pain control with sympathetic blocks, the patients were able to tolerate physical therapy and the patients were able to wean the pain medications.

2. Methods

Data were obtained from retrospective chart review in a single academic hospital for 3 patients presented in this non-consecutive case series. Period of recruitment of these 3 patients were between September 24, 2013 and December 30, 2017. All 3 patients were

diagnosed with CRPS Type 1 based on Budapest criteria.^[2] Evaluation, follow-up, and the sympathetic blocks of all 3 patients were performed by the same fellowship trained interventional pain medicine specialist physician with 17 years of experience in this field. The authors have obtained written consent to publish this case report from the patients. Institutional IRB approval was obtained for this case series.

3. Case 1

A 53-year-old female presented with a history of surgery for degenerative partial tear of the left Achilles tendon. One week after the surgery, the patient reported increased diffuse severe burning pain, diffuse swelling and hypersensitivity of the foot with color and temperature changes. Work-up including x-rays did not show any significant pathology. Magnetic Resonance Imaging (MRI) left ankle showed Achilles tendinitis with thickening in the region of previous surgery without tear, but no other findings to explain diffuse pain and signs. The patient was referred to pain management with suspicion of CRPS. Diagnosis of CRPS Type-I was made based on the Budapest criteria.^[2] The patient was given methyl prednisone for 6 days with a tapering dose and was started on gabapentin 300 mg every 8 hours. The patient did not respond favorably to multimodal medication treatment including anti-inflammatory medications, anticonvulsants, and muscle relaxants. Physical therapy was started; however the patient was not able to tolerate the physical therapy secondary to severe pain. The patient was scheduled for left LSB for diagnostic/therapeutic purposes. As the patient responded favorably to the first LSB with approximately 50% pain relief, she then underwent total of 6 left-sided LSBs. The patient responded well to the series of LSBs with almost complete

resolution of the pain, symptoms, and signs related to CRPS. After the first LSB, the patient was able to resume physical therapy, which she continued for 4 months. Within 6 months duration following the diagnosis of CRPS, the patient was able to wean all pain medications, walk without any limitation or pain, and was able to return to full time employment (Fig. 1).

4. Case 2

A 43-year-old female initially presented with sprain of the right ankle. MRI of the right foot 10 days after the injury showed edema of the medial aspect of the talar head and neck as well as the lateral aspect of the anterior process of the calcaneus. Based on reviews of the MRI, no fracture was present. However, there was no improvement of the pain, swelling, discoloration, and temperature changes over the next 4 weeks. The patient was then referred to pain management, and diagnosis of CRPS type-I was made based on the Budapest criteria.^[2] The patient was started on gabapentin and the dose was titrated to 600 mg every 8 hours. The other medications included diclofenac and oxycodone/acetaminophen 5/325 mg tablets as needed. The patient responded well to first LSB with improvement of pain and other signs, and underwent total of 3 right-sided lumbar sympathetic blocks with complete resolution of the right lower extremity CRPS related pain, symptoms, and signs. After the second LSB the patient was started on physical therapy of the right lower extremity, which she continued for 3 months. The patient was able to gradually wean all the pain medications following the first LSB. Within 6 months duration following the diagnosis of CRPS, the patient was able to wean all pain medications, walk without any limitation or pain, and was able to return to full time employment (Fig. 2).



Figure 1. Case 1: Before and after treatment with lumbar sympathetic block.



Figure 2. Case 2: Before and after treatment with lumbar sympathetic block.

5. Case 3

A 63-year-old female patient with history of left wrist fracture after a fall, required closed reduction the same day of the injury. The patient's left upper extremity was in cast for 4 weeks. The patient started to complain of severe pain after the cast removal. The patient was also complaining of swelling, color, and temperature changes in the left wrist and hand, and did not tolerate physical therapy despite adjustment of pain medications. MRI of left wrist demonstrated healing of distal radial and ulnar fractures with soft tissue edema and regional osteoporosis. The

patient was referred to pain management and was evaluated 2 weeks after the cast removal and 6 weeks after the initial injury. Clinical diagnosis of CRPS type I was made based on the Budapest criteria.^[2] The patient underwent a total of 6 left-sided stellate ganglion blocks with complete resolution of the pain, symptoms and signs related to CRPS. The patient reported 70% pain relief after the first stellate ganglion block and was able to tolerate physical therapy. Within 6 months duration following the diagnosis of CRPS, the patient was able to wean all pain medications, able to use left hand without any limitation or pain, and was able to return to full time employment (Fig. 3).



Figure 3. Case 3: Before and after treatment with stellate ganglion sympathetic block.

6. Discussion

CRPS is differentiated from other chronic pain conditions by the presence of signs indicating significant autonomic and inflammatory changes in the region of pain.^[3] When CRPS is most severe, patients can present with one or several of the following symptoms and signs: a limb displaying extreme hyperalgesia, allodynia, changes to skin color, changes to skin temperature, sweating relative to the unaffected side, edema, altered patterns of hair, skin, or nail growth in the affected region, reduced strength, tremors, and dystonia.^[3]

The stellate ganglion blocks and lumbar sympathetic blocks are used for diagnosis and treatment of sympathetically mediated/maintained pain in a subset of patients diagnosed with CRPS.^[4–6]

Despite the frequent use of sympathetic blocks in clinical practice, there is limited high quality research available regarding their efficacy for providing analgesia.^[5] The majority of the studies are case reports, case series or retrospective reports, with very a few high quality, placebo-controlled, blinded studies existing in the literature.^[5–7] One randomized, double-blind active-control study investigated the efficacy of thoracic sympathetic blocks (TSB) for upper limb CRPS type-1.^[8] At 12 months, the average pain scores were significantly lower in the TSB group (3.47 ± 3.5) compared to the control group (5.86 ± 2.9 ; $P=.046$).^[8] Also noteworthy is that the scores from the McGill Pain Questionnaire (MPQ), Neuro-pathic Pain Symptom Inventory (NPSI), and Hospital Anxiety and Depression Scale (HADS) were significantly lower in the TSB group compared to the control group at 1 and at 12 months.^[8]

Despite the frequent use of sympathetic blocks in clinical practice, there is limited high quality research available regarding their efficacy for providing analgesia.^[5] However, in a subset of patients with diagnosis of CRPS, sympathetic blocks may have significant effect on the reversal of pathology with significant reduction in pain, and other symptoms and signs related to CRPS, thereby allowing patients to resume effective physical therapy to regain their functionality.

In our case series, all 3 patients responded very favorably to sympathetic blocks with dramatic reversal of pathology. All patients reported almost complete resolution of pain, symptoms and signs within 6 months duration following the diagnosis of complex regional pain syndrome. All 3 patients were able to wean their pain medications and achieve normal activities of daily living without any significant limitations. All patients were able to return to full-time employment.

7. Conclusion

Considering the limited availability of treatment options in CRPS, and the lack of high quality research regarding efficacy of sympathetic blocks in the treatment of CRPS, it is important to report the case series with positive clinical response to sympathetic blocks to highlight that the sympathetic blocks maybe very effective in the treatment of complex regional pain syndrome in a subset of patients. Thus, early institution of sympathetic blocks should be considered in complex regional pain syndrome prior to physical therapy and consideration of more invasive pain management interventions. Further high-quality research is needed to better demonstrate the clinical efficacy of sympathetic blocks.

Author contributions

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