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# Sympathetic Nerve Block in Use Management of Vasculitis-Induced Complex Regional Pain Syndrome: A Case Report

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**Background:** Leukocytoclastic vasculitis (LCV) can lead to both dermatological and neuropathic symptoms with many patients ultimately meeting criteria for complex regional pain syndrome (CRPS). While there are accepted treatments for both LCV and CRPS, when these treatments fail, there is very limited evidence for next steps in management.

**Case Report:** A 34-year-old woman with a history of COVID exposure-induced LCV presented to the pain medicine clinic with back and left lower leg pain. The patient failed medical management and initial conservative interventions. Ultimately lumbar sympathetic nerve block resulted in significant and lasting improvement in her symptoms.

**Conclusions:** Sympathetic blockade shows promise in the treatment of refractory vasculitis and chronic pain. More extensive research with a larger sample size and longer patient follow-up is necessary to determine the true efficacy of sympathetic nerve block in both CRPS and vasculitis.

**Key words:** Complex regional pain syndrome, leukocytoclastic vasculitis, lumbar sympathetic nerve block

## BACKGROUND

Leukocytoclastic vasculitis (LCV) is a complex debilitating condition affecting numerous individuals, with an incidence of 4.5 per 100,000 person-years (1). This histopathological finding consists of a small vessel vasculitis (SVV) in which the inflammatory infiltrate is composed of neutrophils that have degranulated and undergone leukocytoclasia, resulting in fibrinoid necrosis and nuclear degeneration present in many cases of SVV (2). LCV is associated with many drugs, infections, malignancies, and systemic diseases and can be found in antineutrophil cytoplasmic antibody (ANCA)-associated vasculitis, immune complex vasculitis, and vasculitides associated with systemic disease (3,4). The clinical presentation of LCV can be systemic or purely dermatologic. The most common dermatologic symptoms include palpable purpura and hive-like papules and plaques resulting in burning, itching, or pain of the associated skin. Signs of systemic vasculitis include fever, weight loss, arthritis, myalgia, and other constitutional symptoms (5). Because of the inflammation and subsequent injury caused by LCV, in rare cases it can lead to a syndrome called complex regional pain syndrome (CRPS). There are very few documented cases of vasculitis leading to CRPS and even fewer for COVID-induced LCV specifically.

CRPS is defined by a continuing regional pain that is disproportionate in time or degree to the usual course of any known cause with the absence of another diagnosis that would better explain symptoms and signs. The pain is regional and usually has a distal predominance. CRPS is a clinical diagnosis and classified into type 1 (formerly known as reflex sympathetic dystrophy) and

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type 2 (formerly known as causalgia). In CRPS type 1, there is no definitive nerve damage, versus in type 2 where evidence of nerve damage is present (6). The Budapest criteria can be used to diagnose CRPS and require symptoms in at least 3 of the following 4 categories: sensory, vasomotor, sudomotor, and motor/trophic (7). The treatment for CRPS centers around physical therapy and symptomatic pain management. Pharmacotherapy consists of nonsteroidal anti-inflammatory drugs (NSAIDs), with adjuvant medications for neuropathic pain such gabapentin and pregabalin, tricyclic antidepressants, and topical creams. When medical management fails, interventional options include sympathetic nerve blocks or implanted devices such as spinal cord and peripheral nerve stimulators. Sympathetic nerve blocks involve an injection of a local anesthetic such as lidocaine or bupivacaine around the local sympathetic ganglion under fluoroscopic or ultrasound guidance. Because the sympathetic ganglia and plexi are anatomically separate from the somatic nerves, they are accessible to cutaneous interruption. Complications of sympathetic nerve blockade depend on the location. Lumbar sympathetic block complications include hypotension secondary to vasodilation of the lower extremities and genitofemoral nerve injury (8).

## CASE

A 34-year-old woman with a history of LCV presented to the pain medicine clinic with back and left lower leg pain. Her symptoms began after a COVID-19 exposure 9 months prior without ever developing the illness. She was empirically treated with azithromycin to which she developed a drug reaction and noticed bruises in various places. A biopsy was performed, and she was diagnosed with LCV. Subsequently, steroids were trialed; however, they made her symptoms worse. In addition to the bruising, she noted changes in sensation to her left lower extremity from her lateral thigh to her shin as well as lower back pain. A few months later, she developed left foot drop and intermittent left ankle swelling resulting in multiple falls. About 3 weeks prior to initial presentation, the pain started moving to the right lower extremity with associated right foot drop. Around this time, the back pain changed to shooting pain to her right shoulder blade. She described the pain as aching and sharp while rating it an 8 of 10 on the numeric pain scale. The pain also radiated to the lateral aspect of her left lower extremity to her foot. She had pain behind her left knee and in her left calf as well. She noted that elevating her legs alleviated the pain, which was worse in the morning. In addition to pain, she noted swelling of her left lower extremity around her knee and lateral hip. She also reported "bruising discolorations," her left lower extremity becoming cold, slower growth of her left big toenail compared to her right, dysesthesias, and allodynia. Because of the pain, she avoided walking and using her left lower extremity. She denied any associated numbness, tingling, weakness, or bowel and bladder incontinence. She was taking dapsone 25 mg twice daily for active vasculitis and pregabalin 50 mg twice daily for pain. She had previously completed physical therapy, which provided mild subjective improvement, and trialed gabapentin and cyclobenzaprine without improvements.

On physical examination the patient was not in acute distress and was alert and oriented to person, place, and time. She had a normal mood with a congruent affect. She demonstrated tenderness to palpation over the left lumbosacral paraspinal muscles with negative straight leg, FABER (Flexion, Abduction, and External Rotation), and lumbar facet loading tests bilaterally. Her neurologic exam demonstrated grossly intact cranial nerves II-XII and 2+ bilateral patellar and Achilles reflexes. In addition, she demonstrated dysesthesias in the left anterior and lateral thigh and left anterior, lateral, and posterior leg. Her musculoskeletal exam exhibited 5 of 5 strength of the bilateral lower extremities. Her skin was warm and dry without rashes.

After her initial visit, she was started on duloxetine 20 mg, methocarbamol 500 mg 3 times a day as needed, and meloxicam 15 mg daily as needed. Because of failed conservative therapy, a left L5/S1 transforaminal epidural steroid injection (TFESI) was performed which resulted in 80% improvement for one week. At her follow-up visit one month later, she felt like the improvements had mostly worn off, and was complaining of more muscle spasms and significant left hip pain. Initially, her presentation met Budapest criteria for a CRPS diagnosis due to persistent sensory, vasomotor, motor, and trophic symptoms; however, there was uncertainty given that some of her pain may have been radicular in nature. Yet after TFESI failed to improve her symptoms, radiculitis was ruled out, and a diagnosis of CRPS was made. The duloxetine, meloxicam, and methocarbamol were helpful, but she complained of mild drowsiness. The duloxetine was increased to 40 mg daily, and a left lumbar sympathetic nerve block was performed. At her follow-up visit one month after the left lumbar sympa-

thetic nerve block, she reported 50% improvement in her left lower extremity pain with complete resolution of left anterior thigh numbness. Three weeks later, she underwent a second left lumbar sympathetic block. At her 2-week follow-up visit, she reported 80% improvement in her left lower extremity pain and was able to use the extremity. She continues to complete physical therapy with use of her left lower extremity.

## DISCUSSION

This case demonstrates a patient who developed vasculitis after COVID exposure and ultimately met criteria for a CRPS diagnosis. After failing conservative treatment, a sympathetic nerve block was performed which significantly improved her pain. A second block was done, which has continued to help, and, as of her 3-month follow-up, allows her significant use of her left lower extremity.

One of the many noted complications of COVID-19 infection has been vasculitis, most commonly LCV, IgA vasculitis, and Kawasaki disease-like vasculitis (9). Oxidative stress and hypoxia induced by COVID-19 infection lead to endothelial inflammation, apoptosis, and dysfunction, which are mediated by various inflammatory cytokines and immunoglobulins (10). This cytokine storm and rise in IL-6 levels can result in immune complex deposition in the small vessels and subsequent neutrophil activation (11). LCV is characterized by immune system activation, and thus elevated levels of serum IL-1, IL-6, IL-8, and tumor necrosis factor have been linked to vasculitides (12). A systemic review of COVID-19-associated vasculitis describes 3 cases of COVID-19-associated LCV. However, none of the cases had nerve pain or led to CRPS, and all patients were successfully treated with a course of steroids (8). The widely accepted management of patients with LCV includes a short dose of steroids. However, in patients who fail steroid therapy and have continued active disease, the next steps are unclear (5). While there are several medical options, their effectiveness has been limited to case reports. Dapsone has been found to be effective in a small case series (13) while colchicine was reported to improve skin and joint symptoms in cutaneous vasculitis (14). In urticarial predominant vasculitis, hydroxychloroquine was reported to help alleviate symptoms (15). Because our patient's symptoms were neurological rather than cutaneous, dapsone was used but failed to relieve her symptoms. There have been very few reports of cases when the above-mentioned agents failed. In those cases, more potent immunosuppressants such as azathioprine, methotrexate, or mycophenolate mofetil have been considered. These immunosuppressants, however, often have severe side effects and are saved for patients with potential organ damage from their vasculitis (5). Because her symptoms were pain-related and she met criteria for CRPS, interventional options were considered. There is limited documentation of the use of nerve blocks in vasculitis.

While the underlying cause of CRPS is unknown, it has been hypothesized that the sympathetic nervous system is a major contributor of pain in CRPS. Rat-based models have shown sprouting of sympathetic fibers into the sensory dorsal root ganglia after peripheral nerve injury, which gives a possible explanation of the link between CRPS and sympathetic mediated pain (16). Although sympathetic nerve blocks have been used for many years in treatment of refractory CRPS, there lacks a consensus. A systematic review of 12 randomized trials with 461 total participants demonstrated no consensus of benefit with most studies showing no difference in pain outcomes between sympathetic nerve block compared to other active treatment (17). The study ultimately concluded that there remains a lack of high-quality evidence to support or refute the use of sympathetic nerve blocks in CRPS. Because of this, patients considering sympathetic block in refractory CRPS are typically managed on a case-by-case basis. This case report helps support the evidence that sympathetic blockade can be used in refractory CRPS. In addition, it is the first documented case of sympathetic nerve block being used in CRPS secondary to COVID exposure-induced vasculitis.

Further exploration of the use of sympathetic nerve blocks for vasculitis should be performed. In addition, while this case does support the use of sympathetic nerve blocks in refractory CRPS, more research is needed, and further cases should be handled individually.

## CONCLUSION

LCV has various etiologies and can lead to both dermatological and neuropathic symptoms. Patients with vasculitis and pain symptoms can meet criteria for CRPS. While there are accepted treatments for both LCV and CRPS, when these treatments fail, there is very limited evidence for next steps in management. Nonetheless, sympathetic nerve block has promise in treating these refractory cases based on the hypothesized involvement of the sympathetic nervous system

in CRPS. In this case report of a woman with chronic pain secondary to COVID exposure-induced LCV, sympathetic nerve block improved her pain in the setting of failed medical management. This case shows the promising use of sympathetic blockade in refractory vasculitis and chronic pain and is the first to report successful use of such intervention in CRPS secondary to COVID exposure-induced vasculitis. More extensive research with a larger sample size and longer patient follow-up is necessary to determine the true efficacy of sympathetic nerve block in both CRPS and vasculitis.

## REFERENCES


1. Arora A, Wetter DA, Gonzalez-Santiago TM, Davis MDP, Lohse CM. Incidence of leukocytoclastic vasculitis, 1996 to 2010: A population-based study in Olmsted County, Minnesota. *Mayo Clin Proc* 2014; 89:1515-1524.
2. Caproni M, Verdelli A. An update on the nomenclature for cutaneous vasculitis. *Curr Opin Rheumatol* 2019; 31:46-52.
3. Bouiller K, Audia S, Devilliers H, et al. Etiologies and prognostic factors of leukocytoclastic vasculitis with skin involvement: A retrospective study in 112 patients. *Medicine (Baltimore)* 2016; 95:e4238.
4. Blanco R, Martínez-Taboada VM, Rodríguez-Valverde V, García-Fuentes M. Cutaneous vasculitis in children and adults: Associated diseases and etiologic factors in 303 patients. *Medicine (Baltimore)* 1998; 77:403-418.
5. Fraticelli P, Benfaremo D, Gabrielli A. Diagnosis and management of leukocytoclastic vasculitis. *Intern Emerg Med* 2021; 16:831-841.
6. Misidou C, Papagoras C. Complex regional pain syndrome: An update. *Mediterr J Rheumatol* 2019; 30:16-25.
7. Harden RN, Oaklander AL, Burton AW, et al. Complex regional pain syndrome: Practical diagnostic and treatment guidelines, 4th edition. *Pain Med* 2013; 14:180-229.
8. Doroshenko M, Turkot O, Horn DB. Sympathetic nerve block. In: *StatPearls [Internet]*. Treasure Island, FL, StatPearls Publishing, 2022. Date Accessed 05/22/2022.
9. Wong K, Farooq Alam Shah MU, Khurshid M, Ullah I, Tahir MJ, Yousaf Z. COVID-19 associated vasculitis: A systematic review of case reports and case series. *Ann Med Surg (Lond)* 2022; 74:103249.
10. Becker RC. COVID-19 update: COVID-19-associated coagulopathy. *J Thromb Thrombolysis* 2020; 50:54-67.
11. Hoskins B, Keeven N, Dang M, Keller E, Nagpal R. A child with COVID-19 and immunoglobulin A vasculitis. *Pediatr Ann* 2021; 50:e44-e48.
12. Baigrie D, Goyal A, Crane JS. Leukocytoclastic vasculitis. In: *StatPearls [Internet]*. Treasure Island, FL, StatPearls Publishing, 2022. Date Accessed 05/23/2022.
13. Fredenberg MF, Malkinson FD. Sulfone therapy in the treatment of leukocytoclastic vasculitis: Report of three cases. *J Am Acad Dermatol* 1987; 16:772-778.
14. Sais G, Vidaller A, Jucglà A, Gallardo F, Peyrí J. Colchicine in the treatment of cutaneous leukocytoclastic vasculitis: Results of a prospective randomized controlled trial. *Arch Dermatol* 1995; 131:1399-1402.
15. Lopez LR, Davis KC, Kohler PF, Schocket AL. The hypocomplementemic urticarial-vasculitis syndrome: Therapeutic response to hydroxychloroquine. *J Allergy Clin Immunol* 1984; 73:600-603.
16. Chen SS, Zhang JM. Progress in sympathetically mediated pathological pain. *J Anesth Perioper Med* 2015; 2:216-225.
17. O'Connell NE, Wand BM, Gibson W, Carr DB, Birklein F, Stanton TR. Local anaesthetic sympathetic blockade for complex regional pain syndrome. *Cochrane Database Syst Rev* 2016; 7:CD004598.