

Integrative Approach Focusing on Acupuncture in the Treatment of Chronic Complex Regional Pain Syndrome

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Abstract

Background: Chronic complex regional pain syndrome (CRPS) is a chronic pain condition that leads to sympathetic nervous system involvement and trophic changes.

Objective: This study describes the use of acupuncture in a case study of CRPS.

Design, setting, and patient: This is a single case report of a 34-year-old patient diagnosed with CRPS.

Intervention: Acupuncture treatment including acupoints along the Gallbladder, Liver, Spleen, Heart, and Kidney meridians. Self-treatment plan included a laser acupuncture pen device and disposable press needles.

Main outcome measures: Beck Depression Inventory (BDI), McGill Pain Questionnaire, and Sheehan Disability Scale (SDS).

Results: The Patient reported a decrease in pain levels, depression, and an improved quality of life. Pretreatment SDS score of 17, a 12 on the BDI, and a 67 on the McGill Pain Questionnaire. Post-treatment SDS decreased to 4, her BDI went to 0, and her McGill Pain Questionnaire decreased to a 10.

Conclusions: More research is needed and case studies performed to support our findings.

Introduction

IN 1995, THE INTERNATIONAL ASSOCIATION for the Study of Pain (IASP) established criteria to unify two diagnoses known previously as reflex sympathetic dystrophy and causalgia because neither one fully described the spectrum of symptoms that encompassed sympathetic nervous dysfunction triggered by a nerve and/or soft tissue injury. The study coined the term “complex regional pain syndrome” (CRPS) and further subcategorized the disease as either type I (without causalgia) or type II (with causalgia). Causalgia essentially means there is evidence of a nerve injury such as numbness and weakness.¹

CRPS is poorly understood, and often goes unrecognized or disbelieved as a valid diagnosis. It is estimated (per the Reflex Sympathetic Dystrophy Syndrome Association) that approximately 1.5–6 million Americans are currently afflicted. CRPS is three times more common in middle-aged women than men, is triggered by an injury (with fractures thought to be the most common mechanism),¹ and is generally considered to be reversible in early stages. However, in a retrospective cross-sectional analysis of patients with CRPS, findings suggest that after 1 year the disease either

stabilizes with residual symptoms or progresses,² thus making early diagnosis and intervention critical.

The IASP decided on four major criteria for CRPS that must occur in the context of an injury and pain that is disproportionate to the inciting agent. These signs/symptoms include one or more of the following: abnormal function of the sympathetic nervous system, swelling, movement disorder, and changes in tissue growth (dystrophy and atrophy). Until recently, the exact mechanism of CRPS has remained elusive. Recent studies indicate a possible genetic component to the neurogenic inflammation and neuropeptide signaling that accompanies the disorder (substance P and tumor necrosis factor α), with subsequent trauma-related upregulation of neuropeptides at the site of the injury and impaired inactivation on both sides of the body.³ It is theorized that symptoms and complete neuromodulation of patients afflicted with CRPS takes several weeks to fully evolve.¹ Insomnia and emotional lability (limbic dysregulation) frequently follow.⁴

Treatments for CRPS are numerous and lacking in broad-based applicability. Such measures include but are not limited to physical/occupational therapy, aqua therapy, medications, transcutaneous electrical nerve stimulation unit

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treatments, serial sympathetic nerve blocks, sympathetic radiofrequency nerve ablation at affected levels, sympathectomy, spinal cord stimulators, and implantation of a morphine pump.¹

Not much has been written about acupuncture and CRPS, except one case report and one research study in the medical literature documenting the effects of acupuncture for the treatment of CRPS. In one case report, the authors utilized a 4-month treatment plan in a multidisciplinary approach using acupuncture (HT7 and TH5) and chiropractic care as a treatment of choice for CRPS.⁵ In a double-blinded, placebo-controlled prospective trial, 14 patients were randomly assigned to either a classical acupuncture (group A) or sham acupuncture (group S). Both groups received 30 minutes of the same intensive standard treatment 5 times a week for 3 weeks. Pain levels improved in both groups and reached nearly normal levels after 6 months.⁶ However, we described a remarkable case of remission utilizing frequent (3 times a week) acupuncture treatments over a 6-month period using acupuncture plus continuous use of disposable press needles over the skin of affected areas that resulted in an almost complete reversal of pain and trophic changes (muscles atrophy, accelerated hair and nail growth, and skin changes).

Case Report

The patient is a 34-year-old woman. During a 7-month deployment to Iraq in 2007, she sustained a severe right ankle sprain while dismounting from a Black Hawk helicopter. The patient received treatment at the local Combat Support Hospital, was given an ankle brace and tramadol as needed for pain, and was instructed to use rest, ice, and later heat as needed. The pain persisted for several weeks after returning from the deployment. She tried to remain active; however, her pain increased with any type of impact (running, walking, etc.), except the use of the elliptical machine.

The patient was seen by orthopedics at a military treatment facility in October 2007 and given a profile for light duty to heal suspected Achilles tendonitis, due to referred pain she described on the back of her heel. She had swelling of the ankle joint and stated that the pain was spreading to her right calf. Her orthopedist recommended rest, nonsteroidal anti-inflammatory drugs, and stated that there might be inflammation of the periosteal lining of the involved joint. The patient was reevaluated and stated continued pain. Her doctor ordered a right lower extremity magnetic resonance imaging scan, which showed a 2-cm osteochondral dissecans (OCD) lesion of the inferior right talus bone that was confirmed by a computed tomography scan. She was referred to the cast clinic for a 6-week trial of treatment in a walking cast "in an attempt to conservatively heal the bone."

Patient progressed to non-weight-bearing status on crutches due to worsening pain (likely from inactivity) with an air cast prior to undergoing surgery to repair her OCD lesion on the posterior medial aspect of the talus. She rated her right ankle pain 0 out of 10 on the pain scale postsurgery. Right medial ankle pain gradually increased postsurgery, and the patient still exhibited right leg atrophy with burning pain along the right gastrocnemius down to the right medial malleolus. The pain pattern was nondermatomal in nature. Upon further scrutiny, it was determined that the pain followed the distribution of the femoral artery, mainly the

medial half of the right leg, inner groin, inner medial thigh, and the entire right ankle. Opiates were discontinued with improvement in her pain to baseline levels, and a sympathetic block was ordered for suspected CRPS.

The pain spread to her right arm 4 days after the patient had the lumbar sympathetic block performed. The patient complained of right shoulder stiffness and right biceps/triceps pain accompanied by constant muscle spasms. There was burning pain with stiffness in her shoulder, elbow, wrist, hip, knee, and ankle (all on the right side) and accelerated nail and knuckle hair growth on her last two digits (ulnar artery distribution) within days of the procedure. Since the lumbar sympathetic block, her pain spread to the right side of her neck, face, dorsal/ventral back, and abdomen. She complained of frequent blurry vision and also described right-sided headaches (from the occiput to the right eye) that worsened with barometric changes. The patient rated her pain an 8 out of 10 on the pain scale before self-referring for acupuncture.

The patient was diagnosed by a pain specialist in the Pain Management Clinic at a military treatment facility according to the IASP diagnosis criteria. The patient had a cause of immobilization (prior injury and surgery on the posterior medial aspect of the talus), had continuing pain (the patient exhibited severe, constant, burning and/or deep aching pain in her right inner medial thigh, right medial malleolus, and right shoulder), evidence at some time of edema (the patient exhibited edema with a sharply demarcated on the surface of the right ankle), changes in skin blood flow (patient exhibited redness on the right inner medial thigh), or abnormal sudomotor activity in the area of pain. The diagnosis also excluded the existence of any conditions that would otherwise account for the degree of pain and dysfunction.

Methods

Prior to the 6-month acupuncture protocol, the patient scored a 17 on the Sechan Disability Index, a 12 on the Beck Depression Inventory (BDI) (>30 is clinically significant), and a 67 on the McGill Pain Questionnaire (higher numbers indicate severity of pain and the maximum score is 78). The SDS, BDI, and the McGill Pain Questionnaire self-assessment reports were utilized based on the symptoms that patients with chronic pain would experience in CRPS (depression, impairments in social and occupational functioning, and chronic pain symptoms). Additionally, the BDI was developed to assess depressive symptoms *vis-à-vis Diagnostic and Statistical Manual of Mental Disorders*, 4th edition. It has fair-to-good correlations (i.e., 0.68, 0.37, and 0.71) with other measures of depression (such as the Beck Hopelessness Scale, Suicide Probability Scale, and Revised Hamilton Psychiatric Rating Scale for Depression). Internal consistency (coefficient α) estimates of reliability range between 0.39 and 0.69, whereas the test-retest reliability estimate after 1 week is in the acceptable range (i.e., $r = 0.93$). The Sheehan Disability Inventory (SDI) measures the severity of impairments in social, occupational, or other important areas of functioning in patients with chronic pain. The SDI is a three-item self-report scale measuring the severity of disability in the domains of work, family life/home responsibilities, and social/leisure activities. It has been shown to have adequate internal reliability (α -coefficients and factor analyses) and construct/

criterion related validity. The McGill Pain Questionnaire consists primarily of three major classes of word descriptors—sensory, affective, and evaluative—that are used by patients to specify subjective pain experience. The McGill Pain Questionnaire provides quantitative information that can be treated statistically, and is sufficiently sensitive to detect differences among different methods to relieve pain.

Treatment began after obtaining the patient's consent. Acupuncture sessions were conducted 3 times weekly for 1 hour during a period of 6 months. Seirin acupuncture needles (0.20×30 mm) were utilized in this case study. Needles were inserted at a depth of ¼ inch. Needles were inserted subcutaneously with no needle manipulation. The acupuncture treatment protocol included the gallbladder channel unilaterally on the left GB41, GB40, GB20, the Liver channel unilaterally on the left using LR2, LR8, the Spleen channel unilaterally on the right SP6, SP9, and SP10, followed by the Heart channel bilaterally using HT7 and HT3, and the Kidney channel unilaterally on the right using KI6, KI3. Additionally, points at BL60 (R), *Yintang*, LI4 (bilaterally), and SI3 (bilaterally) were also utilized.

The patient utilized a self-treatment protocol for her specific disease presentation. Her acupuncturist gave her diagrams and a treatment protocol for her to follow using the acupuncture laser pen (MF-1900 Laser Pen with a wavelength of 660–680 nm from HBW Supply, Inc.). The patient was instructed to use the laser pen at a continuous frequency daily on each acupoint for a total of 3 minutes. Protocol involved the Gallbladder channel unilaterally on the left (using GB41, GB40, GB20), the Liver channel unilaterally on the left (using LR2, LR8), the Spleen channel unilaterally on the right (SP6, SP9, and SP10), followed by the Heart channel bilaterally (using HT7 and HT3), and the Kidney channel unilaterally on the right (using KI6, KI3). Points BL60 (R), *Yintang*, LI4 (bilaterally), and SI3 (bilaterally) were added midway through the treatment. In times of severe pain and stress, her protocol included the above, then adding GB8 (R), BL2 (R), TH23 (R), and GB20 (R) for her severe migraines, and any trigger points she complained of near the occiput at the time of an acute flare. For times when she had severe right inner thigh pain, SP6, SP9, SP10, LR8, LR11, and LR10 were treated. For severe right shoulder pain, SI3, LI4, LI15, GB21, and TH14 were treated. For her severe right ankle pain, BL60, KI6, BL62, and KI3 were treated. For severe right sternocleidomastoid muscle (SCM) pain, LI18, SI16, TH16, and TH17 were treated. Lastly, for stress and anxiety HT7 (bilaterally) with PC6 (bilaterally) and *Yintang* were treated. Press needles were used on trigger points on the affected right ankle, right shoulder, right inner medial thigh, right SCM, and medial border of the right scapula.

The patient also utilized the elliptical machine 5–6 times a week for 30–40 minutes per workout to reduce her pain symptoms. Medications to manage her severe chronic pain were also utilized (tramadol HCl 150 mg b.i.d. and tramadol CR 100 mg at night).

A one-time re-evaluation of post-treatment (after the 6-month treatment protocol) rating scales showed substantial improvement. Her SDS decreased to 4, her BDI went to 0, and her McGill Pain Questionnaire dropped to a 10. Self-treatments with the laser pen, a balanced diet, pain medications, cardio workouts on the elliptical machine several times a week, and avoiding strenuous physical activity has led to a 70% reduction in her pain (on average 5 days a week

pain free) with a drastic improvement in her quality of life. The patient started to experience a reduction in her pain levels 3 weeks into the treatment protocol. Sustained pain reduction did not occur until the sixth month of the treatment protocol.

Discussion

The acupuncture treatment plan needed be intense enough to reverse the patient's chronic pain symptoms. A treatment plan that included three acupuncture sessions per week for a period of 6 months with the use of a multitude of acupoints was necessary in this case study. The patient was already in the chronic phases of the disease course when a sympathetic block was performed, thus increasing the chance of spreading symptoms after her procedure. At this phase, any type of invasive procedure comes with a high risk of spreading symptoms.¹ CRPS is theorized to spread distally until it reaches the nearest autonomic ganglion, and can either spread laterally (thus "mirroring" symptoms into the opposite limb as observed in the above case) or ascend up the same side of the body through the autonomic chain¹ (also observed in the above case). Left untreated, symptoms can spread throughout the entire body and increase the likelihood of complications including rashes, spontaneous bruising, eye changes (thought to be due to poor circulation of brainstem regions),⁴ headaches,⁴ and amputations from worsening disease progression related to suppression of endogenous endorphins via immobilization and/or chronic use of opiates.⁴ The patient's case is notable for worsening disease progression due to suppression of her endogenous endorphins from use of long-acting opiates, long-term immobilization, and lack of exercise. This combination likely accelerated dysfunctional neuromodulation and vascular changes, which are theorized to cause muscle spasm and atrophy (it has long been accepted that atrophy associated with CRPS occurs from sympathetic cellular-mediated changes and not solely from disuse⁴), and the spreading of her symptoms after undergoing invasive procedures. Worsening cellular damage can also manifest as rashes¹ and increased pruritus,⁴ which the patient complained of while on MS Contin (morphine sulfate).

Additionally, since the patient exhibited severe burning pain and constant muscle spasms, the novel approach of using cutaneous pushpins and maintenance therapy of self-treatment with an acupuncture laser pen needed to be utilized to prolong the therapeutic effects of acupuncture. Acupoints for the self-treatment plan were selected based upon the pain distribution that the patient exhibited. The patient's severe burning pain on the inner right medial thigh and the right medial malleolus was addressed with acupoints at SP6, SP9, SP10, KI6, KI3, and BL60. Her low-back and right-shoulder pain was addressed with LI4 (bilaterally) and SI3 (bilaterally). Acupoints that were utilized to improve the patient's depression included *Yintang*, HT7 (bilaterally), HT3 (bilaterally), points on the Gallbladder channel unilaterally on the left (using GB41, GB40, GB20), and the Liver channel unilaterally on the left (using LR2, LR8). Additional points were included in the acupuncture self-treatment plan to enable the patient to address acute flares in her right shoulder, right ankle, right SCM, right inner thigh, and right-sided temporal migraines. By utilizing this self-treatment

plan, the therapeutic effects lasted longer and it also empowered the patient, enabling her to self-treat her chronic pain symptoms.

It should be noted that the patient was utilizing exercise (elliptical machine) and pain medications (tramadol) prior to the implementation of the laser acupuncture self-treatment plan and the application of weekly acupuncture sessions for her CRPS. The patient did not sustain any pain reduction until the start of the acupuncture treatment plan and the self-treatment plan.

Conclusions

Given the lack of high efficacy rates for the procedures and treatments of CRPS, the above style of acupuncture with the novel approach of using cutaneous pushpins and maintenance therapy of self-treatment with an acupuncture laser pen is a viable and promising alternative treatment for CRPS.

This patient's dramatic response to treatments justifies further clinical studies utilizing an integrative approach with a focus on acupuncture in the treatment of chronic CRPS. Since this case study involved only 1 subject, a future CRPS acupuncture study that includes a bigger population size with a randomized wait-list control is needed to support the findings in this case report. Additionally, since this case study involved a 6-month treatment period with a complex treatment plan, a future case study will need to be designed to further assess the feasibility of this study, and include a shorter treatment period (i.e., 1 month versus 3 months) and a more defined acupuncture treatment protocol.

Acknowledgments

The authors would like to thank Bob Deschner for contributing his knowledge of CRPS to this case report.

Disclosure Statement

No competing financial interests exist.

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