

# Pain Management and End-of-Life Care CME Program

## Module 5

**Registration:** The registration page and test questions are at the end of this article (pages 72-74). The 11 questions must be answered and submitted to the CSA in order to receive the CME credit. The full text of each module of this CME program, along with references, also will be accessible through the CSA Web Site, [www.csahq.org](http://www.csahq.org).

**Fees:** This is a free service for CSA members. Non-members will be charged \$25 per CME credit hour. Your CME certificate will be mailed from the CSA office.

**Availability:** This module is available from March 31, 2005, until March 31, 2008.

**Target Audience:** California law now requires that every licensed physician complete 12 credit hours in pain management and end-of-life care by the end of 2006. This module fulfills one credit hour of CME toward that requirement. This program is intended for all licensed physicians, including anesthesiologists, residents, and physicians with an interest in pain management.

### Faculty and Disclosures for Module 5:

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The California Society of Anesthesiologists Educational Programs Division designates this educational activity for a maximum of 1 credit hour toward the AMA Physician's Recognition Award.

**Evaluation:** An evaluation of Module 5 of this series is offered after the test questions. Please fill in your responses and return them to the CSA office.

**Objectives:**

1. Understand the symptoms of Complex Regional Pain Syndromes (CRPS);
2. Distinguish CRPS1 from CRPS2; and
3. Discuss the treatment algorithm for CRPS.

**Resources:** These materials are offered online at the CSA Web Site at [www.csahq.org](http://www.csahq.org) also. The questions are also available online. Please fill out the registration form, answer the questions, fill out the evaluation form and fax (650) 345-3269 or mail these to the CSA office at 951 Mariner's Island Boulevard #270, San Mateo, CA 94404.

## Complex Regional Pain Syndromes

*By Joshua P. Prager, M.D., M.S., Clinical Assistant Professor of Anesthesiology and Internal Medicine at the David Geffen School of Medicine at UCLA*

*Dr. Prager received his M.D. and M.S. (Management/Health Services Research) from Stanford in 1981. He completed his Internal Medicine Residency at UCLA and Anesthesia Residency at Massachusetts General Hospital. He has served on the full-time faculty at Harvard Medical School and at UCLA where he was the Director of the Pain Medicine Center. Currently, he is Director of the Center for the Rehabilitation of Pain Syndromes (CRPS) at 100 UCLA Medical Plaza, a multi-disciplinary program focused on the functional rehabilitation of patients with CRPS. He is President-Elect of the North American Neuromodulation Society (NANS), the society of physicians who implant devices for the control of pain and spasticity and other nervous system disorders. An award winning amateur blues harmonica player known as Dr. Lester "Les" Payne, Dr. Prager is also the Editor of the CSA Pain and End-of-Life CME Program.*

Complex Regional Pain Syndromes (CRPS) are a group of nervous system disorders that manifest themselves in the periphery. Despite the fact that early diagnosis and treatment can make a significant difference for the patient, CRPS is poorly understood by most practicing physicians.

This article serves as a primer for physicians who do not usually care for patients with CRPS. The information contained here provides the clinician with a global perspective on the syndromes and dispels many misconceptions. Very little is taught in medical school and most residencies about CRPS so that most of what is learned about these syndromes by nonspecialists occurs when a CRPS patient is encountered. Often, the diagnosis is made later than it could have been, resulting in significant consequences for the patient. Early intervention can alleviate the symptoms, minimize suffering, and often prevent the progression of the syndrome.

It is important to understand that Complex Regional Pain Syndromes are nervous system disorders, despite the fact that physical manifestations are often seen in the periphery. CRPS can be caused by minor trauma, including appropriately performed surgery, resulting in visible findings in the periphery. Modern nervous system imaging techniques demonstrate the changes in activity in areas of the brain in patients with CRPS.<sup>1</sup>

## History

In Module II of this series,<sup>2</sup> an early description of CRPS was cited to conclude the article. The end of the quotation stated, “The seat of burning pain intensity varies from a most trivial burning to a state of torture which can hardly be credited, which reacts on the whole economy until the general health is seriously affected.”<sup>3</sup> Dr. Mitchell was an early author regarding CRPS. He was the first to recognize that the symptoms experienced by the patient in the periphery led to consequences that affected the general health. Dr. Mitchell was writing about soldiers who experienced blunt trauma in the Civil War. The syndrome he was discussing was causalgia.

John Bonica, M.D., an anesthesiologist, wrote about reflex sympathetic dystrophy more than 50 years ago. Dr. Bonica made significant contributions to the field with his descriptions. Dr. Bonica classified CRPS into various stages. Although this staging was useful at the time, we now recognize that patients can exhibit findings consistent with two of Bonica’s stages simultaneously. Thus, the concept of staging has become relatively obsolete. Instead, we can refer to patients as exhibiting some of the signs and symptoms of the various classic stages.

In the early 1990s, a group appointed by the International Association for the Study of Pain (IASP) met to discuss what is now termed Complex Regional Pain Syndromes. Previously, multiple names existed for the syndromes. Common terms included causalgia, reflex sympathetic dystrophy (RSD), and Sudeck's atrophy. The term "Complex Regional Pain Syndromes" was developed to encompass the constellation of syndromes. Reflex sympathetic dystrophy (RSD) was classified as CRPS I, whereas causalgia is now classified as CRPS II. We distinguish Type I from Type II CRPS on the basis of a clinically detectable injury to a major nerve in CRPS II. CRPS I (RSD) is marked by the absence of a major nerve injury.

Current diagnostic criteria for CRPS I are as follows:

1. Presence of an initiating noxious event or a cause of immobilization.
2. Continuing pain, allodynia, or hyperalgesia, with which the pain is disproportionate to any inciting event.
3. Evidence at some time of edema, changes in skin blood flow, or abnormal pseudomotor activity in the region of the pain.
4. The diagnosis is excluded by the existence of a condition that would otherwise account for the degree of pain and dysfunction.

It should be noted that Criteria 2 through 4 must be satisfied.<sup>5</sup>

The IASP has convened four meetings on CRPS in the last decade and a half to discuss diagnostic criteria and treatment. The most recent meeting, in 2003, underscored the treatment algorithm proposed at the 1995 meeting.<sup>6</sup>

## **Differential Diagnosis**

In Module IV of the series, Wallace<sup>7</sup> described in detail the sensory disturbances found in neuropathic pain syndromes. In early CRPS, many of these symptoms can be found. These include burning pain, hyperesthesia, hyperalgesia, and allodynia. In addition, in early CRPS, we see autonomic findings, including edema, vasomotor changes (including temperature and color changes), and sudomotor changes (including sweating changes). Most physicians are not aware that motor changes are frequently seen in this syndrome, including decreased range of motion, weakness, tremor, and dystonia. In addition, trophic changes occur in the skin, nails, and hair.<sup>8</sup> Changes can be seen with radiological imaging, including osteoporosis. Bone scintigraphy, including triple phase bone

scans, can be abnormal. Functional MRI of the brain can demonstrate abnormal perfusion in areas other than the sensory cortex.<sup>1</sup> When the pain is sympathetically maintained, sympathetic nerve blocks can decrease or eliminate the pain on a temporary basis.

Outcomes of procedures, such as sympathetic nerve blocks or triple phase bone scans, neither establish nor refute a possible diagnosis by themselves. Despite this, a common error made by physicians is to establish a diagnosis of CRPS based almost entirely on a positive response to sympathetic blockade. The differential diagnosis of Complex Regional Pain Syndromes includes unrecognized local pathology, other neuropathic pain syndromes, peripheral neuropathies, inflammatory and infection disorders, and vascular disorders. These etiologies should be ruled out before a diagnosis of CRPS is made.

CRPS should be differentiated from trauma. Clinically indistinguishable symptoms of pain, edema, and temperature asymmetry are present in both CRPS and trauma. Symptoms which differentiate early CRPS from trauma or post surgery include motor signs, trophic changes, and changes in hidrosis. The majority of patients develop CRPS after injury or surgery.<sup>9</sup> Figure 1 depicts the breakdown of the precipitating injury for the cause of CRPS.

In summary, CRPS is developed and maintained by abnormalities in the central and peripheral nervous system. Pathophysiological considerations include neurogenic inflammation, impairment of sympathetic function, and coupling between sympathetic efference and nociceptive afference,<sup>2,7</sup> as described in detail in Modules II and IV in this series.

One of William Osler's famous aphorisms states that if a clinician understands lues, the physician will understand medicine.<sup>10</sup> Similarly, given the discussion above, one could state that if one knows CRPS, then one will understand pain medicine.<sup>11</sup>

## **Treatment**

Understanding that CRPS is a nervous system disorder, with peripheral manifestations, it becomes essential to recognize that treatment must be multidisciplinary in nature. Clinical guidelines emphasize the multidisciplinary nature of treatment.<sup>12</sup> Figure 2 represents an updated interdisciplinary clinical pathway for CRPS.

The underlying principle of treatment is "Use it or lose it." Immobilization due to pain, guarding, or casting can exacerbate the syndrome. The mainstay of

treatment, as specified by the algorithm, is physical therapy. All interdisciplinary modalities should be oriented toward enhancing the physical therapy. Basics include oral and topical medications and psychological treatment with an educational focus.

Physical therapy begins with motivation, desensitization, and reactivation. As it progresses to the next phase, flexibility and edema control are achieved and diagnosis of secondary myofascial pain and its treatment are performed. In the next phase, the patient is moved to active range of motion, stress loading, and aerobic conditioning. The last phase of rehabilitation includes normalization of use, with vocational and functional rehabilitation. Figure 3 depicts this.

In the CRPS care continuum, although the mainstay is physical therapy, there are two adjuvant wings. When necessary, intensive psychological treatment is part of the rehabilitation. The other adjuvant wing is interventional pain management. This includes nerve blocks, including sympathetic nerve blocks. Inadequate or partial response mandates more invasive procedures, including neurostimulation and neuraxial drug infusions. Although sympathectomy often has dramatic short-term results, long-term consequences are significant.<sup>13</sup>

Important points regarding treatment include:

1. Physical therapy is the mainstay of treatment.
2. Nerve blocks should be used to enhance physical therapy and should not be a treatment unto themselves. The main goal is functional rehabilitation, and any neuro-destructive procedure should only be considered after noninvasive, reversible procedures, combined with active functional rehabilitation, have failed.

### **Special Considerations for the Anesthesiologist**

Anesthesiologists often are faced with the need to provide anesthesia for a patient with CRPS. Thus, special care must be provided to avoid painful stimuli from the site of surgery from reaching the central nervous system. Clearly, general anesthesia does not accomplish this. Regional anesthesia potentially can prevent a recurrence or occurrence of the syndrome from being precipitated. It is also important to note that CRPS has been caused by such minor traumas as intravenous line placement, blood donation, or simple blood draw.<sup>14</sup> With this understanding, the anesthesiologist should attend to these procedures with special care and attempt to minimize any painful stimuli associated with them.

## Summary

Complex Regional Pain Syndromes are nervous system disorders manifesting themselves with peripheral symptoms. Early intervention can play an important role in reducing the long-term sequelae of this syndrome. Whenever procedures are performed on these patients, care should be exercised to avoid painful stimuli.

“Because time is of the essence, failure to progress should be seen as a trigger to introduce regional anesthesia or neuromodulatory efforts to support the progressive rehabilitation.”<sup>15</sup>

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## Complex Regional Pain Syndromes-Cont'd

### Registration

To register for the CSA CME Course in Pain Management and End-of-Life Care, Module 5, fill out this form. Then make copies of the test and evaluation. Once you have answered the questions, **mail or fax** the form, the test answers and the evaluation to the CSA office at:

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### Questions

1. Which of the following are true regarding complex regional pain syndromes?
  - a. Reflex sympathetic dystrophy is classified as complex regional pain syndrome type II.
  - b. CRPS-I requires an injury to a major nerve.
  - c. The main goal of treatment of CRPS is to provide pain relief through nerve blocks.
  - d. All of the above.
  - e. None of the above.

## Complex Regional Pain Syndromes-Cont'd

2. Which of the following does not distinguish CRPS from trauma or post surgery?
  - a. Motor signs.
  - b. Trophic changes.
  - c. Pain, edema, and temperature asymmetry.
  - d. Increased sweating.
  
3. The differential diagnoses for CRPS includes:
  - a. Unrecognized local pathology.
  - b. Neuropathic pain syndromes.
  - c. Inflammatory and infectious disorders.
  - d. All of the above.
  - e. None of the above.
  
4. CRPS can manifest as:
  - a. Sensory change.
  - b. Motor change.
  - c. Autonomic change.
  - d. Trophic change.
  - e. All of the above.
  
5. Autonomic changes seen with CRPS include all of the following except:
  - a. Edema.
  - b. Temperature and color change.
  - c. Sweating change.
  - d. Blood pressure change.
  
6. Motor changes seen in CRPS include all of the following except:
  - a. Increased range of motion.
  - b. Weakness.
  - c. Tremor.
  - d. Dystonia.
  
7. Trophic changes in CRPS include all of the following except:
  - a. Skin changes.
  - b. Nail changes.
  - c. Tooth changes.
  - d. Hair changes.
  
8. Sensory changes with CRPS include all of the following except:
  - a. Burning pain.
  - b. Hyperesthesia.
  - c. Analgesia.
  - d. Hyperalgesia.
  - e. Allodynia.

## Complex Regional Pain Syndromes-Cont'd

9. CRPS can be caused by:
- a. Intravenous line placement.
  - b. Blood donation.
  - c. A simple blood draw.
  - d. Ankle sprain.
  - e. All of the above.
10. Which of the following is not part of the early interdisciplinary clinical pathway for treatment of CRPS?
- a. Physical therapy.
  - b. Nerve blocks.
  - c. Psychological treatment.
  - d. Sympathectomy.
11. A positive sympathetic nerve block and a positive triple phase bone scan establish a diagnosis of CRPS?
- a. True
  - b. False

## Evaluation of Module 5

As part of the CSA Educational Programs Division's ongoing efforts to offer continuing medical education, the following evaluation of this program is requested. This is a useful tool for the EPD in preparing future CME programs.

1. How well were the learning objectives of this program met?
- |                 |   |               |   |
|-----------------|---|---------------|---|
| Very Well       | 5 | Above Average | 4 |
| Average         | 3 | Below Average | 2 |
| Not Well at All | 1 |               |   |
2. How relevant was the information in this program to your clinical practice?
- |                 |   |               |   |
|-----------------|---|---------------|---|
| Very Well       | 5 | Above Average | 4 |
| Average         | 3 | Below Average | 2 |
| Not Well at All | 1 |               |   |
3. How would you rate this program overall?
- |                 |   |               |   |
|-----------------|---|---------------|---|
| Very Well       | 5 | Above Average | 4 |
| Average         | 3 | Below Average | 2 |
| Not Well at All | 1 |               |   |
4. Did you detect any commercial bias in this module?      Yes      No