

FUNDAMENTALS OF C.R.P.S.

PHILIP GETSON, D.O.

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I DON'T KNOW !

Philip Getson, D.O.

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HISTORY

The first mention of CRPS dates back to the 17th Century when surgeon Ambrose Pare reported that King Charles IX suffered from persistent pain and contracture of his arm following a bloodletting procedure

During the Civil War Mitchell described soldiers suffering from burning pain due to gunshot wounds. He termed this *Causalgia*

In 1900 Sudek described complications of trauma to the limbs with swelling, limitation of motor function and resistance to treatment

The term *Reflex Sympathetic Dystrophy* was first used by Evans in 1946



NOMENCLATURE

- **Causalgia**
- **Sudek's Atrophy**
- **Post traumatic Pain Syndrome**
- **Post traumatic Painful Arthrosis**
- **Sudek's Dystrophy**
- **Post Traumatic Edema**
- **Reflex Dystrophy**
- **Shoulder Hand Syndrome**
- **Chronic Traumatic Edema**
- **Algodystrophy**
- **Peripheral Trophoneurosis**
- **Sympathalgia**
- **Reflex Sympathetic Dystrophy**
- **Reflex Neurovascular dystrophy**



DEFINITION

Complex Regional Pain is a neuropathic/inflammatory pain disorder characterized by:

- 1. Severe pain that extends beyond the injured area and is disproportionate to the inciting event.**
- 2. Autonomic dysregulation**
- 3. Edema – usually neuropathic in nature**
- 4. Movement disorders**
- 5. Atrophy and/or dystrophy**



CAUSE

- ❑ There is no single cause of CRPS
- ❑ Some more common are: sprain, contusion, surgery, fracture, infections, myocardial infarctions, carpal tunnel syndrome, constrictive casts
- ❑ The most common I have encountered are Brachial Plexus Stretch Injuries
- ❑ Harden, et. al suggest that following fractures or total knee arthroplasty, 11-18% will develop CRPS.



UNDERLYING CAUSES

It is imperative to control concurrent medical problems such as:

Diabetes

Hormonal imbalance

Thyroid Dysfunction

Cardiac issues especially arrhythmias

Pulmonary problems

Nutritional Abnormalities

Any injuries especially orthopedic

Significant emotional upset

Adrenal deficiency



STAGES

Stage 1 – lasts three months

Changes in skin temperature

Faster growth of hair and nails

Muscle spasm and joint pain

Severe burning and aching pain the worsens with slight touch

Skin that becomes blotchy, purple, pale or red; thin and shiny; swollen; sweaty

Edema

Disproportionate pain to inciting event

Sensitivity to weather/barometer changes



Stage 2- lasts 3-6 months

Continued changes in skin

Brittle nails

Increasing pain

Slower hair growth

Stiff joints and weak muscles

Edema

Short term memory loss

Photophobia / otophobia / vibrational pain



Stage 3 – irreversible

Muscle wasting

Pain in the entire limb

Limited movement in limb because of contracture

Spread to other body regions

Accelerated skin changes with atrophy



SUB-TYPES

CRPS-Current terminology

Complex regional pain syndrome (CRPS)

- **Types**

- **CRPS 1 = RSD (No nerve lesion identified)**
- **CRPS 2 = Causalgia (involves nerve injury)**
- **CRPS- NOS (Not Otherwise Specified) - partially meets CRPS criteria; not better explained by other condition)**



INCIDENCE

- ❑ **CRPS has been identified by the FDA as a rare disorder**
- ❑ **Anticipated to grow by at least 50,000 new cases annually**
- ❑ **Estimate differ greatly as to the number of afflicted individuals, ranging from 250,000 to 2 million**
- ❑ **Most common in the 25-55 y/o age group**
- ❑ **Three to five times more common in women than men (my own figures are about a 5:1 ratio)**



SIGNS AND SYMPTOMS

- Pain that is described as deep, aching, cold, burning, and/or increased skin sensitivity**
- An initiating injury or traumatic event such as a sprain, fracture, minor surgery etc. that should not cause as severe a pain as being experienced or where the pain does not subside with healing**
- Moderate to severe pain associated with allodynia (pain responses from stimuli that do not normally evoke pain)**
- Continuing pain with hyperalgesia (heightened sensitivity to painful stimuli)**
- Abnormal swelling in the affected are**
- Abnormal hair or nail growth**
- Abnormal skin color changes**
- Abnormal sweating of the affected area**
- Limited range of motion, weakness or other motor disorders such as paralysis or dystonia**



DIAGNOSIS

In 1994 the International Association for the Study of Pain agreed on diagnostic criteria and at that time re-named the disorder.

In 2003 a workshop was held in Budapest Hungary to discuss and modify these criteria.

These criteria with subsequent modifications led to research results of a sensitivity of 70% and a specificity of 94%

They also led to the establishment of the NOS criteria which, in their minds applied to 12.5% of the patients who were studied.



BUDAPEST CRITERIA

1. Continuing pain, which is disproportionate to any inciting event

2. Must report at least one symptom in *three of the four* following categories:

Sensory: Reports of hyperalgesia and/or allodynia

Vasomotor: Reports of temperature asymmetry and/or skin color changes and/or skin color asymmetry

Sudomotor/edema: Reports of edema and/or sweating changes and/or sweating asymmetry

Motor/Trophic: Reports of decreased range of motion and/or motor dysfunction (weakness, tremor, dystonia) and or trophic changes (hair, nails, skin)



BUDAPEST CRITERIA

3. Must display at least one sign at the time of evaluation in

two or more of the following categories:

Sensory: Evidence of hyperalgesia (to pinprick) and/or allodynia (to light touch and/or deep somatic pressure and/or joint movement)

Vasomotor: Evidence of temperature asymmetry and/or skin color changes and/or skin color asymmetry

Sudomotor/edema: Evidence of edema and/or sweating changes and/or sweating asymmetry

Motor/Trophic: Evidence of decreased range of motion and/or motor dysfunction (weakness, tremor, dystonia) and or trophic changes (hair, nails, skin)

4. There is no other diagnosis that better explains the signs and symptoms

Complex Regional Pain Syndrome: Practical Diagnostic and Treatment guidelines, 4th Edition.
Pain Medicine 2013 – Harden et al.



EXACERBATING FACTORS

Stress

Cold

Changing Barometric Pressure

Infection (Especially dental)

Humidity

Poor diet

Vaccinations

Toxins (Aluminum & Fluoride)

Certain Prescription Medications

Candida

Lyme disease



SPREAD

Spread of the disease is more common than not and can occur up to EIGHT YEARS after the initial diagnosis

Spread occurs horizontally or vertically 95% of the time and diagonally 5%

Schwartzman et al – PAIN – January 2001



DIAGNOSTIC TESTING

- ❑ **X-Ray**
- ❑ **CAT Scan**
- ❑ **MRI**
- ❑ **Triple Phase Bone Scan**
- ❑ **Discogram**
- ❑ **Myelogram**
- ❑ **Arthogram**
- ❑ **Laboratory Testing**
- ❑ **Electrodiagnostic Testing**
- ❑ **SSEP**
- ❑ **Quantitative Sensory Testing**
- ❑ **Thermography**



THERMOGRAPHY

A great benefit of infrared imaging is its ability to image the function of the nervous system, especially with chronic pain conditions.

The Nervous System along with the blood vessels creates most of the heat patterns we see using thermal imaging.

A hallmark of CRPS is an excessive vasoconstriction of blood vessels that can cause cold hands and feet.

Thermography provides images of the sympathetic nervous system and given that CRPS is considered by some to be a disease of sympathetic origin, it is the perfect tool for the corroboration of the clinical diagnosis



TREATMENTS

Mobilization

**Physical therapy – Mirror Box therapy,
Graded Motor Imagery**

Occupational therapy

Recreational therapy



INTERVENTIONAL PAIN MANAGEMENT

- Injections – Epidurals, SGB, LSB, Facet blocks, local blocks (Bier, Sural)**
- Infusions- epidural, intra-pleural, therapeutic, prialt, and pre-pump trials**
- Infusions – IV- Lidocaine, ketamine**
- Stimulators**
- Intra-thecal Pumps**
- R.F.A.**



MEDICATIONS


Antidepressants
Anti-anxiety agents
Antispasmodics
Calcium Channel Blockers
Antihypertensives
Anti-epileptics
Muscle Relaxants
Anti-inflammatories
Analgesics

Pamidronate
Neridronate
Lenalidimide
Mexilitine
Capsaicin
DMSO
Topical Compounds
Dextromethorphan
Amantadine
Alpha Adrenergic Antagonists
Calcitonin
IVIG



KETAMINE

Ketamine was introduced in 1963 following a search for the “ideal” anesthetic, the name being derived from the “keto” derivative of an amine. The S or positive isomer has a four-fold greater affinity for the NMDA (N-methyl D-aspartate) receptor in the brain.



It inhibits serotonin and dopamine re-uptake. It is useful as an anesthetic because it preserves sympathetic reflexes, thereby supporting blood pressure and does not interfere with respirations. Ketamine has proven to be more effective to prevent central sensitization from a nociceptive barrage (allodynia, hyperalgesia) than from physiological pain (post-operative)



METABOLISM AND EXCRETION

Ketamine is extensively metabolized by the liver's cytochrome P-450 system mostly to norketamine and hydroxynorketamine. Due to the high rate of liver extraction and minimal renal excretion of intact ketamine, doses need not be altered in the presence of renal or hepatic dysfunction. It is highly lipid soluble allowing it to cross the blood-brain barrier



INITIAL USES

- ❑ **Subanesthetically in burn victims during wound debridement and in removing staples from skin.**
- ❑ **A frequent use was in children for procedural pain especially in patients with congenital heart disease, asthma, trauma, hemodynamic instability burns or poor IV access**
- ❑ **Chronic non-malignant pain (especially in oral form)**
- ❑ **Cancer pain**
- ❑ **Dental sedation**



MODES OF ADMINISTRATION

- **IV**
- **Oral**
- **Topically –patch, gel, cream**
- **Intra-nasal**



KETAMINE & SURGERY

- **In cases of known or suspected RSD/CRPS Ketamine should ALWAYS be used Intravenously during the surgery to lessen the likelihood of spread of the disease.**
- **“The major findings of this study are that Ketamine, used as adjunctive anesthesia in refractory CRPS patients undergoing surgery was successful in reducing pain, and blocking spread in severely affected, long standing patients” –**

Schwartzman, Getson, et. al – J Clinical Case reports – Volume 2 – Issue 12



PSYCHOLOGICAL COUNSELING

- The family unit should be counseled especially the significant other.**
- The use of anti-depressants helps with sleep and day to day activities, but will NOT significantly lessen the depression.**
- The ONLY thing that will do that is physical improvement.**



OTHER TREATMENTS

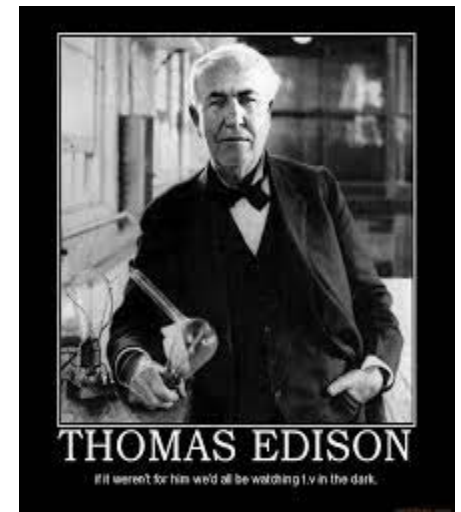
Diet and Lifestyle Alteration
Gluten free & Anti-inflammatory diet
Organic & Healthy Foods
Smoking & alcohol cessation
Home exercise program

Alternative Therapies

Reiki
Manipulation/Massage
Acupuncture
Vitamins and Nutraceuticals
B-12 and intrinsic factor
Hormonal & Neurotransmitter balancing

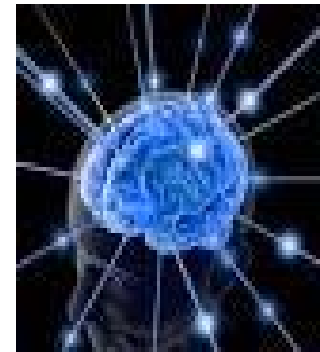
“The doctor of the future will give no medication, but will interest his patients in the care of the human frame, diet and in the cause and prevention of disease.”


-Thomas Edison -



NEUROTRANSMITTERS

Neurotransmitters are chemical messengers that facilitate communication between neurons. This affects every cell, tissue and organ system within the body. When neurotransmitters are out of balance this communication is altered causing a wide variety of physical, mental and emotional clinical symptoms.





MAJOR NEUROTRANSMITTERS

Glutamate (High in Parkinson's, Alzheimer's)

GABA (low in anxiety and sleep problems)

Serotonin (low in Depression, migraines OCD)

Epinephrine (high in fear & anger, fight or flight)

Norepinephrine (High in anxiety & stress)

Dopamine (low in fatigue, poor memory)

Histamine (low in nausea, anxiety memory loss)

PEA (Beta-phenylethylamine) – (low in depression)

HORMONES

Cortisol

DHEA

Estradiol

Estrone

Estriol

Progesterone

Testosterone

Melatonin



PROMISE YOURSELF...

To be so strong that nothing can disturb your peace of mind.

To talk health, happiness, and prosperity to every person you meet.

To make all your friends feel that there is something worthwhile in them.

To look at the sunny side of everything and make your optimism come true.

To think only of the best, to work only for the best and to expect only the best.

To be just as enthusiastic about the success of others as you are about your own.

To forget the mistakes of the past and press on to the greater achievements of the future.

To wear a cheerful expression at all times and give a smile to every living creature you meet.

To give so much time to improving yourself that you have no time to criticize others.

To be too large for worry, too noble for anger, too strong for fear, and too happy to permit the presence of trouble.

To think well of yourself and to proclaim this fact to the world, not in loud word, but in great deeds.

To live in the faith that the whole world is on your side, so long as you are true to the best that is in you.