"Light Bulb Moments and the Art of Deductive Medical Reasoning".

PHILIP GETSON, D.O.

T.D.I. / H.T.A. Webinar
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Each fact is suggestive in itself. Together they have a cumulative force.

Sherlock Holmes

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

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

RSD Association Website

DIFFERENTIAL DIAGNOSIS

Diabetic and
small-fiber peripheral
neuropathies
Entrapment neuropathies
Thoracic outlet syndrome
Discogenic disease
Deep vein thrombosis
Cellulitis
Vascular insufficiency
Lymphedema
Costochondritis
Brachial Plexopathies

Raja SN et al. *Anesthesiology.* 2002;96:1254-1260.

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.

THE DISEASE

The pain is profound, chronic and widespread. It can migrate to all parts of the body and vary in intensity. The pain has been described as stabbing and shooting pain and deep muscular aching, throbbing, and twitching. Neurological complaints such as numbness, tingling, and burning are often present and add to the discomfort of the patient. The severity of the pain and stiffness is often worse in the morning. Aggravating factors that affect pain include cold/humid weather, non-restorative sleep, physical and mental fatigue, excessive physical activity, physical inactivity, anxiety and stress.

Additional symptoms may include:
irritable bowel and bladder, headaches and migraines, restless legs syndrome (periodic limb movement disorder), impaired memory and concentration, skin sensitivities and rashes, dry eyes and mouth, anxiety, depression, ringing in the ears, dizziness, vision problems, Reynaud's Syndrome, neurological symptoms, and impaired coordination, sleep disturbance and fatigue

The preceding two slides are directly from the

National Fibromyalgia Website

REFERENCES

Is Fibromyalgia a Generalized Reflex Sympathetic Dystrophy?-

M.Martinez-Lavin- "Clinical & Experimental Rheumatology", 2001: 19:1-3

Fibromyalgia and the Complex Regional Pain Syndrome: Similarities in Pathophysiology and Treatment

Richard J Wurtman - "Metabolism Clinical and Experimental"- 59-2010 -837-840

MULTIPLE SCLEROSIS

I have studied nine patients, all female, who have been diagnosed with BOTH MS and CRPS.

Treatment was initiated to the MS by neurologists and ALL nine showed improvement of the CRPS symptoms while seven showed improvement of the MS

It is imperative to control concurrent medical problems such as:

Diabetes
Hormonal imbalance
Thyroid Dysfunction
Cardiopulmonary issues especially arrhythmias
Nutritional Abnormalities

Any injuries especially orthopedic

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

- Validation of Thermography in the Diagnosis of Reflex Sympathetic Dystrophy

  Bruehl, et al. The Clinical Journal of Pain Vol. 12 (4)

  Dec. 1996, pp. 316-325

- Long term skin temperature measurements – A practical diagnostic tool in complex regional pain syndrome

  Krumova et al – Pain 140 (2008) 8-22

CASE HISTORY

A 40 y/o female was seated on the third row of a football stadium at a charity event when one of the players kicked a ball into the crowd. A fan threw the ball down attempting to reach the field but instead impacted the patient who, in an attempt to prevent getting hit in the face put her left arm up and was struck by the tip of the ball, fracturing her hand.

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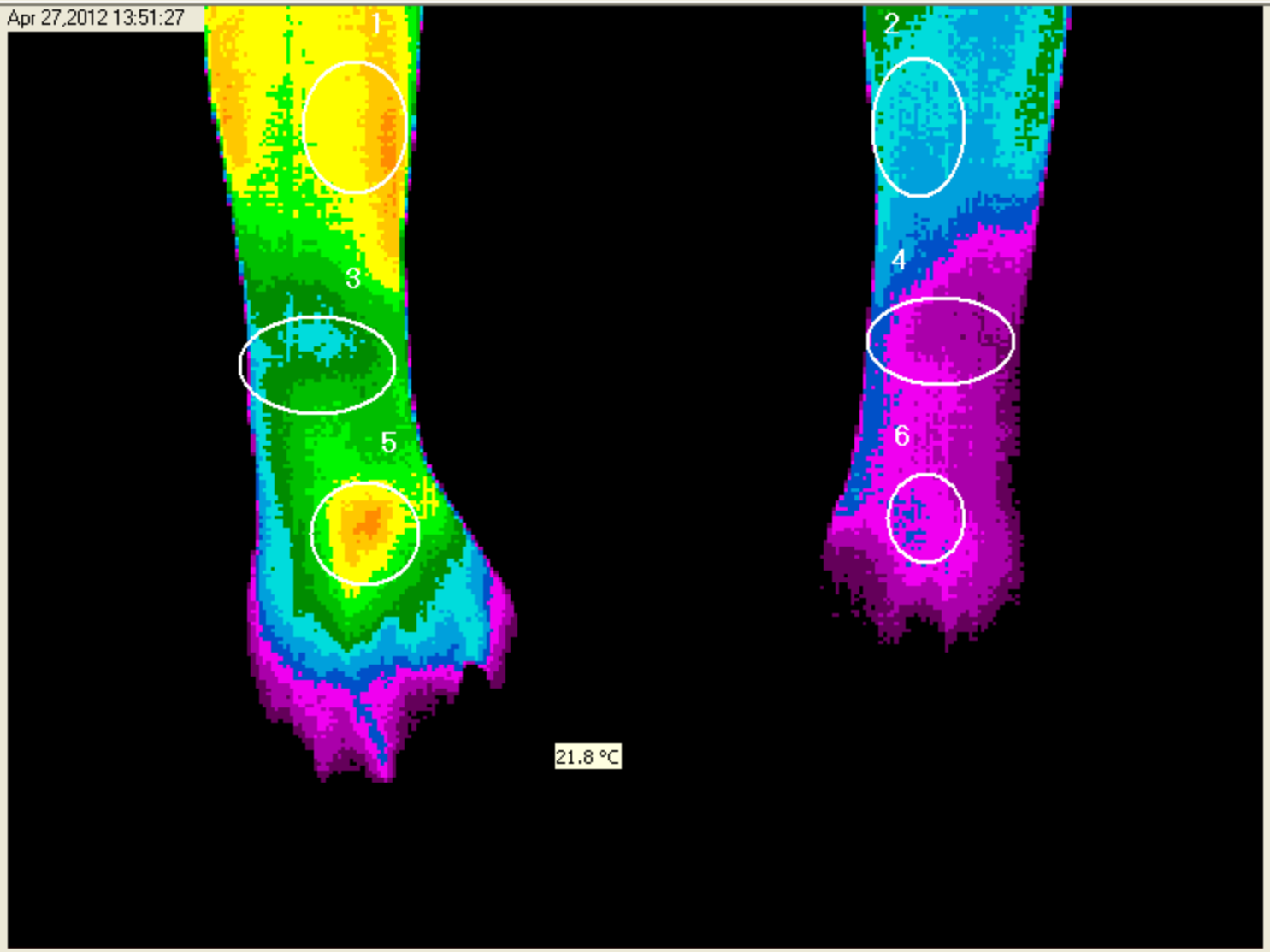

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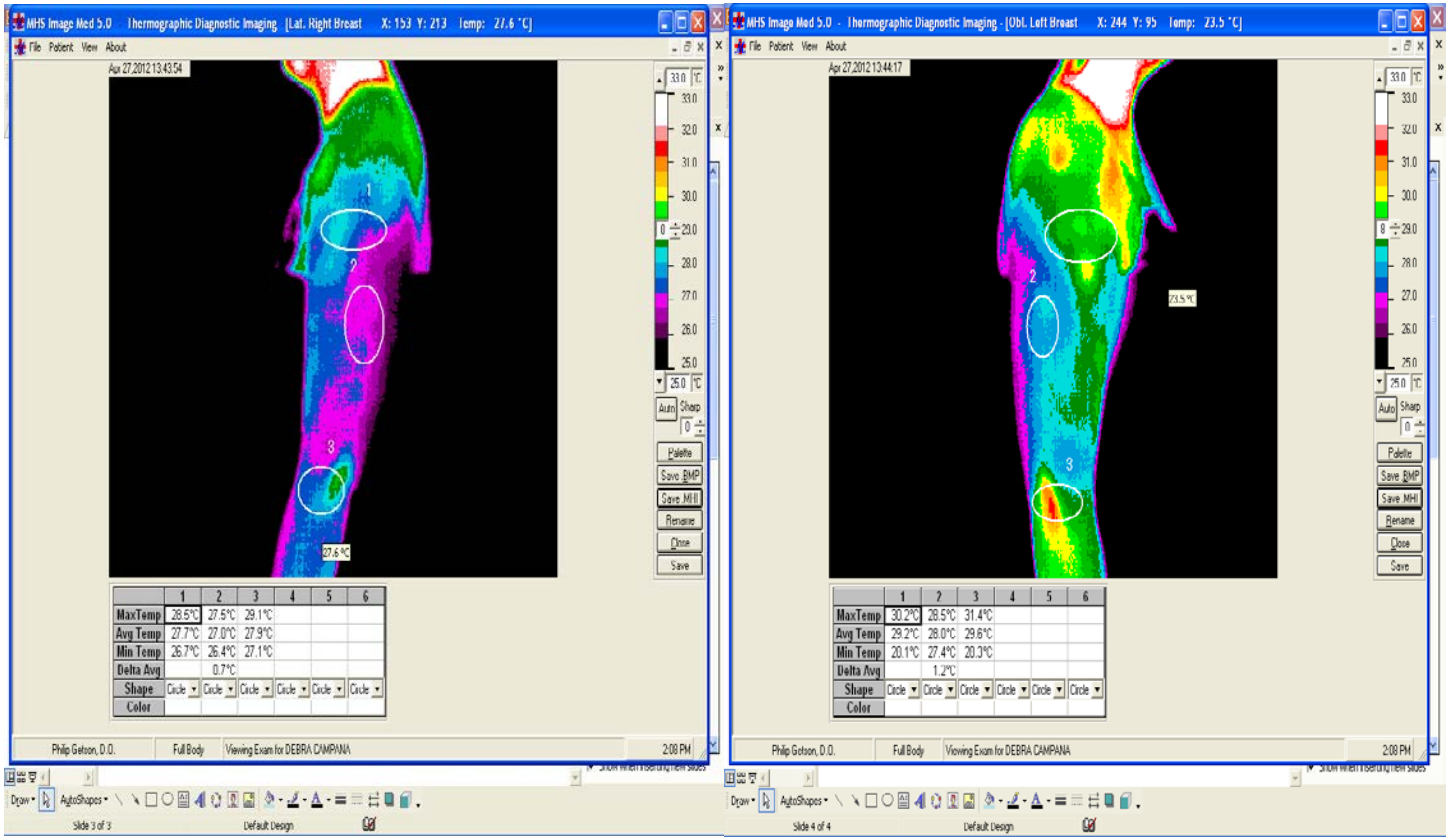
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Philip Getson, D.O.
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Life is infinitely stranger than anything that the mind of man can create

Sherlock Holmes

VASOMOTOR CHANGES

ABNORMAL SWEATING

MOTOR DISTURBANCE- DYSTONIA

FACIAL DYSTONIA

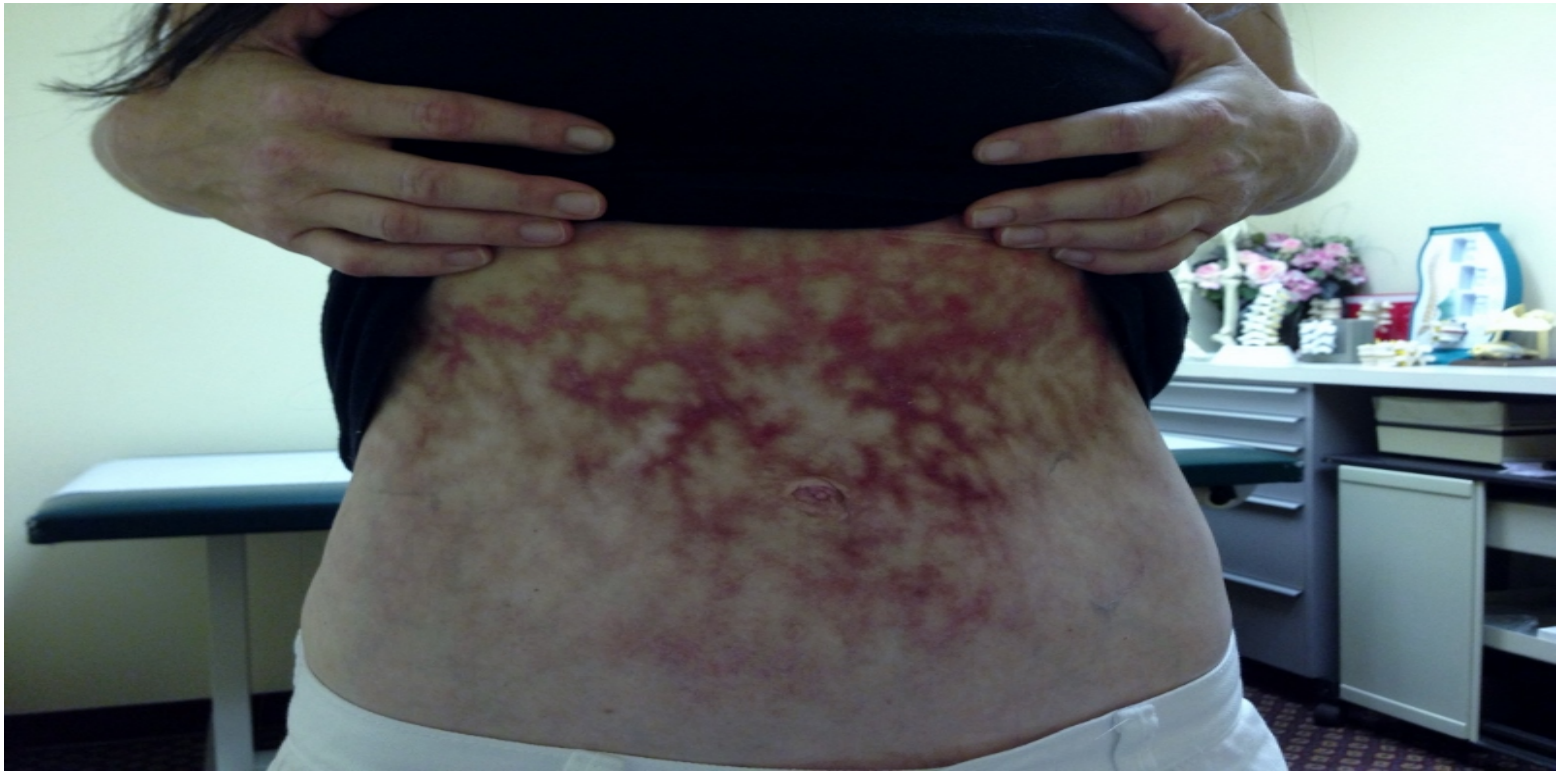
DYSTONIA – BEFORE

AFTER 5 DAYS OF KETAMINE

NEUROGENIC EDEMA

ERYTHEMA

LIVIDO RETICULARIS



STASIS DERMATITIS WITH EDEMA – BEFORE

AFTER 3 DAYS OF KETAMINE

GASTROPARESIS ?

SYSTEMIC MANIFESTATIONS OF C.R.P.S.

You see but you do not observe…..the distinction is clear

Sherlock Holmes

Gastrointestinal

Apart from the obvious acid peptic and irritable bowel symptoms, we have to deal with intractable nausea and vomiting. Endoscopically there may be some mild gastric irritation but generally the findings are minimal. Conventional treatment is rarely effective. The etiology is clearly gastroparesis and objectively identified via gastric emptying studies.

We have had great success with the endoscopic administration of Botox into the pyloric sphincter. In many instances one to three such injections have stopped the vomiting for prolonged periods of time.

- Our only two failures with botox were both females with intractable pain, nausea and vomiting and severe malnutrition and weight loss.
- They both ultimately underwent fundal plication surgery which was successful in reversing the GI abnormality

- THEY ARE SISTERS!

Another interesting finding is a number of patients with clinical and laboratory confirmed pancreatitis with no other etiology evident save for their CRPS

Other G.I. symptoms include:

Dysphagia, indigestion
I.B.S
Constipation (frequently opioid induced)
Biliary dyskinesia

Urinary

Commonly, patients experience urinary incontinence, dysuria or inability/difficulty voiding. The condition is usually misdiagnosed as Interstitial Cystitis. The problem has responded marginally to conventional medications. Bladder pacemakers have been somewhat useful. Again, Botox injections into the pelvic floor have helped a great number of sufferers. Additionally, I have found that lumber epidural infusions of bupivicaine over a 5 day period works very well. Ketamine has resolved this to a small degree as well.

Gynecologic

Polymenorrhea
Dysmenorrhea
Menometorrhagia
Secondary amenorrhea

OBSTETRIC

An interesting finding is that patients in the third trimester of pregnancy (and some earlier in their pregnancy) become dramatically less symptomatic and many become asymptomatic. This lasts into and after childbirth and seems to be further extended by breast feeding. I currently have data on nine such cases and am exploring the hormonal shift that may be common to all of these individuals

PODIATRIC

Morton's neuroma is a mechanically induced degenerative neuropathy predominantly affecting the second and third common digital nerves. It is not actually a tumor but a thickening of the tissue that surrounds the nerves leading to the toes. It is eight to ten times more likely to occur in women than in men and most prevalent in middle aged women

VERTIGO

Vertigo is common as an early symptom
Sometimes it is positional but mainly it is movement related

Treatment is based upon reducing the CRPS symptoms and occasionally meclizine helps make the vertigo tolerable pending the improvement of the disease process

SYNCOPE

" Syncope is common in patients with CRPS especially with lower limb involvement. Autonomic dysregulation of the lower extremities leads to sympathetic vasoconstriction and venous pooling which can predispose these patients to syncope."

Syncope in Complex Regional Pain Syndrome – Smith et al. – *Clinical Cardiology* 34.4; 222-225 (2011)

Syncope- Case presentation

A 44 year old female with long standing history of CRPS is involved in a MVA which accelerates her symptoms. She further injures her brachial plexus in the accident and has classic symptoms of that sub-division of CRPS. However she begins to have “drop attacks” with increasing regularity.

Comprehensive work up with brain MRI, EEG, laboratory testing and carotid ultrasound all prove negative.

The solution proved to be immobilization in a soft cervical collar. Here is how that transpired…….

HEADACHES

MIGRAINES(?)
TENSION HEADACHES
GREATER OCCIPITAL NEURALGIA

VISUAL DISTURBANCE

DOUBLE VISION
BLURRED VISION
OCCULAR MIGRAINES
VISION LOSS
PHOTOPHOBIA
BURNING OF THE EYES

OTORHINOLARYNGOLOGIC

Patients report significant **otophobia.**

Recently there has been an increase in individuals reporting significant discomfort from **vibration**, specifically the bass of stereos even through walls and from adjacent motor vehicles while travelling.

Intermittent and transient **hoarseness** comes from the effect of the disease on the branchial plexus and is frequently misdiagnosed as immune compromise

DENTAL

Unfortunately dental disease is rampant in patients with CRPS

Part of this stems from dietary indiscretions, part from immune system compromise and part from the disruption of the dental nerve roots.

Perhaps the greatest reason is that the side effects of common medications prescribed for chronic pain lead to a change in lifestyle, poor oral hygiene, poor nutrition and a loss of saliva (dry mouth) that result in decay, periodontal disease and ultimately tooth loss

DERMATOLOGIC

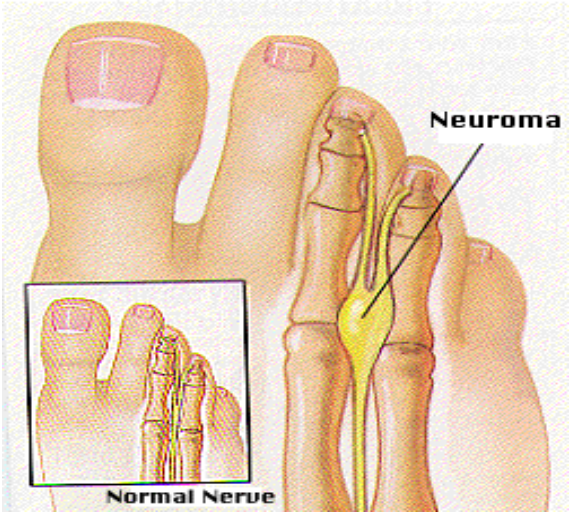
- The most common finding apart from dry skin or hyperhydrosis is neurodermatitis. This can occur randomly on any area of the body. Lesions have the appearance of small acne-type eruptions that itch for hours to days and disappear spontaneously. There is no specific etiology apart from the CRPS and no treatment save for topical low potency steroids or anti-histamines to reduce the itch. If scratched they will scar

DERCUM'S DISEASE

Dercum's disease, is a rare condition characterized by multiple, painful lipomas. These lipomas mainly occur on the trunk, the upper arms and upper legs. The understanding of the cause and mechanism of Dercum's disease remains unknown. Possible etiologies include: nervous system dysfunction, mechanical pressure on nerves, adipose tissue dysfunction and trauma.

PODIATRIC

Morton's neuroma is a mechanically induced degenerative neuropathy predominantly affecting the second and third common digital nerves. It is not actually a tumor but a thickening of the tissue that surrounds the nerves leading to the toes. It is eight to ten times more likely to occur in women than in men and most prevalent in middle aged women



COGNITIVE DYSFUNCTION

There have been an increasing number of CRPS patients with cognitive issues. Mostly these are STML, word retrieval & difficulty with expression. It has been theorized that this is medication related but it occurs in individuals who take virtually no meds. Current thoughts abound with no single answer surfacing as being definitive.

DERMATOLOGIC

- Neurodermatitis
- Livido Reticularis
- Intermittent discolorization

It has long been as theory of mine that the little things are infinitely the most important

Sherlock Holmes

OTHER SYMPTOMS

- Shortness of breath
- Inability to take a deep breath
- Neurogenic edema
- Muscle weakness/atrophy
- Endocrine dysfunction – adrenal, thyroid, hormonal imbalance
- Gardner Diamond Syndrome – spontaneous bruising in uninjured areas
- Lethargy
- Fatigue
- Sleep Disturbance

"Systemic Complications of Complex Regional Pain Syndrome"–
Robert J. Schwartzman –*Neuroscience & Medicine, 2012,3,225-242*

GENETICS

A 37 year old female casino worker is struck by a "money cart" in the left lateral thigh and subsequently develops CRPS in that limb. It later migrates to the left arm.

One year later, her sister, a 35 year old police officer was broadsided in her patrol car while driving. The door handle impacts her left lateral thigh and SHE develops CRPS in the left leg which within months migrates to the left arm!

Currently I treat 18 families with more than one member who has CRPS.

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There is one article in the literature that has studied genetics and CRPS – 31 families were studied, two families had five afflicted members, four families had four, eight families had three and 17 had two.

Familial occurrence of complex regional pain syndrome – deRooiji et al – Eur j Pain – 2009 – Feb; 13(2): 171-177

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 –SCS & DRG– (Accurate Study)
- Intra-thecal pumps
- R.F.A.
- “Scrambler” Therapy

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
Calcitonin
IVIG

OPIOID- INDUCED HYPERALGESIA

- Opioid-induced hyperalgesia is a phenomenon observed in patients treated with opioids, who paradoxically demonstrate an increased sensitivity to painful stimuli.
- Pain is associated with hyperalgesia, allodynia or both and may be experienced in a different location; and of a different quality than the original pain.

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 dorsal horn of the spinal cord, twice the analgesic potential and fewer psychomimetic effects.

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

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
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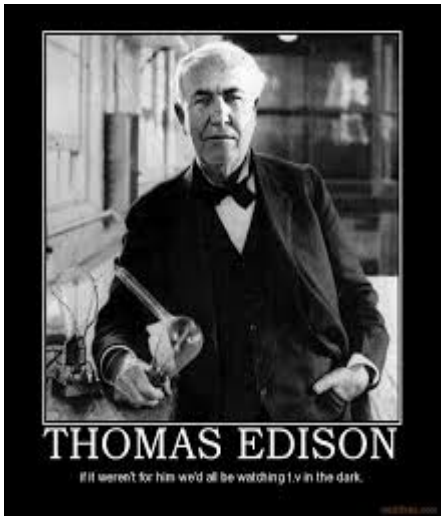
<u>Alternative Therapies</u>

Reiki
Manipulation/Massage
Acupuncture
Vitamins and Neutraceuticals
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 -



SEVEN "FOODS" TO AVOID

Aspartame (nutrasweet)

Additives like MSG & Nitrates

Sugar, fructose and simple carbohydrates

Caffeine

Yeast & Gluten

Dairy

Nightshades (tomatoes, potatoes, eggplant)

Eliminate (or limit)

Caffeine
Alcohol
Sugar
Processed food
Stress
Smoking

GLUTEN FREE DIETS

Most recently we have begun exploring a link between gluten free diets and diminished G.I. symptomatology. To date ALL of the individuals who have made the commitment to go “gluten free” have had not only a reduction in GI symptoms but also an overall reduction in pain!

GLUTEN SENSITIVITY

Gluten sensitivity is actually an autoimmune disease that
creates inflammation throughout the body, with wide-ranging effects across all organ systems including your brain, heart, joints, digestive tract, and more. It can be the single cause behind many different "diseases." To correct these diseases, you need to treat the cause--which is often gluten sensitivity--not just the symptoms.

DISEASES ASSOCIATED WITH GLUTEN

A review paper in *The New England Journal of Medicine* listed 55 "diseases" that can be caused by eating gluten. These include osteoporosis, irritable bowel disease, inflammatory bowel disease, anemia, cancer, fatigue, canker sores, rheumatoid arthritis, lupus, multiple sclerosis, and almost all other autoimmune diseases. Gluten is also linked to many psychiatric and neurological diseases, including anxiety, depression, schizophrenia, dementia, migraines, epilepsy, and neuropathies such as CTS, sensory ganglionopathies and fibromyalgia. It has also been linked to autism.

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.

HORMONES

Cortisol
DHEA
Estradiol
Estrone
Estriol
Progesterone
Testosterone
Melatonin

B – VITAMINS

Low levels of folic acid B 12, Thiamine, Riboflavin, and B6 have all been associated with mood disorders. Excessive B6 has actually been shown to create pain.

The brain requires lots of B vitamins for repair and permanent maintenance of proper brain neurotransmitter and adrenal function.

Stress causes the B vitamins to be quickly depleted.

BASIC SUPPLEMENTS

Fish Oil (Omega 3)
Probiotics
Multivitamins/multiminerals
Vitamin D3
Magnesium & Calcium
Digestive Enzymes
Hydrochloric Acid

PAIN AND NUTRITIONAL SUPPLEMENTS

5HTP- acts as a painkiller and antidepressant

DLPA -has opiate agonist qualities

Methionine - helps reduce pain in the manner of anti-histamines- good in arthritis, Parkinson's disease and depression

Fish oil - acts similar to ibuprofen

B6, zinc and manganese - aid in pain relief

RECOMMENDED READING

- The Diet Cure & the Mood Cure – Julia Ross, M.A.
- Sugar Blues – William Duffy
- The Anti-inflammation Zone – Dr Barry Sears
- Clean Gut – Alejandro Junger, M.D.
- Hungry for Health – Susan Silberstein, PhD
- Wheat Belly – William Davis
- Misdiagnosed – The Adrenal Fatigue Link – Steven M. Zodkoy, D.C.
- Nutrition & Physical Degeneration – Weston A. Price, D.D.S

Today I will find
balance in my life. I will
reveal my potential by feeling
and being healthy, by embracing
all the elements that are on my
path to wellbeing. By striving for
the best expression of Me. I will
find greater connectedness
to the world and to those
I love. Today I will live
intentionally.

When you eliminate the impossible, whatever remains, however improbable, must be the truth

Sherlock Holmes

TDINJ.com

Our website provides information regarding helpful diet and lifestyle tips for better health and free monthly newsletters and health webinars

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