Psychological Aspects of
Reflex Sympathetic Dystrophy (RSD)
Complex Regional Pain Syndrome (CRPS)

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Abstract. Reflex sympathetic dystrophy (RSD) or complex regional pain syndrome (CRPS) is a complex form of neuropathic pain associated with hyperpathia; neurovascular instability; neuroinflammation; and limbic system dysfunction.

As the condition becomes chronic, the other aspects of this syndrome complete the clinical picture. Inflammation develops, insomnia, agitation and depression affect the patient's diurnal cycle, deprive the patient of resting well and sleeping normally at night and the end result is the full-blown picture of RSD (CRPS).

Careful history taking, neurological evaluation, and understanding the nature of emotional components of RSD (CRPS) spares the patient from misdiagnosis and improper treatment.

Descriptors. complex regional pain syndrome (CRPS), limbic system, psychological aspects, reflex sympathetic dystrophy (RSD).

INTRODUCTION

The distressful, complex, chronic, regional pain syndrome of reflex sympathetic dystrophy (RSD) also known as complex regional pain syndrome (CRPS) is felt from the periphery all the way to the spinal cord, the brain stem, thalamus up to the limbic system where the sensory input ends in the cerebral hemispheres. This sensory input is completely different from the somatic sensory input which ends up in the parietal lobe in post central gyrus of the opposite hemisphere. The sympathetic sensory input in the cerebral hemispheres is exclusively in the mesial-frontal and temporal regions (limbic system) of the brain (1). The limbic system has the main function of emotional control, and the influence on memory, judgment, and mood.

The input of the sympathetic impulses into the limbic system on long term basis results in irritability, agitation, depression, insomnia, and poor judgment (2).

EMOTIONAL ASPECTS OF RSD (CRPS)

In our review of 824 RSD (CRPS) patients, one or more of the limbic system dysfunctions were present in every case except three. These consisted of insomnia (92%), irritability, agitation, anxiety (78%), (depression (73%), poor memory and concentration (48%), poor judgment (36%), and panic attacks (32%). Understanding

the nature of emotional components of RSD (CRPS) spares the patient from misdiagnosis and improper treatment (2).

Doctor Mary Lynch reviewed the subject of psychological aspects of RSD (CRPS) (3). Her conclusion was "There is general agreement that profound emotional and behavioral changes can follow these types of pain. Opinions have varied widely on the issue of psychological etiology. It has often been suggested that certain personality traits predispose one to develop sympathetically related pain syndromes. A review of the literature reveals no valid evidence to substantiate this claim."

On the other hand, De Good et al found patients suffering from RSD (CRPS), when compared to patients suffering from back pain and headaches, had the highest level of pain intensity, but demonstrated relatively less emotional distress(4).

Early in the twentieth century the Freudian School of Neuropsychiatry even claimed that there was a personality trait for patients developing Multiple Sclerosis (MS). Obviously there is no personality trait for either RSD (CRPS) or MS.

However, because of the nihilistic approach of the neurologists in regard to any form of a chronic disease causing neuropsychological dysfunction, the RSD (CRPS) patients are frequently called neurotic, and histrionic. There is no doubt that the RSD (CRPS) affecting limbic system invariably causes psychological disturbances including tendencies for being neurotic, histrionic, exaggeration, poor judgment, poor memory, poor concentration and depression.

Yet the RSD (CRPS) patient is expected to be stoic, and to be able to sleep through the constant protopathic and allodynic pain. Otherwise, the patient is considered to have a "psychiatric disturbance."

If the patient develops movement disorder practically identical to Parkinsonian tremor, dystonia, spasticity and spastic gait in absence of abnormal reflexes, then it is easy to claim that the patient suffers from malingering. However, since 1988, three prominent researchers, Schwartzman, Yokota, and Jankovic have demonstrated that all the above-mentioned types of movement disorder may be secondary to RSD (CRPS) (5-7).

If the patient has a thermatomal sensory loss in the distribution of the branches of brachial or a femoral artery rather than in a dermatomal radicular distribution, the patient is called a malingerer.

If the patient is being tired with an infusion pump and gets excellent relief from infusion of Morphine in the spinal fluid, the patient undergoes a placebo test by draining the Morphine out of the pump, and replacing it with normal saline. By the next day the patient still has pain relief due to the presence of residual of Morphine in the spinal fluid. As the patient continues to have pain relief in the face of normal saline infusion, then the patient is called a malingerer and all the treatment are discontinued. The patient is told that "It is all in their head."

If the patient at the beginning of the course of treatment responds satisfactorily to sympathetic nerve blocks with complete relief of pain (sympathetically maintained pain- SMP), and after several months develop enough ischemia and injury to the somatic nerves for the pain to become sympathetically independent pain (SIP), the repeated nerve block does not control the pain and the patient is told that they never had RSD (CRPS) to begin with because the nerve blocks are not helping them anymore.

After years of denial of diagnosis and treatment, eventually the patient is told that they are being sent to a doctor in a large medical center who is supposed to be the ultimate expert in RSD (CRPS). With plenty of hype and build up of expectation, the patient is sent to a doctor who agrees that the patient has RSD (CRPS). By now the doctor is a God in the eyes of the patient who for the first time has found someone who believes them. Obviously any treatment that this doctor applies is accomplished by a lot of hope and feeling of relief.

On the background of such a hype and high expectation the doctor gives the patient a placebo. There is enough power of suggestion and positive psychotherapy that the patient is going to express improvement of pain. This is not an exact neutral type of "placebo test." This especially is the case when realizing that the patient already has disturbance of judgment due to the pathologic state of the limbic system function in RSD (CRPS).

In 1948, Sunderland and Kelly reported on the subject of causalgic state (8). "Harassed by continuous pain and lack of sleep, the patient after time may become a nervous wreck. If seen at this stage by an enthusiastic clinician with a psychosomatic bias, the patient may have their mind probed in search of psychic trauma, and the practitioner who suspects a psychogenic cause does not often fail to uncover a confirmatory history." Still, as of today the neurologists are routinely practicing what Sunderland and Kelly warned against.

Unfortunately, if the CAT Scan or MRI is negative and if the patient belongs to the 35% to 45% of cases that show no abnormalities on bone scan, then the patient is doomed to be diagnosed as neurotic, psychotic, or a malingerer(9). CAT Scan and MRI are routinely normal in RSD (CRPS), and a simple X-ray of bones in more likely to show osteoporotic change. The osteoporotic changes obviously are not necessary for the

diagnosis of RSD (CRPS). Neither are atrophy, loss of fingernails, loss of hair, and other gross monstrous deformities of the totally untreated RSD (CRPS) patients.

Even one simple nerve block may be enough to prevent the development of the gross, advanced, late stage abnormalities. Yet, the old literature makes us believe that such advance's changes are supposed to be present in all RSD (CRPS) patients.

DIAGNOSIS OF RSD (CRPS)

Of the four pillars of the RSD (CRPS) diagnosis (allodynic pain, muscle spasm or tremor, inflammation, and limbic system disturbance), the history of inflammation is more than two times as common as the presence of inflammation at the time of the examination. This is because RSD (CRPS) is in a constant state of flux, so it does not show edema or other aspects of inflammation invariably at the time of physical examination.

RSD (CRPS) is a syndrome with multiple manifestations which require the following minimal symptoms and signs for the condition to be called RSD (CRPS).

1. Pain: constant, burning pain, and in some forms at times during the course of the disease, stabbing type of pain (causalgic). The pain is relentless and is invariably accompanied by allodynia (even simple touch or breeze aggravating the pain) and hyperpathia (marked painful response to simple stimulation).

2. Spasms in the blood vessels of the skin and muscles of the extremities. The spasms in the blood vessels result in a very cold extremity. The muscle spasms result in a tremor, and movement disorders such as dystonia, flexion spasm, weakness and clumsiness of the extremities, and tendency to fall.

3. RSD (CRPS) is accompanied by a certain degree of inflammation in practically all cases. This inflammation may be in the form of swelling (edema), skin rash (neurodermatitis), inflammatory changes of the skin color (mottled or purplish, bluish or reddish or pale discolorations), a tendency for bleeding in the skin, skin becoming easily bruised, inflammation and swelling around the joints as well as in the joints (such as wrists, shoulders, knee, etc.) which can be identified on MRI in later stages, and secondary freezing of the joints.

4. The fourth component and prerequisite of diagnosis of RSD (CRPS) are insomnia and emotional disturbance. The fact that the sympathetic sensory nerve fibers carrying the sympathetic pain and impulse up to the brain, terminate in the part of the brain called "limbic system." This limbic (marginal) system which is positioned between

the old brain (brainstem) and the new brain (cerebral hemispheres) is mainly located over the temporal and frontal lobes of the brain. The disturbance of function of these parts of the brain results in insomnia, agitation, depression, irritability, and disturbance of judgment. Insomnia is an integral part of an untreated RSD (CRPS) case. So are problems of depression, irritability and agitation.

So the clinical diagnosis of RSD (CRPS) is based on the above four principles rather than simply excluding RSD (CRPS) and finding some other cause for the patient's pain.

LIMBIC SYSTEM DYSFUNCTION

In contrast to the somatic pain, the sympathetic pain terminates in a more primitive part of the brain, called the limbic system (1). This is the area of the brain at the margin of brain stem and neocortex (frontal and temporal lobes). It controls emotion, memory, and judgment. The end result is insomnia, agitation, irritability, poor judgment and depression (Tables I, Table II).

A more glaring example of the limbic dysfunction being mistaken for "psychological disturbance" or post-traumatic stress disorder is the case of electrical injuries. In our experience and the experience of Nelson and Novy, such patients are mistaken for being malingerer or suffering from conversion reaction when in fact they suffer from bi-frontal cerebral dysfunction secondary to the electrical injury (10, 11).

Even when the patient is given the credit of being evaluated by a psychologist, it is rare for the psychologist to utilize objective detailed neuropsychometric tests such as Halstead-Reitan or Luria-Nebraska tests. Instead they check the patient's IQ and do the standard superficial neuropsychometric tests or MMPI tests. The MMPI test quite frequently shows evidence of anxiety which is very common in RSD (CRPS) patients. Such evidence similar to the evidence of normal CAT scan and normal bone scan are utilized to rule out RSD (CRPS).

Table I. Pain Perception
1. Somatic (Simple, Common Pain) Parietal Cortex
2. Sympathetic (Neuropathic)
3. Bilateral Limbic System/Anterior Frontal Temporal Lobes (1)

Table II. RSD Components
1. Sensory Burning Pain
2. Motor: Cold Extremity Tremor/Flexor Spasm (5,6)
3. Inflammation: Swelling, Skin Rash, Bruising of the Skin, Osteoporosis, Fractures, Fluid in Joints
4. Limbic System Dysfunction (Emotional Control Centers of Temporal and Frontal Lobes): Insomnia, Agitation, Depression, and Poor Judgment.

SUMMARY AND CONCLUSION

In practically every patient suffering from RSD (CRPS) demonstrates some degree of limbic system disturbance. These patients are expected to be depressed in more than 3/4 of the cases, anxious in practically every one of the cases, and to suffer from insomnia, agitation, irritability and poor judgment in practically every one of the cases. These manifestations are one of the four criteria for the diagnosis of RSD (CRPS). There is no way the limbic system can be left intact in the face of RSD (CRPS).

The fact remains that regardless of whatever the nihilist wants to call it, be it, RSD, CRPS, Mimocausalgia, or any other name, the RSD (CRPS) based on the above-mentioned four principles has a stereotyped clinical picture that cannot be mistaken for any other disease. This is a diagnosis made on the so-called 'Four Duck Principle (Table III)." The well-known Duck Principle describes "if it waddles like a duck, quacks like a duck, looks like a duck, and is called a duck, then it must be a duck."

With proper understanding the nature of emotional components of RSD (CRPS) spares the patient from years of misdiagnosis and improper treatment.

Table III. The Four Duck Principle
Principle 1: Afferent : Allodynia, hyperpathia.
Principle 2: Efferent: Muscle spasm, cold extremities, paresis, tremors.
Principle 3: Inflammation : Edema, ulcers, skin rash, MRSA.
Principle 4: Limbic System : Dysfunction, poor memory and judgment, insomnia, depression.

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