

**CLINICAL CONTRIBUTION TO
COMPLEX REGIONAL PAIN SYNDROME (CRPS I)**

Dr. H.A. Badala, Ex Prof. Adjunto of Medicine: Cardiology

University of Medicine

(Montevideo, R. O. Del Uruguay)

SUMMARY. The nature of this work is basically clinical. Patient's records with different forms and expressions of complex regional pain syndrome I (CRPS I) are clinically analyzed. There is an emphasis in the symptoms and signs that can be presented in each patient allowing a correct diagnosis that is supported by the bone scintigraphy (BS) with pyrophosphate of Tc 99 and radiological examination of the effected area.

This analysis will allow the treating doctor a correct and early diagnosis allowing an effective treatment that will lead beneficially not only for the patient but also the health care system.

Key Words: complex regional pain syndrome, CRPS I, alfa-1-adrenergic receptors, bone scintigraphy, BS, electrical study, nitroglycerin.

INTRODUCTION

Synonyms: It has a wide range and it is known by the English speaking countries as Reflex Sympathetic Dystrophy Syndrome (RSDS), and in Europe as Algodystrophy. The actual name is Complex Regional Pain Syndrome (CRPS Type I and II). The difference with CRPS II is that there is nerve injury.

We consider that it is incorporated within the concept of the syndrome, due to a group of signs and symptoms that form part of CRPS I.

Obeying the same physical pathology, the presence in the affected area of the receptors alpha-1-adrenergic in a larger number than normal, and a less sense if sensibility for the circulating catecholamine that are at normal values. This syndrome has been demonstrated as an illness of the alpha 1 – adrenergic receptors (1-3).

Incidence: It is larger than presumed. In Puteau-Colles' fracture we can observe CRPS I, between 24 -28 %. In a radius distal fracture we can find 26 %, and if we consider all

traumas it is 0.01% (4-7). In an operated carpal tunnel syndrome we can observe between 0 – 5% (8).

We can observe our casuistic in a larger frequency in middle age women and older, and leading causes to; secondary trauma, carpal tunnel syndrome operated or not, or in tenosinovitis where we can point out de Quervain's (*Figure 1*).

A number of CRPS I cases are not diagnosis due to the lack of knowledge of the syndrome or by unusual clinical forms.



Figure 1

Figure 1- Female 24 years old, CRPS I RSD post surgery of de Quervain right tenosinovitis. Form of heat initiation.

FUNDAMENTALS OF THE STUDY:

- (a) To demonstrate that the basic element to diagnosis of CRPS I is clinical.
- (b) To quote clinical forms of CRPS I where we can point out clinical facts uncommon of this syndrome.
- (c) Value the complementarily examine in the diagnosis of CRPS I.

OBJECTIVES:

To refer to the treating doctor, my personal experience lived through these clinical records that will allow a correct diagnosis of CRPS I.

MATERIALS AND METHODS:

CLINICAL FORM OF PAINLESS CRPS I?

A main symptom of this syndrome is the pain. However we think that this syndrome can exist without pain. Example: A 60 year old employed female patient, with postfracture of the right olecranon, once the cast was removed she presented: in the upper right extremity a level of distal signs of vegetation and swelling of the hand and forearm, and cyanosis of the skin of the hand with variations during the day.

That extremity was colder in reference to the opposite extremity. Alterations of the superficial sensibility (touch, thermal, pain). Loss of strength in the hand- weakness in the apprehension, opposition of the thumb and at a muscle inter-bone level, trophic alterations- diminution of muscle mass of the tender and hipotender eminencies.

The Rx of the hand and forearm showed diffuse carpal osteoporosis and extremities of cubical and radius. BS was not carried out. Treated as it were a CRPS I, the clinical situation mentioned recovered after three months and as a consequence there is a discreet alteration of the superficial sensibility.

CLINICAL FORM OF THE BEGINNING OF TREMOR.

This symptom can be seen in the course of this syndrome but it is infrequent for it to begin as CRPS I with tremor.

Example: A young 22 year old female, that without an initiating factor, she consults for a fine tremor of her right hand without any extrapyramidal signs: after months CRPS I settles in, its clinical form is sharp inflammatory. She has an angiographic that shows a tremor in the arteries: radius and cubical. In the arteriogram we can not observe circulation in the hand. This shows us that not only in CRPS I the microcirculation is affected but the macro circulation is also compromised. She was treated for 12 months. At the present date she is cured, living a normal life as a house wife and with her work; in the following studies of more than 3 years, there have been no relapse (10) (*Figures 2,3,4,5*).



Figure 2



Figure 3



Figure 4



Figure 5

Figures 2, 3, 4, 5

Female 23 years old, essential CRPS I RSD:

Incitation of treatment

Evolution

Angiography: cubic and radius arteries vasospasm

Angiography: there is no vascularization of the hand observed.

CLINICAL FORM EN RELATIONSHIP TO THE OPERATED CARPAL TUNNEL SYNDROME

A 42 year old female patient, technical in cardiology after being operated she presented with carpal tunnel syndrome, immediately post surgery she presented sharp inflammatory CRPS I. Previous to the surgery when she was interrogated she expressed that she had tumefactions of that hand, alteration of the sensibility that affected the areas of the nerves, cubical and radius, she also had intermittences changes in her skin coloration, shade of cyanosis. (*Figures 6, 7, 8*)

The BS was (+) and the Rx showed diffused osteoporosis in carpal cubical and radius distals. She was treated for three months and the evolution of the treatment was a full recuperation of all the clinical parameters of CRPS I.



Figure 6

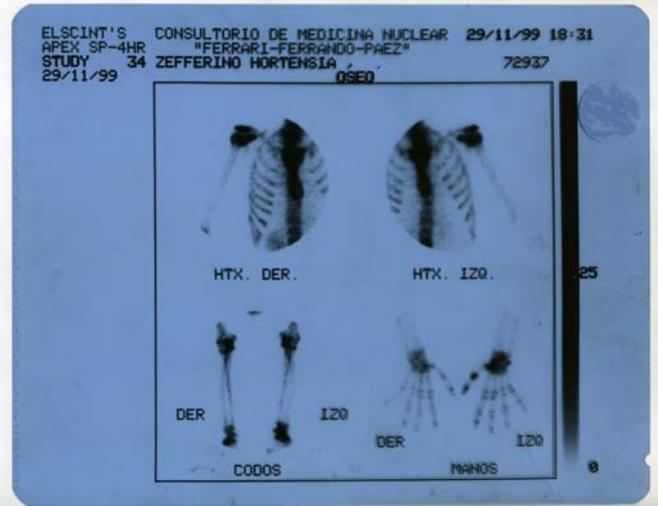


Figure 7



Figure 8

Figures 6,7,8

Female 45 years old, CRPS I MSI secondary to an operated carpal canal.

Incitation of treatment

Bone Scintigraphy (+)

Evolution

CLINICAL FORM OF A COLD BEGINNING

Example: A 26 year old female operated of a de Quervain tenosinovitis, she began immediately post operation a form of a cold initiation of CRPS I. The hand Rx showed a diffused osteoporosis and a bone BS (-); her treatment evolved very well until almost all symptoms and signs disappeared. (Figures 9, 10, 11).



Figure 9



Figure 10



Figure 11

Figures 9,10,11

Female 26 years old, CRPS I secondary to an operated de Quervain tenosinovitis.

Initiation (cold form)

Bone Scintigraphy (-)

Evolution

CLINICAL FORM POST HIP SURGERY

At present day hip surgery is used with more frequency, especially the prosthesis for traumatic complex fractures or secondary arthritis to dysplasia. The CRPS I observed from the post operation has differential diagnosis and especially with the feared articular infection.

A male patient 52 years old, in apparent good health suffers a traffic accident and fractures his hip. After his surgery, post operation immediately he complains of pain in the area of the operated hip expanding through out his inferior homolateral. An articular puncture was practice, to which he was aseptic. After months of bearing permanent and intense pain, there is a functional impotence of the extremity associated. He arrives with two crutches, not being able to lean against the foot of the operated hip. Once he was examined, being in apparent good health, not presenting a fever, with an operational injury which appears to be tumeficated recent and with a red-cyanotic color. In the distal level of the extremity especially the foot there are clinical characteristic of CRPS I (*Figures 12, 13, 14, 15*).

The diagnoses was a secondary CRPS I due to the operation of the hip. He was treated for 6 months. He is currently cured and works in USA.



Figure 12



Figure 13



Figure 14

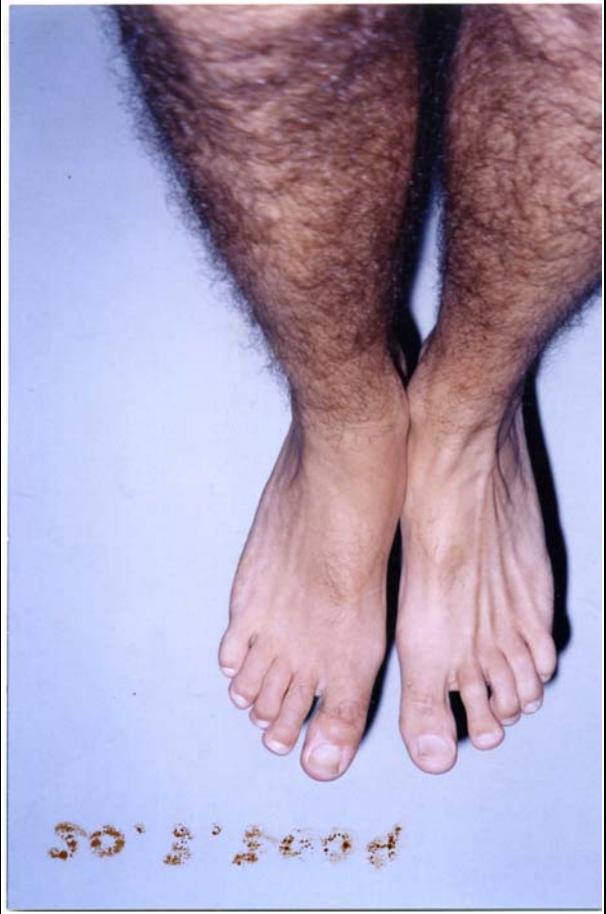


Figure 15

Figures 12,13,14,15

Male 45 years old, CRPS I secondary to a right hip osteosintesis.

Initiation operated scar

Initiation of foot and leg

Evolution of operated scar

Evolution of foot and leg

CLINICAL FORM OF MIRROR

It is that CRPS I that affects an extremity – post lesion or in an essential way- and at the same time or subsequently after the syndrome manifests itself in the contra lateral

extremity with the same or less intensity in consequence of the symptoms and signs. Example: An 81 year old retired female, with a left radius fractured forearm. Once the cast was taken off she presented CRPS I in that extremity and almost subsequently presented itself in her upper contra lateral extremity. She was treated for 5 months in which she had a very good evolution and was discharged (*Figures 16, 17, 18, 19*).



Figure 16



Figure 17



Figure 18



Figure 19

Figures 16, 17, 18, 19

Female 82 years old CRPS I secondary to a right radius fracture.

Initiation clinical mirror form

Initiation palmary face

Evolution dorsal face

Evolution palmary face

CLINICAL FORM SECONDARY TO A POUTEAU-COLLES

Its importance is given due to the high incidence of CRPS I observed as a complication to this fracture. Patient, SP, a 62 year old female that with a post right fracture of Pouteau-Colles after two months, CRPS I is acquired in her upper right extremity. She is administrated nasal calcitonin without receiving any therapeutic result. Scintigraphy with Tc 99 (+). She was treated with transdermic patches of nitroglycerin with a 0mg2hr 12 hr.

Liberation obtaining good results after 2 months of treatment and without any adverse secondary effects (*Figures 20, 21, 22, 23*).



Figure 20



Figure 21



Figure 22



Figure 23

Figures 20,21,22,23

Female 62 years old CRPS I secondary to a left Pouteau-Colles fracture.

Initiation dorsal face

Initiation palmary face

Bone Scintigraphy (+)

Evolution of dorsal face

A 62 year old female patient presented with CRPS I as a complication of a Pouteau-Colles fracture to the left once the external adjustments were removed. We would like to point out that she presented a “slight touch”. The BS was (+), she was treated with nitroglycerin in the usual way and by the end of three and a half months, she had a good outcome with a slight diminution of her superficial sensitivity and of the articulation of her fist. She later presented a slight adverse secondary effect that stopped the treatment from continuing (*Figures 24, 25, 26, 27*).



Figure 24



Figure 25

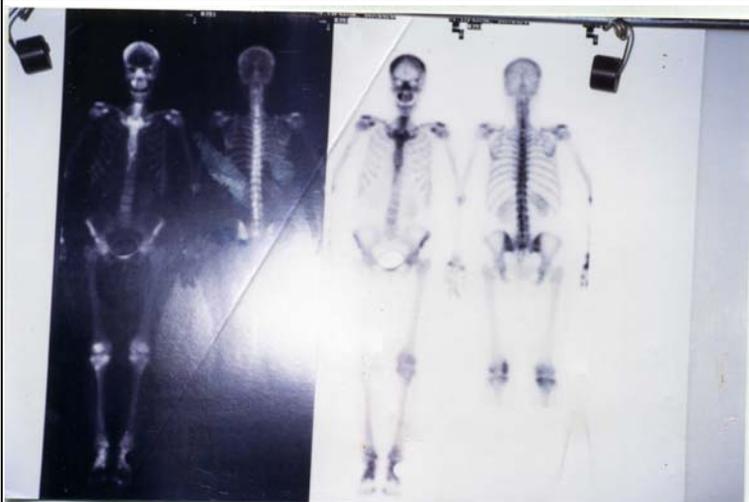


Figure 26



Figure 27

Figures 24,25,26,27

Female CRPS I secondary to a right Pouteau-Colles fracture.

Initiation dorsal face

Initiation palmary face

Bone Scintigraphy (+)

Evolution of dorsal face

METHODS

The methodology employed for the patients with CRPS I, is supported by diagnostic which are clinical (11). The simple Rx of the affected area is a late expression that can show a muted or diffused osteoporosis, which in this syndrome is more intense, from that which is observed in women climacteric, as if it had coursed in a period of ten years.

Nuclear medicine used the technetium-labeled diphosphomate bone scans, it has a high specificity and sensitivity and precocidad in the diagnosis of CRPS I, showing areas of increased bone intake of the 99 technetium – labeled diphosphomate bone scan especially in the phase two and three of the study in the affected areas (12), it describes forms of CRPS I with BS (-) (13). It sustained that this form of BS (-) is not CRPS I (14).

We do not recommend electric studies in the affected extremity.

DISCUSSION

In relation to the incidence we have a proportion of 3 to1 women in relation to men.

Doury talked about the high incidences of the essential forms. We have in our study a low frequency of essential forms (13).

Does painless CRPS I exist? We do not have any more experience than the case presented. But we lay down this possibility due to all the symptoms and signs that follow-up to the syndrome and the response to the nitroglycerin. Regretfully the BS could not be done.

Micro and macro circulation, there has been a emphasis in this syndrome to the affection of the microcirculation, but we can see through an angiography how it compromises the macro circulation as we could see in the patient with the clinical form that initiates with tremor.

In reference to the bone scintigraphy we have to consider that if it is negative (-) it does not mean it is CRPS I. For us there are forms of CRPS I (-) as, described when we talked about the clinical form that has a cold initiation.

Electrical study in a member affected by CRPS I, we consider that it is aggressive and therefore increases the pain and shows incorrect results.

1. A working female patient 27 years old consulted for CRPS I after a evolution of 8 years in her upper right extremity post concussion. In this patient her pain increased post study and the results were informed as “normal”. The simple Rx showed osteoporosis and

the BS was (+). The present treatment, she has had real improvement at the end of three months.

2. A working male 45 year old, post fracture of the right radial. Once the cast was taken off the evolution was not normal and there was intense pain, he had an electrical study preformed. The results were: “syndrome of the trapped cubical nerve of the elbow”. He is operated and the nerve was normal. We diagnosed him with CRPS I, he was treated for 4 months, he is cured and without any side effects.

3. A male country laborer 63 years old. Due to a sprain wrist he presents clinical manifestations and is diagnostic “paretico amiotrodico syndrome” the electrical study informs “neuropatia of the middle nerves and cubical as observed in the trapped nerve syndromes” seen by us by the time his 4 month being of his clinical case he was diagnosed with CRPS I. With 3 months of treatment, his evolution was very good, persisting a slight superficial sensibility. He regains his choirs in the country and his evolution was monitored for 10 months, there were no recidivas of CRPS I.

In relation of CRPS I and carpal tunnel syndrome (CTS), three facts can be considered. The first, without being operated CRPS I can be determined. The second, after being operated the syndrome appears. The third, as exposed, being operated while the CRPS I is in course. From there CRPS I must be discarded faced with CTS before being operated on.

In regards to the clinical form of CRPS I post surgery of the hip we must consider, if the patient presents infectious syndrome, analyze the surgery scare and if at a distal level changes of the color of the skin and alterations to heat or sweat, in more or less in regards to the counter lateral extremity. If the strength is disable in the foot or toes if the protopatic superficial sensibility is altered. If there are any trophic alterations and verify the state of the nail and fuzz.

The physical exam is complemented; in our work, we did not find any modifications with the profound sensibility study, osteotendinosos reflex, and arterial pulse.

Institutional Treatment (9)

In all the patient mentioned as a basic element of the treatment the use of the Nitroglycerin transdermic patches, in general with liberation of 0mg2 hour 12 hour and for a period no less than 3 months.

CONCLUSION

This work is clinically based, on how CRPS I is diagnosed. Its incidence are more frequent than as is normally supposed.

We can generally observe it in the members and secondary trauma which its seriousness does not coincide with the seriousness of the syndrome, and as a complication of surgery, in carpal tunnel syndrome, ruptures of aquilles heel, and in tenosinovitis as served in an example in de Quervain's tendinitis.

The results of the complementary exams were valued for diagnose, pointing out the high specification, sensibility and early results of the BS. It was explicit not to proceed in the electrical study in the member or members affected by the CRPS I.

Different forms of manifestation of this syndrome were clinically discovered. The importance of conducting a correct interrogation and physical exam was pointed out to allow a correct diagnoses and precocious treatment.

BIBLIOGRAPHY

1. Blomery PA. A review of reflex sympathetic dystrophy. *Australian Family Physician*. 1995; 24: 1651-1655.
2. Drummond PD, Shipworth S; and Finch PM. Alpha – 1- adrenoceptors in normal and hyperalgesic human skin. *Clinical Science*. 1996; 91:73-77.
3. Arnold J, Teasell RW, MacLeod AP, et al. Increased venous alpha -1- adrenoceptors responsiveness in patients with reflex sympathetic dystrophy. *Ann Internal Med*.1993; 118: 619-621.
4. Field J and Atkins RM. Algodystrophy is an early complication of Colles fracture, *J Hand Surg (British and European Volume)* 1997; 22b: 178-182.
5. Laulan J, Bismuth JP, Sicre G, Garaud P. The different types of algodystrophy after fracture of the distal radius: Predictive criteria of outcome after 1 year. *J Hand Surg (British and European Volume)* 1997; 22: 441-447.
6. Borg AA. Reflex sympathetic dystrophy syndrome. *Disability and Rehabilitation*. 1996; 18: 174-180.
7. Kozin F. Reflex sympathetic dystrophy syndrome. *Current Opinion in Rheumatology*. 1994; 6: 210-216.

8. Blombery P. A; A review of reflex sympathetic dystrophy. *Australian Family Physician*. 1995; 24: 1651-1655.
 9. Badala H, Toledo S. Tratamiento de la Distrofia Simpatico Refleja (DSR). Con nitroglicerina transdermica. *Archivos de Medicina Interna* Volumen XXIV; 1-01 52 Marzo 2002 pages 23-27.
 10. Badala H. VI Simposio Internacional de Osteoporosis y III Simposio de Enfermedades del Metabolismo Oseo y Mineral del MERCOSUR 5-7 de Setiembre 1003.
 11. Badala H, Toledo S. Distrofia Simpatico Refleja *Archivos de Medicina Interna* Volumen XXII: 3: 95-146 Setiembre 2000.
 12. Schiepers C. Clinical value of dynamic bone and vascular scintigraphy in diagnosis reflex sympathetic dystrophy of the upper extremity. *Hand Clinics* 1997 13: 423-429.
 13. Doury P. Algodystrophy. A spectrum of disease, historical perspectives criteria of diagnosis and principles of treatment. *Hand Clinics* August 1997 13 (3).
 14. Driessens M, Infrequent presentations of reflex sympathetic dystrophy and pseudo dystrophy. *Hand Clin*. 1997; 13: 413-422.
-

I would like to thank Dr. Badala for allowing me to post this article on our website.

Also, I would like to thank Ms. Gabriela Gonzalez for all her hard work translating this article from Spanish to English.

Thank you both so very much!

Eric M. Phillips