

MEDICATION AND APPROPRIATE PHYSICAL THERAPY OF COMPLEX REGIONAL PAIN SYNDROME PATIENTS AFTER TRAUMA

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Objective: Treatment of patients with complex regional pain syndrome (CRPS) after trauma needs a complex physical and medical therapy, according of the stage of condition. The patient with trauma is coming to rehabilitation department, after surgery treatment. The aim of our study is to represent the effect of complexity physical therapy and medical support in treatment of patients with CRPS with evaluation of decrease of pain and increase of function in affected region. **Method:** we are treating 35 patients overage 35-70 years with 2 including criteria, clinical reaction of CRPS and radiological changes of osteoporosis. Medication includes non steroidal anti-inflammatory drugs, tricycle anti-depressants, vasoactive drugs and calcitonin. Physical therapy is consisting of electro therapy, sonophoresis and paraffin. **Results:** The evaluation was made with observation and measurement of pain, swelling and color of skin and movements of the joint. **Conclusion:** the goodness of the condition with whole time of rehabilitation 3-6 months was significant $p < 0.01$.

Keywords: complex, regional, pain, syndrome, management.

INTRODUCTION

Complex regional pain syndrome (CRPS) also known as Reflex Sympathetic Dystroph, causalgia, as well as algodystrophy, Sudeck's atrophy, neuroalgodystrophy, and posttraumatic dystrophy are often challenging for treatment. Early diagnosis and intervention improve outcomes in most patients, however some patients will progress regardless of intervention.^{1,2} The etiology of bone dystrophy varies, but it is dominant by trauma 50%, idiopathic 25%, after stroke 20% and iathrogenic 5%.

CRPS is a chronic inflammatory condition affects one or more extremities of the body. It is characterized by excruciating pain (aching, burning, pricking or shooting), difficulty sleeping, pain unresponsive to narcotics, swelling, stiffness and hypersensitivity. CRPS has an unclear path of physiology and unpredictable course.³ It reveals with regional pain and enhanced regional bone resorption and high bone turnover, so bisphosphonates which have potent inhibitory effect on bone resorption were proposed for treatment.⁴

Severe pathphysiological concepts have been proposed to explain the complex symptoms of CRPS: 1) facilitated neurogenic inflammation,

2) pathological sympatho-afferent coupling and 3) neuroplastic changes within the CNS.⁵ Exact pathogenic mechanism of CRPS is still unclear. Suggested pathogenic mechanisms are in four groups consist of classic inflammation, hypoxic changes and chronic ischemia, neurogenic inflammation and sympathetic dysregulation. All of these suggested pathogenic mechanisms product with inflammation, cytokines mediated by nuclear factor kappa B.⁶

Diagnosis is based on signs and symptoms derived from medical history and physical examination. It should be established as soon as possible.³ The disorders usually develops after minor trauma, burns, surgery of lumbar spine with bilateral manifestations, and after stroke.⁷ It can also be found in childhood.

The clinical picture comprises a characteristic of clinical triad of symptoms including autonomic (disturbance of skin temperature, color, presence of swelling abnormalities), sensory (pain and hyperalgesia) and motor (paresis, tremor, dystonia) disturbances. Sudeck's bone dystrophy is represent in some basic orthopedic books in four stages.⁵ The optimal treatment has interdisciplinary approach encompassing medical, interventional, psychological and rehabilitation services that emphasize the role of physical and occupational therapies.⁸ The central focus of treatment is the restoration of function, utilizing a systematic, coordinated and progressive set of therapeutic strategies.

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Pharmacological therapy is merely a supporting element and focuses on the pain management and sympathetic excitability. Medication included non steroidal anti-inflammatory drugs, tricycle anti-depressants and vasoactive drugs. Psychological support of the patients during rehabilitation is important part of treatment.

While the optimal therapeutic treatment is still controversial, it is a consensus that the best results will be achieved if the treatment begins early and if it will adapted to the clinical stage of the disease.

The aim of our study is to represent the effect of complexity treatment physical therapy with medication with evaluation of decrease of pain, increase of joint mobility and goodness of the local affected bone.

PATIENTS AND METHOD

Study design

At the physical therapy department patients are usually coming after bone trauma from the surgery department and after surgery treatment operatively or conservatively. We are following and treating 35 patients, 29 female and 6 male with average age of 53 years (min.35-max.70). Institutional review board/ethics committee approval was obtained from Medical Ethic Commission and this study adhered to the tenets of the Declaration of Helsinki.

All patients have unilateral trauma, 5 of low extremity with manifestation of foot, and 24 after trauma of hand joint. The inclusion criteria for treatment were: clinical reaction of CRPS and radiological changes with manifestation of local posttraumatic osteoporosis.



Fig.1 Clinical and X-ray Pictures of CRPS Patient

The anamnesis data base and clinical changes with measurements have been involved in already protocol for treatment as: age, sex, localization of trauma and surgery treatment, the duration of immobilization, date of starting physical therapy treatment and stage of condition.

The clinical observation and measurements have been followed before and after serial of 10 days treatment. It was noted score of pain with

numerical renting scale 0-5, strong- 5 point, bear- 3 points, and no pain 0 point, and maximum points of pain 175. The size of swelling was measured by tailor meter for circumference of joint. The color of skin was noted like normal, red, pail or violet. Mobility in attached joint measured with goniometer for foot dorsal and plantar flexion, for hand joint flexion and extension. Muscular force was measured with manual muscle test. Fibrosis with less skin elasticity. The effect of treatment was evaluated before, after first, and after second rehabilitation program, the maximum points of clinical changes by 5 modalities were 175.

Medication of CRPS patients

All medical treatment was during two months consist of;

- ❖ Tab. Pentoxifylline 400 mg, twice a day,
- ❖ Tab. Benzodiazepine 2 mg, before sleep,
- ❖ Nasal Spray: Salmon calcitonine 200 IE, once a day,
- ❖ Tab. Multivitamin with 100mg calcium supplement, twice a day,
- ❖ Tab. Paracetamol 500 mg, twice a day,

Physical therapy of CRPS patients

Physical therapy protocol for stage 1, 2 and 3 is consisting of:

1. IFC-Interferential current with 4 electrodes, and frequentation of 0-100Hz, 15 min daily, was applied local on joint;
2. IF-Iontophoresis with vasoactive medicament dihydroergotoxine, on positive electrode, 15 min daily, was applied in distal part;
3. LPB-Local bath in indifferent temperature of the water (35-36 °C), with pine aromatherapy, and modest activity to a free of pain in attacked joint, 15 min. per day;
4. Occupational hand therapy with activity to a free of pain in attacked joint, 15 min. per day.

The physical therapy protocol for stage 4 is consisting of:

1. Sonophoresis with heparin grease, with dose of: 0.5w/cm², 5 min. daily;
2. Paraffin treatment, 20min.daily;
3. LPB-Local bath in indifferent temperature of the water (35-36 °C), with pine aromatherapy, and modest activity to a free of pain in attacked joint, 15 min. per day;
4. Occupational hand therapy with activity to a free of pain in attacked joint, 15 min. per day.

The patient in stage 1, 2, and 3 had two series by 10 days of physical therapy. The patient in stage 4 had two series by 10 days of physical therapy.

Statistical analyze

Data was entered and analyzed using standard biostatistics software package (SPSS). The data

was compiled and tabulated, and comparison was made between the score of maximal point and the point before treatment, after first and second rehabilitation program. We have used comparisons t-test, and differences of proportions, all were carried out at 5% level of significant.

RESULTS

The results of score measurements of pain are showed in Table 1. The goodness of condition is representing in percents of actual persisting pain. The all patients before the treatment had maximum point of pain 151 (86%) from max. after first treatment 86 points (49%) and after second rehabilitation after three mounts 9 points (5%). The effect of treatment was significant with increase of pain, $p < 0.01$.

Table 1
Decrease of pain after rehabilitation program

Pain Max. score 175	Before treatment	After Rehabilitation	
		1 st	2 nd
Strong (5 points)	115	20	0
Bear (3points)	12	66	9
No pain (0 point)	0	0	0
Total points	151	86	9
%	86	49	5
Effect of treatment		t = 6.6 $p < 0.01$	t = 8.55 $p < 0.01$
Differences of proportions			

The results from evaluation of condition by clinical change and measurement of muscle forces and mobility of the joints before and after treatment are showed in Table 2. The all patients before the treatment had maximum point of clinical changes 132 (75%) from max. after first treatment 66 points (37%) and after second rehabilitation after three mounts 4 points (2.2%). The effect of treatment was significant with decrease of mobility and muscle force, $p < 0.01$.

Table 2
Clinical Goodness after Rehabilitation Program

Clinical examination Max. score 175	Before treatment	After Rehabilitation	
		1 st	2 nd
Swelling	23	11	0
Change of skin color	23	2	0
Less mobility of the joint	35	23	2
Less muscles forces	35	23	2
Fibrosis	16	7	0
Total points	132	66	4
%	75	37	2.2
Effect of treatment		t = 5.42 $p < 0.01$	t = 4.64 $p < 0.01$
Differences of proportions			

DISCUSSION

Complex regional pain syndrome is still actual in medical practice, because the patients suffer from pain, with limitation of movements.^{6,9,10}

The pathophysiology is combination of sensory and motor abnormalities. The present diagnostic criteria of CRPS were used in our study with classification in four stages like clinical picture of Sudeck's bone dystrophy.¹¹

In our study all patients had CRPS after trauma, and only x-ray picture was used like imaging technique for diagnosis of local posttraumatic osteoporosis. It is one old but easy useable method.¹² After clinical examination we have started with complex treatment by physiological basis. The medical support was made with: paracetamol, Pentoxiphilinum, benzodiazepines, calcitonin and multi vitamin complex. It was made separately or like pain treatment in consulting studies.^{1,13-18}

We have used multidisciplinary non pharmacological approaches include physiotherapy, local bath and occupational therapy.⁵ The measurement of pain was made in standard way with numerical rating scale.^{12,15,19-21}

The most frequently specialists who treated CRPS was anesthetist 55%, specialist of rehabilitation medicine 41%. We have treated all patients after surgery treatment at physical therapy department. Over 90% of the patients recoiled pharmacotherapy, 45% received intravenous therapy, 89% received physiotherapy by one consulting study.²²

Noninvasive physical therapy was applying five days in week, two mounts by stage of condition. It was made separately in many consulting studies where it was used with interferential current, diadinamic current, sonophoresis, low level laser and electromagnetic.^{18,23,24}

Clinical picture in stage four is characterizing with fibrosis and limitation of movements and skin contracture. We have used in this stage paraffin and sonophoresis with heparin grease, because they have fibrinolytic effect. Heparin was used for treatment of scare and wound healing locally in some studies.²⁵⁻²⁷

The temperature of water for local bath is very important to be in frame of indifferent range of 35-36 °C, because those patients had changes of regulation local of temperature in attached area.^{28,29} Aromatherapy with pine bath has positive effect on vascular flow and decrease pain.³⁰

CONCLUSION

From our research in this study we can say follow conclusions: the treatment of CRPS has better effect if it is early diagnosing and treatment should be started as soon as possible by stage of condition. Management plane from physical

therapy with pharmacological support is giving statistically goodness of condition with whole time of rehabilitation 3-6 months. It is relatively shorter correlated with other studies before.

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