

# Can CRP and ESR values may be influenced by rehabilitation therapy in patients with psoriatic arthritis?

Diana Maghiar<sup>1</sup>, Nicoleta Anamaria Pascalau<sup>2,4</sup>, Florin Maghiar<sup>5</sup>, Liviu Lazar<sup>1,2,3</sup>

<sup>1</sup>Doctoral Studies Department, Biomedical Science, Oradea, Romania

<sup>2</sup>Faculty of Medicine and Pharmacy, Department of Medicine-Psycho-Neuroscience and Recovery, Oradea, Romania

<sup>3</sup>Baile Felix Medical Rehabilitation Hospital, Baile Felix, Romania

<sup>4</sup>Pelican Hospital, Rheumatology Department, Oradea, Romania

<sup>5</sup>Faculty of Medicine and Pharmacy, Cardiology Department, Oradea, Romania

## ABSTRACT

**Objective.** Psoriatic arthritis (PsA) is a type of chronic inflammatory arthritis that is linked to psoriasis and affects 20 to 30 percent of those who have it. Clinical symptoms vary and can change over time as one articular pattern evolves into another. This condition has a significant financial and psychological cost attached to it, not to mention the mental state of the patient in relation to the disease. Inflammatory markers such as C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) are frequently used in primary care to diagnose and monitor inflammatory illnesses such as infections, autoimmune diseases, and malignancies. Our main goal was to see whether or not there was a difference between inflammatory markers in patients with psoriatic arthritis who benefited balneotherapy and kinesiotherapy, compared to those who remained only on the fund treatment.

**Material and methods.** We performed a comparative retrospective study regarding the evolution of 110 patients diagnosed with psoriatic arthritis who underwent or not a rehabilitation program that was performed in Rehabilitation Hospital Baile Felix.

**Outcomes.** One of the results we wanted to demonstrate was whether this type of treatment influences the values of CRP and ESR, thus proving the benefits or disadvantages of this treatment.

**Conclusion.** To answer the major question, rehabilitation therapy DOES influence the values of CRP and ESR values in patients with psoriatic arthritis in the sense of decreasing their values. The 2 week-long rehabilitation therapy was capable of reducing the inflammatory process, a conclusion indicated by the decreasing of CRP and ESR values (mean value difference  $p < 0.001$ ).

**Keywords:** rehabilitation therapy, psoriatic arthritis, inflammatory markers

## INTRODUCTION

Psoriatic arthritis (PsA) is a multifaceted, chronic inflammatory illness defined by the coexistence of psoriasis and arthritis, as well as various musculoskeletal and extra-articular symptoms. The goal of treatment for PsA is to create a state of remission or low disease activity in all disease domains, which is quickly evolving due to the introduction of novel biologic and small-molecule medicines [1]. Physical

therapy, exercise, and rehabilitation may play a significant role in the overall management of PsA patients, contributing to lower disease burden in each area, in addition to pharmacological treatment strategies [2].

ESR and C-reactive protein (CRP) are two commonly used laboratory markers of systemic inflammation [3]. The CRP test determines the amount of C-reactive protein (a plasma protein produced by liver cells in response to acute inflammation or in-

Corresponding author:

Diana Maghiar

E-mail: ddmag90@gmail.com

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fection). ESR is an indirect measure of inflammation in the body, unlike CRP, which is a direct measure of inflammatory response. The pace at which red blood cells settle in a specifically designated tube containing anticoagulated blood is measured by ESR, an effect that is influenced by proteins involved in the inflammatory response. The response to treatment may also be monitored, as the level of ESR and CRP may fall if the condition is responding well to treatment [4].

## MATERIAL AND METHODS

We performed a comparative retrospective study regarding the evolution of 110 patients diagnosed with psoriatic arthritis with background therapy (classical or biological treatment) associated or not with rehabilitation program. Half of them followed balneo-physiotherapy associated with the background treatment, named Lot A, and the other half remains only with the background treatment, named Lot B.

The inclusion criteria for the two groups were:

- Diagnosis of psoriatic arthritis defined by the specialist rheumatologist and dermatologist (according to CASPAR criteria);
- Patients over 18 years old
- Onset symptoms for at least one year
- Stable background treatment over the last 6 months
- DAPSA score at inclusion of over 4 (active disease)
- Patient consent to participate in the study.

Patients from lot A received thermal treatment (hydrotherapy) and kinetotherapy, for 14 days. According to doctors, thermal water from Baile Felix can be used both in the internal cure-crenotherapy - for certain diseases of the digestive tract, stomach, small and large intestines, gallbladder, metabolic and endocrine disorders and in the external cure - bathing. The thermal waters from Baile Felix are according to Dr. Gheroghe Moraru, one of the best waters for anti-rheumatic treatment, for inflammatory, degenerative rheumatism, post-traumatic sequelae, and neurological disorders. In addition to the external cure, Felix's water, although few people know it, is also good for the internal cure, the so-called crenotherapy. The water is characterized as a bicarbonate, sulfate and chloro-sodium water which gives it a beneficial action in chronic constipation, spastic and painful chronic colitis, megacolon, bilio-duodenal dyskinesia, hyperacid gastritis, chronic hepatitis, diabetes, gout. By its natural temperature ( $T^{\circ} = 37/38^{\circ} C$ ) as well as by its chemical composition it is defined as a mesothermal oligomineral water. Among the anions in the order of the values found,

the most important are: Bicarbonate ( $HCO_3^-$ ) - 439 mg/%, Sulfate ( $SO_4^{2-}$ ) - 208 mg/%, and of the most important cations are: Calcium ( $Ca^{2+}$ ) - 139 mg/%, Sodium ( $Na^+$ ) - 71 mg/%, Magnesium ( $Mg^{2+}$ ) - 24 mg/%. In the external cure, the beneficial effects are reflected on rheumatic, chronic and degenerative diseases, abarticular rheumatism, post-traumatic, post-operative diseases, hip prostheses, knees, operated cervical and lumbar disc herniation, diseases of the central and peripheral nervous system, paresis, paralysis, neuritis, polyneuritis, circulatory system, arteritis.

All patients were evaluated initial at admission to the study and at 6 months after rehabilitation therapy. The statistical analysis was performed using SPSS 20. All the average parameter values, standard deviations, frequency ranges, and statistical significance tests were calculated by using the Student method - t test and  $\chi^2$ .

## RESULTS

One of the results concerns the sex of the patients. As can be seen in the table below (Table 1), most patients in both groups were females (63.64% lot A and 58.18% lot B respectively). The environment of origin of the patients does not differ in the two groups, in the sense that most belong to the urban environment (65.45% lot A respectively 56.36% lot B). Too many differences did not exist even in terms of average age (61.16 lot A and 61.09 lot B).

**TABLE 1.** Distribution by age, sex and environment

Lot Description	Lot A	Lot B	p Value
sex: Females	35 – 63.64%	32 – 58.18%	0.7
Males	20 – 36.36%	23 – 41.82%	
Environment:			0.4
rural	19 – 34.55%	24 – 43.64%	
urban	36 – 65.45%	31 – 56.36%	
Median Age (years)	61.16 ± 7.24	61.09 ± 8.6	1

The important parameters to follow in this study besides the PASI and DAPSA values were ESR and CRP. They were initially dosed and then 6 months after the end of the rehabilitation therapy. A fairly relevant finding for this study was that both CRP and ESR values decreased in both groups, but significantly in the group that underwent the rehabilitation therapy. We analysed all the parameters. Of interest is the average value before and after treatment and how much it decreased for each lot after treatment.

We applied the statistical test T which analyses the average value of ESR for the two groups. Initially it is observed that we do not have a statistically significant difference and after treatment the difference is statistically significant (Table 2, Figure 1). The value “p” in the columns “Value difference” is obtained following a T test that compares the mean value of ESR in group A and B before treatment with that after treatment. That is, the observed decrease (4.81 and 3.4, respectively) is statistically significant in lot A. There are also decreases in group B, probably due to the background medication, especially the use of biological treatment, but not as significant as the opposite group.

We used the same calculation methods for CRP values. The value “p” in the columns “Value difference” is obtained following a T test that compares the mean value of ESR in group A and B before treatment with that after treatment. That is, the observed decrease (3.66 and 2.25, respectively) is statistically significant especially in lot A. (Table 3, Figure 2).

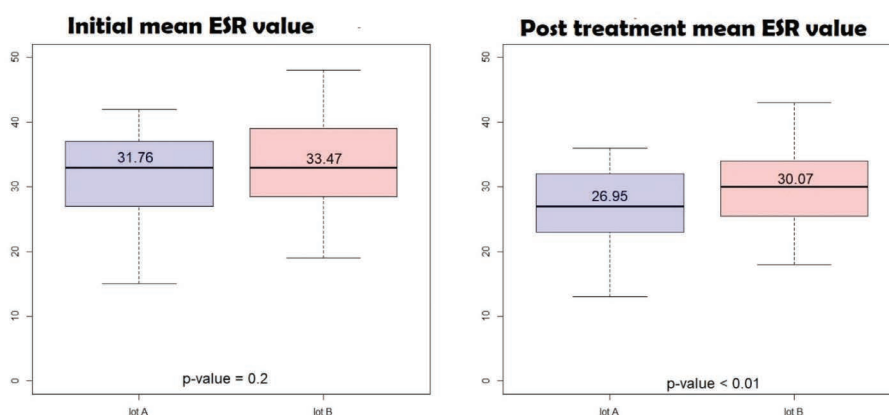
## CONCLUSIONS

To answer the major question, rehabilitation therapy DOES influence the values of CRP and ESR values in patients with psoriatic arthritis in the sense of decreasing their values. The 2 week-long rehabilitation therapy was capable of reducing the inflammatory process, a conclusion indicated by the decreasing of CRP and ESR values (mean value difference  $p < 0.001$ ).

It is known that not many studies have been conducted on rehabilitation therapy, and

**TABLE 2.** VSH values in both lots before and after treatment

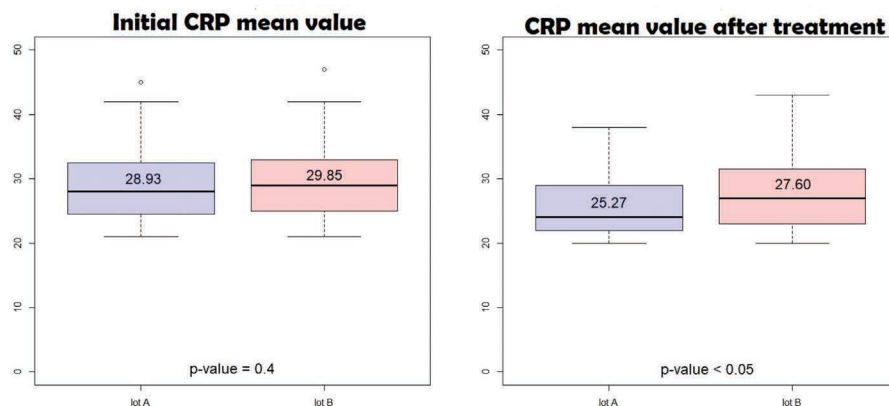
Parameters	Initial ESR Value		Post treatment ESR value		ESR value difference – initially and after treatment	
	Lot A	Lot B	Lot A	Lot B	Lot A	Lot B
Min	15	19	13	18		
Max	42	48	36	43		
Median	33	33	27	30		
Mean	31.76	33.47	26.95	30.07	4.81	3.4
SD	7.22	7.14	5.85	6.17		
Test T	p = 0.2		p < 0.01		p < 0.0001	p < 0.01



**FIGURE 1.** Mean ESR values-initial and after rehabilitation treatment

**TABLE 3.** CRP values-before and after rehabilitation treatment

Parameters	CRP initial value		CRP value after treatment		CRP value difference CRP initially – after treatment	
	Lot A	Lot B	Lot A	Lot B	Lot A	Lot B
Min	21	21	20	20		
Max	45	47	38	43		
Median	28	29	24	27		
Mean	28.93	29.85	25.27	27.60	3.66	2.25
SD	5.83	6.13	4.61	5.74		
Test T	p = 0.4		p < 0.05		p < 0.0001	p = 0.05



**FIGURE 2.** Mean CRP values-before and after rehabilitation treatment

even those that have been performed have included a small group of patients. Ivan Peter et al conducted a study in 2017 regarding balneotherapy in psoriasis rehabilitation, study done on 80 patients and they reached the same conclusion as the one in our study that the CRP values and PASI score decreased significantly after 3 week-long-rehabilitation. In our study we added also the ESR values.

From the two groups studied, the patients belonging to the group benefiting from balneotherapy

had significantly improved results compared to those who remained strictly with the fund treatment (classic or biological treatment). This complex balneotherapy and kinetotherapy performed during rehabilitation is an excellent strategy for reducing psoriatic arthritis symptoms and improving the patient's overall well-being.

\*All authors have equal implication in this study.

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