

# The Role of the Low Energy Diet in Psoriasis Vulgaris Treatment

Ivana Ručević<sup>1</sup>, Antonija Perl<sup>2</sup>, Vladimira Barišić-Druško<sup>1</sup> and Marija Adam-Perl<sup>3</sup>

<sup>1</sup> Department of Dermatovenereology, University Hospital »Osijek«, Osijek, Croatia

<sup>2</sup> Faculty of Food Technology, University J. J. Strossmayer Osijek, Osijek, Croatia

<sup>3</sup> Department of Nutrition, University Hospital »Osijek«, Osijek, Croatia

## ABSTRACT

*The aim of the present study was to determine whether and how the low energy diet acts on reduce of plasma lipids and clinical features of moderate non pustular psoriasis vulgaris. The investigation carried out in Clinical hospital Osijek, at Department of Dermatology as well as at Nutrition Department, included 82 in-patients, aged 46 to 65 (mean age  $53.7 \pm 7.9$ ), which had at least a 10-year history of the skin disorders. 42 participants (22 men and 20 women) in addition to usual topical therapy (neutral bland ointments twice daily), received a low energy diet during four weeks. Controls (40 participants: 22 men and 18 women) received only topical therapy with regular hospital food. Total cholesterol, triglycerides, HDL cholesterol and LDL cholesterol in blood, body weight and clinical features were measured at the beginning of investigation and after four weeks. After four weeks participants on low energy diet showed statistical significantly decreasing of serum lipids in relation to control group as well as significantly decreasing of clinical skin disorders. On contrary there were no significant changes on body weight between both groups of participants. Results of our study suggest that low energy diet could be important adjuvant factor in the prevention and treatment of moderate non pustular psoriasis.*

**Key words:** psoriasis vulgaris, low energy diet.

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## Introduction

It is an old truth that diet has an impact on human health. There is also no doubt that in case of ill condition this influence is even more important. Being de-

veloped for a long time by people lacking medical education, dietetics has been considered a part of folk medicine. The ideas about metabolism enabled new in-

sights into the physiology of human organism. Parallely the science of diet got its medical basis and became a constituent part of medical science.

There are well-recognized associations of some cutaneous diseases and dietary factors (e.g. atopic dermatitis and food allergy; dermatitis herpetiformis and gluten; acrodermatitis entheropathica and zinc deficiency; psoriasis and fish oil, vitamin A and D).

### *Psoriasis and diet*

Psoriasis vulgaris is inflammatory skin disease with increased epidermal proliferation usually characterized by erythematous lesions with silvery scale, and involves anywhere from 1–5% of the population, depending on what racial groups is studied and how strict the diagnostic criteria are. In Western Europe psoriasis is about common as diabetes mellitus<sup>1</sup>. Two factors play a role in aethiopathogenesis of disease: one is genetic predisposition and second is provocation triggers: exogenous and endogenous, such as: infections, medications, pregnancy and delivery, diet, alcohol, smoking cigarettes, hypocalcaemia and stress<sup>1–6</sup>.

Diet can influence psoriasis in two ways. In case of metabolic disorders parts of food are causative factors and as a dietetic measure they can influence the development and treatment of an illness. Pathophysiology processes cannot be strictly defined. There are a considerable number of metabolic epidermal biochemical disorders is connected with genetic changes though psoriasis is neither a disease of metabolism nor is metabolism the only and the most important cause of psoriasis.

There have been numerous dietary approaches for psoriasis dating back many years, but none has gained general acceptance in the management of this disease. It has been alleged (Engelhardt and Cordes 1935) that after the First World War psoriasis almost disappeared from Ger-

many<sup>3</sup>. Simons reported<sup>7</sup> that 8 of 13 Dutch prisoners with psoriasis improved in Japanese concentration camps in Java in World War II, while on a near starvation diet. On the other hand Langer (1957) holds that during the World War II when famine prevailed, there was a striking increase in the incidence and severity of psoriasis<sup>3</sup>.

At the First medical Institute of Dermatology in Moscow, a fasting regimen for psoriasis has been initiated. Patients are placed on a diet of mineral water and vitamins for two weeks, and also receive daily enemas. They generally lose 9 to 10 kg, show some improvement, but relapse shortly after they return home<sup>8,9</sup>.

Yet, Grütz and Bürger (1933), in particular, have conducted studies on the fat metabolism. They have observed a favorable effect of strictly observed diet devoid of fat. They consider psoriasis to be a lipoidosis. Auken (1948) found no hyperlipaemia in psoriatics and no typical alterations in the relation between total lipid, cholesterol and phospholipids. He also found no relationship between the serum cholesterol values and clinical manifestations<sup>3</sup>.

In 1932 Schamberg presented a follow up study of 18 years usage of the low protein diet and wrote that in all those year's only one patient had failed to respond<sup>7</sup>. On contrary, Verma states that psoriasis is common in the State of Gujarat, India, where the majority of the population is vegetarian, and even their non-animal protein intake is very limited<sup>7</sup>.

Eskimos, as compared with Danes, have a low incidence of psoriasis. Eskimos have a high intake of very-long-chain n-3 fatty acid (especially eicosapentaenoic acid and docosahexaenoic acid), found mainly in seal and fish oils, where as Danes have a high intake of n-6 fatty acid (especially linoleic acid), obtained mainly from vegetable sources and animal fat<sup>10,11</sup>.

Psoriasis is characterized by the infiltration of T cells and macrophages in the dermis. It has been hypothesized that psoriatic lesions erupt when an epidermal influx of antigen-presenting cells and helper T lymphocytes overrides the normal epidermal suppressor mechanism<sup>12–15</sup>. Very-long-chain polyunsaturated fatty acids have an antiproliferative effect on T cells *in vitro*<sup>16</sup>. Fish oil might therefore affect immune reactivity and promote a reduction in the expression of psoriasis. In spite of that, many studies of the treatment of psoriasis with dietary fish oil alone have demonstrated only modest clinical improvement<sup>17,18</sup>; modest benefits were demonstrated when fish oil was administered in combination with UVB, retinoid or cyclosporine therapy<sup>19–21</sup>.

According to previous studies where treatment of psoriasis has always been accompanied by numerous diets, and where all dietetic measures have the common aim to reduce the caloric value, we conducted our investigation with aim to establish a role of the low energy diet on fat metabolism (triglycerides, total cholesterol, HDL cholesterol, LDL cholesterol) and improving clinical features at two groups of in-patients with moderate non pustular psoriasis.

## Patients and Methods

The investigation was conducted from November 1997 to May 1999 at the Department of Dermatovenerology, University Hospital »Osijek« with cooperation with Department of Nutrition, University Hospital »Osijek«. Eighty two psoriatic patients were studied (44 male and 38 female) with diagnosis moderate non pustular psoriasis vulgaris which were treated at Department of Dermatovenerology University Hospital »Osijek«.

The main criteria for including to investigation were: histologically proven non pustular psoriasis, which last more than

10 years, involving more than 30% skin surface; age 40 to 65; excluded liver disease, diabetes mellitus and other endocrine and metabolic disorders. First day of hospitalization from patient's complete anamnesis has been taken, as well as clinical examination, body weight and total cholesterol, triglycerides, HDL cholesterol and LDL cholesterol.

The patients were divided into two groups. First group includes 42 persons (22 male and 20 female), which were put under special reduction diet that was made by Department for Nutrition, University Hospital »Osijek«. Reduction diet includes 855 kcal/day (33.9 g/day proteins: 23.3 g/day vegetable proteins and 10.6 g/day animal proteins; 14.7 g/day fat and 149.6 g/day carbohydrates). Reduction diet was based at seven days menu expressed in grams for each food and energy level was expressed in kcal. The most represent food was fresh and boiled vegetables, low energy fruit (apples, oranges) rice, and bread made of wheat. Animal proteins were only from milk and milk products, without products with high-energy fat, because whole diet was based on low energy principle. The patients can drink low energy juices and water, but not coffee or alcohol. The main characteristic of reduction diet was low energy and low protein value (Table 1).

Second, control group include 40 patients (22 male and 18 female) on standard hospital diet, which also was made by Department of Nutrition, University Hospital »Osijek«. Standard hospital diet includes 2100 kcal/day (89.2 g/day proteins: 42.8 g/day vegetable proteins and 46.4 g/day animal proteins; 75.9 g/day fat and 265.2 g/day carbohydrates). Standard hospital diet was based on seven days menu expressed in grams and kcal for each food. Standard hospital diet includes all kind of food. Patients in this group could consume all kind of drinks excluding alcohol drinks.

**TABLE 1**  
INTAKE OF ENERGY AND MAJOR FOOD COMPONENTS IN PSORIASIS PATIENTS

	Energy (kcal/day)	Proteins (g/day)			Fat (g/day)	Carbohy- drates (g/day)
		Total	Plant	Animal		
Standard diet	2,100	89.2	42.8	46.4	75.9	265.2
Low energy diet	855	33.9	23.3	10.6	14.7	149.6

Both groups were treated with local indifferent therapy twice a day. After four weeks, total cholesterol, triglycerides, LDL cholesterol, HDL cholesterol and weight were measured again. Three grades of clinical findings were ranked: very well (hyper and hypo pigmented maculae without new changes); well (few erythematous lesions with silvery scale) and weak (lot of erythematous lesions with silvery scale).

Total cholesterol, triglycerides, HDL cholesterol and LDL cholesterol differences were tested by t-test or Analysis of Variance (ANOVA) after diet between patients divided in three groups according to clinical findings. With ANOVA was analyzed difference between average decrease of total cholesterol, triglycerides, HDL cholesterol and LDL cholesterol, between patients on reduction diet and patients in control group. For all statistical examinations we used software Statistica 6.0 (Statsoft Inc.).

## Results

Four weeks after patients on reduction diet shown statistically significant reduction of serum lipids in compare to control group (for total cholesterol  $p < 0.01$ , triglycerides  $p < 0.001$ , LDL cholesterol  $p < 0.01$ ), and they also shown significant improvement of clinical findings.

Total triglycerides before treatment were  $3.85 \pm 1.77$  mmol/l (male  $3.92 \pm 1.63$  and female  $3.77 \pm 1.96$  mmol/l). After treatment total triglycerides were  $2.96 \pm 1.41$

mmol/l (male  $3.25 \pm 1.39$  and female  $2.64 \pm 1.40$  mmol/l). Total cholesterol before treatment was  $8.96 \pm 2.38$  mmol/l (male  $8.98 \pm 2.32$  and female  $8.38 \pm 2.47$  mmol/l). After treatment total cholesterol were  $7.81 \pm 1.86$  mmol/l (male  $8.11 \pm 1.73$  and female  $7.48 \pm 1.98$  mmol/l). Total LDL cholesterol before treatment was  $6.27 \pm 1.61$  mmol/l (male  $6.36 \pm 1.79$  and female  $6.19 \pm 1.43$  mmol/l). After treatment total LDL cholesterol was  $5.51 \pm 1.37$  mmol/l (male  $5.66 \pm 1.48$  and female  $5.34 \pm 1.27$  mmol/l). Total HDL cholesterol before treatment was  $1.04 \pm 0.33$  mmol/l (male  $0.86 \pm 0.22$  and female  $1.25 \pm 0.30$  mmol/l). After treatment total HDL cholesterol was  $1.06 \pm 0.33$  mmol/l (male  $0.86 \pm 0.22$  and female  $1.27 \pm 0.30$  mmol/l). Average age of patients on reduction diet was  $53.7 \pm 7.9$  years (male  $53.3 \pm 8.1$  and female  $54.1 \pm 7.9$  years). Average body weight of patients was  $81.1 \pm 10.1$  kg (male  $87.0 \pm 9.4$  and female  $74.6 \pm 6.2$  kg) (Table 2).

In control group total cholesterol before treatment was  $8.14 \pm 1.75$  mmol/l (male  $8.38 \pm 1.86$  and female  $7.84 \pm 1.59$  mmol/l). After treatment total cholesterol was  $7.84 \pm 1.69$  mmol/l (male  $8.05 \pm 1.79$  and female  $7.57 \pm 1.59$  mmol/l). Total LDL cholesterol before treatment was  $6.03 \pm 1.35$  mmol/l (male  $6.02 \pm 1.38$  and female  $6.04 \pm 1.35$  mmol/l). After treatment total LDL cholesterol was  $5.47 \pm 1.21$  mmol/l (male  $5.57 \pm 1.25$  and female  $5.34 \pm 1.17$  mmol/l). Total HDL cholesterol before treatment was  $0.99 \pm 0.33$  mmol/l (male  $1.13 \pm 0.26$  and female  $0.82 \pm 0.32$  mmol/l). After treatment total

**TABLE 2**  
BLOOD LIPIDS (X ± SD) IN PSORIASIS PATIENTS ON LOW ENERGY DIET BEFORE AND AFTER TREATMENT

	Triglycerides (mmol/l)		Total cholesterol (mmol/l)		LDL cholesterol (mmol/l)		HDL cholesterol (mmol/l)	
	Before	After	Before	After	Before	After	Before	After
Male	3.92±1.63	3.25±1.39	8.98±2.32	8.11±1.73	6.36±1.79	5.66±1.48	0.86±0.22	0.86±0.22
Female	3.77±1.96	2.64±1.40	8.38±2.47	7.48±1.98	6.19±1.43	5.34±1.27	1.25±0.30	1.27±0.30
Total	3.85±1.77	2.96±1.41	8.69±2.38	7.81±1.86	6.27±1.61	5.51±1.37	1.04±0.33	1.06±0.33

**TABLE 3**  
BLOOD LIPIDS (X ± SD) IN CONTROL PSORIASIS PATIENTS BEFORE AND AFTER TREATMENT

	Triglycerides (mmol/l)		Total cholesterol (mmol/l)		LDL cholesterol (mmol/l)		HDL cholesterol (mmol/l)	
	Before	After	Before	After	Before	After	Before	After
Male	3.49±1.44	3.15±1.21	8.38±1.86	8.05±1.79	6.02±1.38	5.57±1.25	1.13±0.26	1.10±0.26
Female	2.61±1.40	2.34±1.08	7.84±1.59	7.57±1.58	6.04±1.35	5.34±1.17	0.82±0.32	0.92±0.17
Total	3.09±1.47	2.78±1.21	8.14±1.75	7.84±1.69	6.03±1.35	5.47±1.21	0.99±0.33	1.02±0.24

HDL cholesterol was  $1.02 \pm 0.24$  mmol/l (male  $1.10 \pm 0.26$  and female  $0.92 \pm 0.17$  mmol/l). Total triglycerides before treatment were  $3.09 \pm 1.47$  mmol/l (male  $3.49 \pm 1.44$  and female  $2.61 \pm 1.40$  mmol/l). After treatment total triglycerides was  $2.78 \pm 1.21$  mmol/l (male  $3.15 \pm 1.21$  and female  $2.34 \pm 1.08$  mmol/l). In control group average age was  $53.9 \pm 8.0$  years (male  $54.8 \pm 8.0$  and female  $52.6 \pm 8.0$  years). Average body weight was  $80.5 \pm 10.0$  kg (male  $86.3 \pm 7.1$  and female  $73.4 \pm 8.4$  kg) (Table 3).

Decrease of total cholesterol in group one was 8.8% (male 8.3% and female 9.5%), and in control group was 3.9% (male 4.2% and female 3.5%). Decrease of triglycerides was 19.8% (male 15.4% and female 24.7%) and in control group 7.2% (male 8.2% and female 6.0%). Decrease of LDL cholesterol was 11.3% (male 6.7% and female 13.0%) and in control group

5.1% (male 6.7% and female 3.0%). Values of HDL cholesterol weren't shown statistically significant difference at beginning and at the end of the study.

Comparing decrease of triglycerides and improvement of clinical findings there was statistical significant difference between weak and well ( $p < 0.05$ ) and between weak and very well ( $p = 0.01$ ), and between well and very well there was no statistical significant difference (Figure 1). Comparing decrease of total cholesterol and improvement of clinical findings there were only statistical significant between weak and very well ( $p < 0.05$ ), and in the other there was no statistical significant difference (Figure 2). Comparing decrease of LDL cholesterol and improvement of clinical findings there were statistical significant difference between weak and well ( $p < 0.05$ ), and between weak and very well ( $p <$

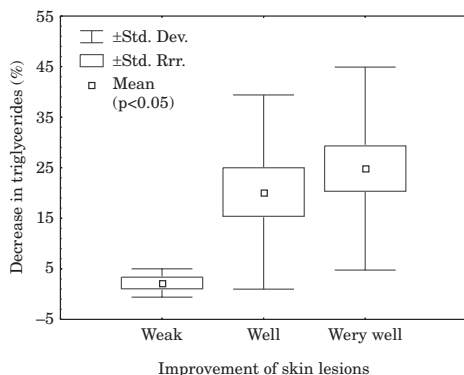


Fig. 1. Average decrease in triglycerides vs. improvement of skin lesions.

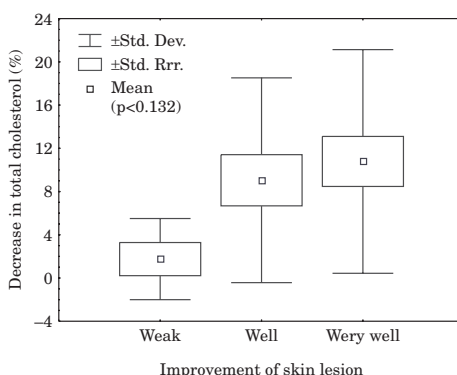


Fig. 2. Average decrease in total cholesterol vs. improvement of skin lesions.

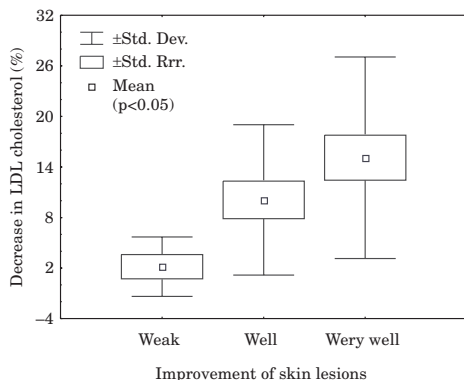


Fig. 3. Average decrease in LDL cholesterol vs. improvement of skin lesions.

0.05) and between well and very well there were no statistical significant difference (Figure 3).

## Discussion

Although there have been extensive studies of serum lipid levels in correlation with clinical course of psoriasis, the data are conflicting. This discrepancy may be explained by differences in the severity of psoriasis in the patients studied, and possibly inclusion of psoriatics with

diabetes. Some authors suggested that it is only overweight psoriatics who exhibit hyperlipidemia, while psoriatics of normal weight do not differ from the general population according level of serum lipids. But the results from the Japanese authors suggest that an impairment of lipoprotein metabolism exists in psoriasis, and this may be related to high incidence of atherosclerosis in psoriatics<sup>22</sup>.

In our study we included psoriatics without any metabolic, liver, renal or endocrinology disturbance, but they were not young population, and their serum lipids levels were to be expected a higher than in young population. They suffered from psoriasis at least 10 years, and we included only patients with moderate non pustular psoriasis.

It is apparent that patients with psoriasis tend to improve in the hospital with simple bland creams on regular hospital diet. Grutz (1938) claimed well results in the treatment of psoriasis with a low-fat diet; though such response has not been obtain by some others authors<sup>23</sup>.

The influence of nutrition on human health has been probed in many multifactorial diseases<sup>24–27</sup>. Psoriasis, like a chronic cutaneous multifactorial disease,



widely held to result from the interaction of genetic predisposition with environmental factors. The identification of environmental factors may be important for the prevention and the treatment of disease. Diet and obesity may contribute to the development and severity of disease<sup>28,29</sup>.

However, in comparing the fat metabolism and clinical course of patients on the regular hospital food with those on the low energy (e. g. low protein) diet, we observed that both (group one and group two) showed decreasing a serum lipids levels, but much more improving in clinical features showed group one (on low energy diet) as well as decreasing of serum lipids levels. On the other hand, there was not significant decreasing HDL cholesterol neither body weight. Only 16 (38.09%) patients from group one lose more than five kilogram what we can explain with lack of physical activity during hospitalization.

Many authors tried to establish the possible effect of low protein intake in psoriasis<sup>7,30</sup> and the effect of low tauri-

ne<sup>31,32</sup> and low tryptophane intake as well<sup>33</sup>. In a survey of Naldi<sup>34</sup> the risk of psoriasis increased with increasing body mass index and was inversely related to consumption of carrots, tomatoes and fresh fruit when compared to control subjects with other skin disease. After controlling for socioeconomic status, alcohol consumption, and cigarette smoking, the association of psoriasis with increased body mass index remained significant.

## Conclusion

After mentioning various diets as low protein, lipid and carbohydrates, gluten-free diet, diet poor or rich in potassium, diet with turkey meet as well as diet with triptophan, all of them alone giving poor results in treatment of psoriasis vulgaris, we suggest based on our results that low energy (e.g. low caloric) diet could be important adjuvant factor in treatment and prevention of moderate non pustular psoriasis. As a supplementary source of energy alcohol consumption are to be avoided too.

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*I. Ručević*

*Department of Dermatovenereology, University Hospital »Osijek«, J. Huttlera 4, 31000 Osijek, Croatia*

## **ULOGA NISKOKALORIČNE DIJETE U LIJEČENJU VULGARNE PSORIJAZE**

### **S A Ž E T A K**

Cilj ispitivanja je bio utvrditi da li prehrana kao vanjski provocirajući čimbenik utječe na tijek liječenja umjerene nepustulozne vulgarne psorijaze. Ispitivanje je provedeno tijekom 2 godine na Odjelu za kožne i spolne bolesti te Odjelu za prehranu Kliničke bolnice Osijek i obuhvatilo je 82 ispitanika starosti 40 do 65 godina, koji duže od 10 godina boluju od ove bolesti. Četrdeset i dva ispitanika (22 muškarca i 20 žena) je uz lokalno liječenje indiferentnim mastima bilo podvrgnuto niskokaloričnoj prehrani kroz 4 tjedna. Druga, kontrolna skupina (40 ispitanika; 22 muškarca i 18 žena) je uz istu lokalnu terapiju, bila na standardnoj bolničkoj prehrani. Ukupni kolesterol, trigliceridi, HDL kolesterol i LDL kolesterol u krvi, tjelesna težina i klinička slika izmjenjeni su na početku ispitivanja i nakon 4 tjedna. Nakon 4 tjedna ispitanici na dijeti su pokazali statistički značajno sniženje serumskih lipida u odnosu na kontrolnu grupu, a pokazali su također i znatno poboljšanje kliničke slike. Suprotno tome, tjelesna težina nije pokazala bitnu tendenciju sniženja, što tumačimo izostankom bilo kakve fizičke aktivnosti kod hospitaliziranih pacijenata. Gornji nalazi upućuju na potrebu nisko kalorične dijetе u prevenciji i liječenju vulgarne psorijaze, koja bi kao bitan čimbenik uz lokalnu terapiju, brže dovela do remisije bolesti.