Comparative Characteristics of Metabolic Parameters in Patients with Psoriasis and Lichen Planus

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Abstract

AIM: The aim of the study was to assess metabolic parameters in patients with lichenoid dermatoses.

METHODS: The study of indicators of metabolic processes was performed on two groups of patients: first group consisted of 50 patients with psoriasis, of whom there were 20 women and 30 men, the average age was 41.3 years; second group included 50 patients with lichen planus, including 23 women and 27 men, the average age was 40.9 years. The control group consisted of 15 healthy individuals, comparable age and gender, whose indicators were considered normal.

CONCLUSIONS: Deviations of lipid metabolism in patients with psoriasis and lichen planus were detected, which were unidirectional with a significant increase in total cholesterol (27% and 30%, respectively) and low-density lipoprotein cholesterol (17% and 21%, respectively).

Introduction

Numerous studies in recent years have revealed the polysystemic nature of chronic lichenoid dermatoses, which are associated with a variety of infectious, autoimmune, metabolic, and inflammatory diseases of various internal organs and systems [1], [2]. There is a close link between psoriasis and metabolic syndrome, but for lichen planus (LP) such comorbidity is less specific [3], [4], [5]. Metabolic disorders in lichenoid dermatoses are more related to carbohydrate-lipid metabolism, but the methods of metabolic correction recorded in modern protocols are not personalized, or even specific to each of the lichenoid dermatoses [4], [6], [7], [8], [9], [10]. Recent studies have shown an association between systemic inflammation and dyslipidemia in patients with psoriasis of varying severity in loco [6], [11], as well as between fatty acid metabolism and cytokine production in psoriatic plaques. Disorders of lipid metabolism were studied in terms of the relationship with HLA antigens, which confirmed the genetic nature of the comorbidity of psoriasis [12]. Obesity is a known risk factor for psoriasis [13], [14]. This relationship is two-way: on the one hand, visceral obesity produces inflammatory cytokines, which contribute to the development of psoriasis, on the other-psoriasis causes metabolic disorders that provoke obesity [15]. In particular, the risk of developing psoriasis in patients with obesity is twice as high as in subjects with normal body weight [16]. There is evidence that increasing the body mass index by one unit increases the risk of psoriasis by 9%, and in patients with psoriasis increases PASI by 7% [14].

A number of works have also been devoted to the study of metabolic disorders in LP. A meta-analysis of 7 observational studies revealed an association of LP with dyslipidemia, which occurred 1.74 times more often than in controls. In this study, hypertriglycerideremia, increased levels of low-density lipoprotein and blood cholesterol and decreased levels of high-density lipoprotein were recorded in patients with LP [4]. Concomitant hyperlipidemia also adversely affects the prognosis of LP. Thus, in the study of Yew...
(2016), patients with LP associated with hyperlipidemia and/or diabetes showed a significantly lower degree of improvement after dermatological treatment compared with patients who did not have such concomitant pathology [14]. There is a suggestion that a violation of the ratio of fatty acids in patients with oral LP may affect the development of dermatosis. Progression of the disease was associated with eicosapentaenoic acid deficiency with a relative increase in the content of lauric and linoleic acids in the blood of patients with oral LP [15].

The study is a fragment of the research work of the Department of Dermatology, Venereology and Medical Cosmetology of Kharkiv National Medical University “Clinical and pathogenetic aspects of chronic lichenoid dermatoses and methods of their correction” № 0119U002910 (2019-2021).

The aim of the study was to assess metabolic parameters in patients with lichenoid dermatoses.

**Methods**

Determination of serum fasting glucose was performed by glucose oxidase method, the results were given in mmol/l. The range of recommended normal values was provided for each specific set but was not higher than 5.9 mmol/l. Indicators of lipid metabolism included the assessment of total cholesterol (TCH), high-density lipoprotein cholesterol (HDL-C), and low-density lipoprotein cholesterol (LDL-C). The concentration of TCH in the serum was determined using an industrial test system from “SpainLab” (Ukraine) on a biochemical analyzer “Labline-80” (Austria). The concentration of HDL-C and LDL-C in the serum was determined using a commercial test system from DAC-SpectroMed (Moldova) on a biochemical analyzer “Labline-80” (Austria) 12–14. Modern software was used for statistical processing of the obtained data: Statistica for Windows software package, Excel spreadsheet editor (Microsoft). Statistical processing of the obtained data was performed using the program “Microsoft Excel 2010” with a minimum reliability of 95% at p < 0.05. Methods of descriptive statistics were used to calculate the arithmetic mean (M), the arithmetic mean error (m), the standard deviation (σ). To assess the reliability of the difference between the groups used an odd t-test Student with a preliminary check of the normality of the distribution option [15]. The study of indicators of metabolic processes was performed on two patients groups with a confirmed diagnosis of psoriasis and LP, who were examined and treated in the inpatient and outpatient dermatologic units. The first group consisted of 50 patients with psoriasis, of whom there were 20 women and 30 men, the average age was 41.3 years. The second group included 50 patients with LP, including 23 women and 27 men, the average age was 40.9 years. The control group consisted of 15 healthy persons, compared with age and gender, whose indicators were considered normal.

**Results and Discussion**

The analysis of indicators of metabolic processes revealed deviations of lipid metabolism against the background of the tendency to hyperglycemia in patients with lichenoid dermatoses (Table 1).

| Indicators | Psoriasis (n = 50) | LP (n = 50) | Control (n = 15) |
|------------|-------------------|------------|-----------------|
| Glucose (mmol/l) | 5.03 ± 0.13* | 5.34 ± 0.52 | 4.65 ± 0.54 |
| TCH (mmol/l) | 5.89 ± 0.97* | 6.02 ± 1.17 | 4.64 ± 0.24 |
| LDL-C (mmol/l) | 4.53 ± 0.18* | 4.63 ± 0.18* | 3.84 ± 0.16 |
| HDL-C (mmol/l) | 1.12 ± 0.05 | 1.16 ± 0.05 | 1.16 ± 0.07 |

*significantly different from the control (p < 0.05); **significantly different from the psoriasis (p < 0.05),

LP: Lichen planus, LDL-C: Low-density lipoprotein cholesterol, HDL-C: High-density lipoprotein cholesterol.

There was a probable increase in the serum level of total cholesterol in patients with psoriasis (by 27%) and, to a greater extent, patients with LP (by 30%), relative to the group of healthy donors. There was also a probable increase in LDL-C relative to control in the group of patients with psoriasis (by 17%) and in the group of patients with LP (by 21%). There was no significant difference in the level of LDL-C between the groups of patients with lichenoid dermatoses, but the rate was higher in the group of LP (2%). The level of HDL-C was lower relative to control in patients with psoriasis (by 3.5%), but this difference was not significant. The level of HDL-C in patients with LP did not differ from the control and was higher than the corresponding figure in patients with psoriasis. Glucose levels in patients with lichenoid dermatoses were higher than control values (8% in patients with psoriasis and 14% in patients with LP respectively), but the difference was not significant. In patients with LP, serum glucose was slightly higher (6%) than in patients with psoriasis, but both indicators were within the reference range.

The association of psoriasis with lipid disorders is a well-known fact in medical science. Over the past century, a number of authors have considered psoriasis as “skin lipoidosis” or “cholesterol diathesis,” also recording the accumulation of cholesterol in psoriatic plaques, the association of lipid accumulation in injured skin with the development of kebnerization [11]. We have found the deviations of lipid metabolism in patients with lichenoid dermatoses, which were unidirectional in both patients with psoriasis and in patients with LP, and were characterized by a significant increase in TCH and LDL-C. In our opinion, the identified changes require mandatory screening of the above indicators in patients with lichenoid dermatoses and pathogenetic metabolic correction in the overall management strategy of lichenoid dermatoses, and in each individual case.
Conclusions

Deviations of lipid metabolism in patients with psoriasis and LP were detected, which were unidirectional with a significant increase in total cholesterol (27% and 30%, respectively) and LDL-C (17% and 21%, respectively).

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