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Skinfold thickness in men with mild and severe psoriasis without and taking into account the somatotype

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Significant prevalence and decline in quality of life caused by psoriasis in combination with the lack of etiologic methods of its treatment, put this disease, in terms of relevance for modern medicine on a par with diabetes, hypertension, asthma etc. That is, there is a need to find easily accessible markers that would determine the susceptibility to this disease. The aim of the study was to establish the differences in the skinfold thickness between healthy and/or psoriatic Ukrainian men depending on the severity of the disease without and taking into account the somatotype. For 32 Ukrainian men of the first mature age, patients with mild psoriasis and 68 men with severe psoriasis (according to the PASI index) were determined skinfold thickness according to Bunak and determined the somatotype according to the Heath-Carter scheme. The control group consisted of 82 healthy men of similar age, selected from the database of the research center of National Pirogov Memorial Medical University, Vinnytsya. Statistical data processing was performed in the license package "Statistica 5.5" using non-parametric methods of evaluation of the obtained results. It was found that in patients with mild or severe psoriasis of men without division into somatotypes and in representatives of the mesomorphic somatotype compared to healthy men, the skinfold thickness is significantly higher at the lower angle of the scapula, abdomen and side, and significantly lower on the back and front of the shoulder, chest and thighs. When comparing the skinfold thickness between patients with mild or severe psoriasis of endo-mesomorphic somatotype with healthy men of similar somatotype, we found larger values of the skinfold thickness under the lower angle of the scapula (only with mild course), on the abdomen and side, and also smaller values of the skinfold thickness on the posterior surface of the shoulder and only in representatives with severe psoriasis - on the anterior surface of the shoulder, chest and thigh. Between patients with different degrees of severity of dermatosis both without distribution, and with distribution on various somatotypes of reliable or tendencies of differences of skinfold thickness are not revealed. Thus, there are pronounced differences in most indicators of the skinfold thickness between healthy and patients with mild or severe psoriasis of Ukrainian men of the first mature age, both without distribution and with the division into different somatotypes.

Keywords: psoriasis, skinfold thickness, somatotype, men.

Introduction

Psoriasis is a chronic immune-mediated inflammatory skin disease that has a chronic recurrent course that significantly affects the quality of life of patients. According to research, the leading triggers of the disease are stress (48.3 %), insolation (24.9 %) and infectious diseases (9.1 %) [18].

The prevalence of the disease is heterogeneous, but there is a peculiar trend when it is more prevalent in high-income countries. Thus, in the United Kingdom the

prevalence is 2.2 %, in Norway 4.5 %, in the United States 2.2 %-3.15 %, and in Africa, Asia and Latin America the average is 0.5 % [18, 20]. In Israel, the average incidence rate is 2.69 % [24].

In the United States as of 2010, 7.2 million people suffered from psoriasis, and in 2013 this figure was already 7.4 million people. Although in general the authors of the study claim that since the early 2000s the number of patients with psoriasis in the country has stabilized [21].

In addition, it is known that psoriasis is often associated with various diseases of other body systems. Psoriatic arthritis occurs in 86 % of patients. Cardiovascular diseases, diabetes mellitus, sometimes rheumatoid arthritis, Crohn's disease, multiple sclerosis, etc. are often associated [2]. It should be noted that the complication of the cardiovascular system on the background of psoriasis is the most common cause of death in this group of patients, especially when it comes to psoriatic arthritis. According to the literature, the probability of death from the cardiovascular system in such patients increases by 50 % [4].

It is known that psoriasis is a multifactorial disease, ie it occurs both under the influence of genetic factors and environmental factors. Scientists are already well aware of which genes are associated with psoriasis (for example, the best known association with the HLA-Cw6 allele) [12]. Direct gene research is a complex and costly process. However, it can be successfully replaced by anthropometric research due to the fact that genes that encode certain phenotypic traits can be linked to certain genes associated with disease. This statement has been repeatedly proven in practice by various studies, in particular, for skin diseases [17].

One of the potential anthropometric indicators that can be successfully used for this purpose is the skinfold thickness. A group of researchers found that there is a correlation between the skinfold thickness on the leg and the risk of head and neck cancer [1].

M. R. Esco and co-authors [8] in the study found a relationship between heart rate variability, heart rate recovery and total skinfold thickness on the abdomen, chest and thighs ($p < 0.01$).

Indicators of the skinfold thickness of the epigastric can be used to predict the occurrence of depression in the elderly [13].

In a study of 451 Hawaiians, a group of authors found that higher rates of skinfold thickness in the triceps were associated with a higher risk of Parkinson's disease. Similar results were achieved by a group of Swedish authors who found a correlation between the total skinfold thickness and the risk of Parkinson's disease [26].

The study of cardiovascular parameters and anthropometric parameters in groups of 100 people revealed a correlation between the rate of arterial stiffness and the skinfold thickness in the triceps ($r = 0.377$, $p < 0.001$), which was seen when performing regression analysis (arterial stiffness indicator = $6.41 + 0.072 \times \text{TST}$; $R^2 = 0.142$, $F_{(1-98)} = 16.23$, $p < 0.001$) [23].

J. Surendar and co-authors [25] in 2016 found an association between the total skinfold thickness, the peripheral skinfold thickness and the risk of diabetes.

Regarding the study of the skinfold thickness in people with psoriasis, the analysis of English-language scientometric databases revealed only one work in 1992 [22], where the author studied this indicator only among

people with psoriasis of four "skin types". Thus, there is a need to conduct this study with the participation of both patients and healthy individuals and a modern assessment of the severity of psoriasis.

The aim of the study was to establish the differences in the skinfold thickness between healthy and/or psoriatic Ukrainian men depending on the severity of the disease without and taking into account the somatotype.

Materials and methods

The skinfold thickness (mm) was determined according to the scheme of Bunak V. V. [5] for 32 Ukrainian men of the first mature age (22-35 years) with mild psoriasis and 68 men with severe psoriasis. The Bioethics Committee of the National Pirogov Memorial Medical University, Vinnytsya (Minutes № 2 of 02.20.2020) found that the studies did not contradict the basic bioethical norms of the Declaration of Helsinki, the Council of Europe Convention on Human Rights and Biomedicine (1977), WHO regulations and Ukrainian laws.

Assessment of the severity and area of psoriatic lesions was performed using the total PASI index (Psoriasis Area and Severity Index) [9], according to which: mild severity - PASI value < 10 ; moderate severity - PASI values from 10 to 20; severe - PASI value > 20 [3].

The control group consisted of 82 healthy men of similar age group, whose anthropometric data were taken from the database of the research center National Pirogov Memorial Medical University, Vinnytsya.

Somatotype assessment was performed according to the Heath-Carter scheme [6]. The following distribution of somatotypes among men with mild and severe psoriasis was established: mesomorphs - 28 (87.5 %) and 55 (80.9 %), respectively; ectomorphs - 0 (0 %) and 2 (2.9 %), respectively; ecto-mesomorphs - 0 (0 %) and 2 (2.9 %), respectively; endomesomorphs - 4 (12.5 %) and 9 (13.2 %), respectively. Among healthy men, the distribution of somatotypes is as follows: endomorphs - 2 (2.4 %); mesomorphs - 39 (47.6 %); ectomorphs - 9 (11.0 %); ecto-mesomorphs - 13 (15.9 %); endomesomorphs - 13 (15.9 %); representatives of the middle intermediate somatotype - 6 (7.3 %).

Statistical processing of the obtained results was performed in the license package "Statistica 5.5" using non-parametric evaluation methods. The significance of the difference in values was determined using the Mann-Whitney U-test.

Results

When comparing the skinfold thickness between healthy and psoriatic men of mild and severe course without taking into account the somatotype, it was found (Table 1) significantly higher ($p < 0.01-0.001$) values in healthy men of the skinfold thickness on the back and front of the shoulder, on chest and thighs; and significantly lower ($p < 0.05-0.001$) values in healthy men of the skinfold

thickness under the lower angle of the scapula, abdomen and side. There were no significant or tendencies of differences in the skinfold thickness between men with mild and severe psoriasis without taking into account the somatotype (see Table 1).

Both between healthy and patients with mild psoriasis of mesomorphic and endomesomorphic somatotypes, significantly higher values of the skinfold thickness ($p < 0.01-0.001$) were found in representatives of endomesomorphic somatotype (Table 2). Between healthy and patients with mild psoriasis of the mesomorphic somatotype, the picture of differences in the skinfold thickness is completely similar to the established differences without division into somatotypes (see Table 1, Table 2). Between healthy and mild psoriasis men of endo-mesomorphic somatotype, the picture of differences in the skinfold thickness is slightly different: in contrast to the established differences without division into somatotypes, there are no significant differences in the skinfold thickness on the front surface of the shoulder, chest and thighs (see Table 1, Table 2).

When comparing the skinfold thickness between patients with severe psoriasis course men of mesomorphic and endomesomorphic somatotypes, in latter found significantly higher values ($p < 0.05-0.01$) of the skinfold thickness only on the back of the shoulder, forearm, abdomen, side and on the thigh (Table 3). Between healthy and severe psoriasis men of mesomorphic somatotype, the pattern of differences in the skinfold thickness is almost similar to the established differences in men without division into somatotypes (see Table 1) and between healthy and mild course of psoriasis mesomorphic men (see Table 2). Between healthy and severe course of psoriasis men of endo-mesomorphic somatotype, the picture of differences in the skinfold thickness differs from the established differences without division into somatotypes only in the absence of differences in the skinfold thickness at the lower angle of the scapula (see Table 3).

It should be noted that between patients with mild and severe psoriasis course in men of mesomorphic or endomesomorphic somatotypes, as well as without taking into account the somatotype, there are no significant or trends in differences in the skinfold thickness.

Discussion

It is known from scientific literature sources that in various pathological processes the rate of genotype reaction clearly defines the limits of clinical variability and pathomorphosis of human diseases. At the phenotypic level, this reaction rate is registered by the macromorphological subsystem of the general constitution, namely its morphophenotype (somatic type, somatotype, body type) [19]. Therefore, the identification of phenotypic traits that are in close causal relationships with different links in the pathogenesis of multifactorial diseases is essential to justify the influence of hereditary or

Table 1. Comparison of the skinfold thickness between healthy and psoriatic men without somatotype ($M \pm \sigma$).

Indicators	Healthy	Patients with psoriasis		p_{h-mc}	p_{h-sc}	p_{mc-sc}
		MC	SC			
GZPL	7.848± 2.914	4.938± 1.933	5.059± 1.819	<0.001	<0.001	>0.05
GPPL	5.592± 2.132	3.875± 1.792	3.868± 1.656	<0.001	<0.001	>0.05
GPR	4.173± 1.621	4.281± 1.727	4.177± 1.360	>0.05	>0.05	>0.05
GL	13.53± 3.92	17.31± 7.44	16.12± 6.63	<0.01	<0.05	>0.05
GGR	4.924± 1.729	3.938± 1.501	4.059± 1.761	<0.01	<0.001	>0.05
GG	12.33± 4.79	17.97± 8.68	17.63± 7.79	<0.001	<0.001	>0.05
GB	10.75± 4.41	20.28± 7.87	18.47± 7.17	<0.001	<0.001	>0.05
GBD	12.80± 3.85	8.906± 3.439	8.868± 3.425	<0.001	<0.001	>0.05
GGL	8.982± 2.691	10.25± 3.98	9.441± 3.431	>0.05	>0.05	>0.05

Notes: here and in the following tables, GZPL - the skinfold thickness on the back of the shoulder; GPPL - on the front surface of the shoulder; GPR - on the forearm; GL - under the lower angle of the scapula; GGR - on the chest; GG - on the abdomen; GB - on the side; GBD - on the thigh; GGL - on the shin; MC - mild course; SC - severe course; p_{h-mc} - the reliability of the difference between the relevant indicators between healthy and patients with mild psoriasis; p_{h-sc} - between healthy and patients with severe psoriasis; p_{mc-sc} - between patients with mild and severe psoriasis.

environmental factors on the predisposition or resistance of the population to psoriasis.

During the analysis of the skinfold thickness, in patients with mild or severe psoriasis men without division into somatotypes or representatives of the mesomorphic somatotype compared with healthy men of similar groups, we found: higher values of skinfold thickness - under the lower angle of the scapula, respectively by 27.9 % and 19.1 % and by 15.7 % and 23.5 %, on the abdomen respectively by 45.7 % and 43.0 % and by 30.3 % and 44.6 %, as well as on the side respectively by 88.7 % and 71.8 % and by 88.9 % and 86.7 %; lower values of skinfold thickness - on the back of the shoulder respectively by 37.1 % and 35.5 % and by 37.2 % and 30.7 %, on the front surface of the shoulder, respectively by 30.7 % and 30.8 % and by 31.3 % and 23.2 %, on the chest respectively by 20.0 % and 17.6 % and by 20.1 % and 8.2 %, as well as on the thigh, respectively by 30.4 % and 30.7 % and by 33.7 % and 29.6 %.

During the analysis of the skinfold thickness, in patients with mild or severe psoriasis course men of endomesomorphic somatotype compared with healthy men of similar somatotype, we found: higher values of skinfold thickness - under the lower angle of the scapula by 91.6 % (only with a mild course), on the abdomen respectively by

Table 2. Comparison of the skinfold thickness between healthy and patients with mild psoriasis men of mesomorphic and endomesomorphic somatotypes ($M \pm \sigma$).

Indicators	Healthy		p	MC of psoriasis		p	$p_{h/m-mc/m}$	$p_{h/m-mc/em}$
	mes.	en-mes.		mes.	en-mes.			
GZPL	7.108 $\pm$ 2.344	11.09 $\pm$ 2.18	<0.001	4.464 $\pm$ 1.527	8.250 $\pm$ 0.957	<0.01	<0.001	<0.05
GPPL	5.044 $\pm$ 1.493	7.831 $\pm$ 2.106	<0.001	3.464 $\pm$ 1.427	6.750 $\pm$ 1.500	<0.01	<0.001	>0.05
GPR	3.713 $\pm$ 1.295	5.646 $\pm$ 1.760	<0.01	3.893 $\pm$ 1.423	7.000 $\pm$ 1.155	<0.01	>0.05	>0.05
GL	13.09 $\pm$ 3.51	16.96 $\pm$ 3.02	<0.01	15.14 $\pm$ 3.94	32.50 $\pm$ 9.00	<0.01	<0.05	<0.01
GGR	4.515 $\pm$ 1.147	6.254 $\pm$ 1.926	<0.01	3.607 $\pm$ 1.133	6.250 $\pm$ 1.893	<0.01	<0.01	>0.05
GG	11.79 $\pm$ 4.64	16.84 $\pm$ 3.35	<0.001	15.36 $\pm$ 4.25	36.25 $\pm$ 10.31	<0.01	<0.01	<0.01
GB	9.721 $\pm$ 3.502	15.72 $\pm$ 3.58	<0.001	18.36 $\pm$ 5.91	33.75 $\pm$ 7.09	<0.01	<0.001	<0.01
GBD	12.22 $\pm$ 3.50	16.05 $\pm$ 3.99	<0.01	8.107 $\pm$ 2.485	14.50 $\pm$ 4.36	<0.01	<0.001	>0.05
GGL	8.741 $\pm$ 2.720	11.50 $\pm$ 2.32	<0.001	9.250 $\pm$ 2.238	17.25 $\pm$ 6.65	<0.01	>0.05	>0.05

Notes: here and the following tables, p is the significance of the difference between the corresponding indicators between the representatives of mesomorphic and endomesomorphic somatotypes; $p_{h/m-mc/m}$ - between healthy and patients with mild psoriasis and mesomorphic somatotype; $p_{h/m-mc/em}$ - between healthy and psoriasis patients with mild endomesomorphic somatotype.

Table 3. Comparison of the skinfold thickness between healthy and patients with severe psoriasis of mesomorphic and endomesomorphic somatotypes ($M \pm \sigma$).

Indicators	Healthy		p	MC of psoriasis		p	$p_{h/m-mc/m}$	$p_{h/m-mc/em}$
	mes.	en-mes.		mes.	en-mes.			
GZPL	7.108 $\pm$ 2.344	11.09 $\pm$ 2.18	<0.001	4.927 $\pm$ 1.709	6.667 $\pm$ 1.732	<0.01	<0.001	<0.001
GPPL	5.044 $\pm$ 1.493	7.831 $\pm$ 2.106	<0.001	3.873 $\pm$ 1.504	4.778 $\pm$ 2.108	>0.05	<0.001	<0.01
GPR	3.713 $\pm$ 1.295	5.646 $\pm$ 1.760	<0.01	4.073 $\pm$ 1.120	5.667 $\pm$ 1.581	<0.01	>0.05	>0.05
GL	13.09 $\pm$ 3.51	16.96 $\pm$ 3.02	<0.01	16.16 $\pm$ 4.45	19.89 $\pm$ 13.23	>0.05	<0.001	>0.05
GGR	4.515 $\pm$ 1.147	6.254 $\pm$ 1.926	<0.01	4.146 $\pm$ 1.693	4.000 $\pm$ 2.449	>0.05	=0.065	<0.05
GG	11.79 $\pm$ 4.64	16.84 $\pm$ 3.35	<0.001	17.05 $\pm$ 5.83	26.11 $\pm$ 11.50	<0.05	<0.001	<0.05
GB	9.721 $\pm$ 3.502	15.72 $\pm$ 3.58	<0.001	18.15 $\pm$ 5.83	25.44 $\pm$ 9.00	<0.01	<0.001	<0.01
GBD	12.22 $\pm$ 3.50	16.05 $\pm$ 3.99	<0.01	8.600 $\pm$ 3.083	12.22 $\pm$ 3.56	<0.01	<0.001	<0.05
GGL	8.741 $\pm$ 2.720	11.50 $\pm$ 2.32	<0.001	9.273 $\pm$ 2.453	12.33 $\pm$ 6.22	>0.05	>0.05	>0.05

Notes: $p_{h/m-sc/m}$ - between healthy and men with severe psoriasis and mesomorphic somatotype; $p_{h/m-sc/em}$ - between healthy and patients with severe psoriasis of endo-mesomorphic somatotype.

115.5 % and 55.0 % and on the side respectively by 114.7 % and 61.8 %; lower values of skinfold thickness - on the back of the shoulder respectively by 34.4 % and 66.3 %, on the front surface of the shoulder by 63.9 % (only with severe course), on the chest by 56.4 % (only with severe course) and on the thigh by 31.3 % (only with severe course).

S. V. Dmytrenko [7] in 2005-2006 in patients with limited psoriasis in men found significantly greater values of most skinfold thickness of the upper extremity and torso, as well as significantly greater values of the skinfold thickness in patients with advanced psoriasis men than in healthy men of the same age and place of residence (residents of the Podillia region of Ukraine).

In addition, the results of work on the study of the prevalence of somatotype and features of anthropometric parameters in patients with other skin diseases are widely presented. Thus, I. M. Makarchuk [14, 15] in 2014 examined 84 boys and 116 girls with acne and 150 healthy boys and

160 healthy girls (control group) in order to identify differences in transverse body sizes between the studied groups of persons, taking into account and without taking into account somatotype. Statistical processing of the obtained data showed that individuals with mesomorphic somatotype have the least pronounced homogeneity in anthropometric indicators.

In the works of I. V. Gunas and co-authors [10, 11] the peculiarities of somatotype distribution for both healthy and acne patients, residents of the Podillia region of Ukraine were found, namely - among boys suffering from acne there are more persons of mesomorphic and endomesomorphic somatotype, and among girls - mesomorphic somatotype.

The data identified during the study logically complement and agree with the findings of our previous work and the work of other teams of authors, thus increasing the effectiveness of future use of anthropometric indicators

to identify risk groups for psoriasis and its severity. This in turn will allow doctors to respond in a timely manner and modify the patient's lifestyle and improve his quality of life.

Conclusions

1. In men with mild and severe psoriasis course without division into somatotypes, as well as in patients of different disease course of mesomorphic somatotype, the skinfold thickness on the back and front of the shoulder, chest and thigh is smaller ($p < 0.01-0.001$), and under lower angle of the scapula, on the abdomen and on the side - larger ($p < 0.05-0.001$), compared with healthy men. In contrast to the established differences in skinfold thickness, in men of endomesomorphic somatotype patients with mild psoriasis course there are no significant differences in the

skinfold thickness on the front surface of the shoulder, chest and thigh; and in representatives of severe psoriasis - only the skinfold thickness under the lower angle of the scapula.

2. The skinfold thickness is greater in men of endomesomorphic somatotype than in representatives of the mesomorphic somatotype when comparing healthy ($p < 0.01-0.001$) or patients with mild course of psoriasis ($p < 0.01$) men. In patients with severe course of psoriasis men of endomesomorphic somatotype, higher values ($p < 0.05-0.01$) of the skinfold thickness were found only on the posterior surface of the shoulder, forearm, abdomen, side and thigh than in representatives of the mesomorphic somatotype.

3. There are no significant or trends in differences in the skinfold thickness between sick men with mild and severe psoriasis, both without and with somatotype.

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