

bodies, anti-gastric parietal cell antibodies (3,4,9). Cui reports the presence of circulating antibodies, so-called "vitiligo antibodies", interacting with human melanocytes in patients with the acquired vitiligo (3). Their identification by means of lactoperoxidase suggests that they are melanocyte surface antigens (3,4). The three prevailing theories of the pathogenesis of vitiligo are the immune hypothesis, the neural hypothesis and the self-destruct hypothesis (4,9). Spleen is an immunologically active organ. An enlargement of spleen may reflect changes undergoing in it.

Because in the course of vitiligo there have been observed not only numerous irregularities in the cells which are transferred via spleen but also various antibodies of an unknown origin, we decided to study this organ in vitiligo children.

The aim of this work was to examine the image of spleen by means of ultrasonographic measurements, i.e. to state possible changes in its structure, estimate its sizes in a group of ill children with vitiligo and compare the results with those in a control group of healthy children.

MATERIAL AND METHODS

38 vitiligo children (23 boys and 15 girls, age 7-15, median age 10.8 ± 2.0 years) and 43 of control group (18 boys and 25 girls, age 7-15, median age 10.5 ± 2.2 years) were enrolled in this study which was conducted by the Paediatric Ward of the Clinic of Dermatology in Lublin. The control group of children, sex and age-matched, was with a mild form of pityriasis capitis of the head. The enrollment excluded patients with disseminated vitiligo. The characteristics of the examined group are placed in Table 1. The type of vitiligo was type "A". The skin lesions covered the skin of the trunk and/or limbs and they did not affect more than 25% - 38% surface of the whole body.

In additional examinations there were found no deviations in the analysed population, there were no cases of hepatitis or any contagious diseases or infectious ones which might affect the immunological system and the size of the spleen (9).

The children were not previously treated with any general or skin drugs. Ultrasonography (US) was performed on a Siemens Sonoline Sx and Siemens Sonoline Elegra apparatus with a 3.5 MHz transducer. We made ultrasonographic measurements of spleen in two dimensions, longitudinal oblong and transverse.

Statistical analysis. The statistical analysis included the calculation of mean value, standard deviation, standard error of deviation and the evaluation of the significance of and difference were estimated by Whitney-Mann U test, t-Student's test and mediana test. Differences were considered significant at $p < 0.05$.

RESULTS

The characteristics of both groups are presented in Table 1:

Table 1. Characteristics of the examined groups

Group	n	parameter	mean	SD	minimum	maximum	p
C	43	age (years)	10.5	2.2	7.0	15.0	>0.5
V	38	age (years)	10.8	2.0	7.0	15.0	
C	43	weight (kg)	37.4	12.9	18.5	75.0	>0.2
V	38	weight (kg)	34.4	8.6	18.0	50.0	
C	43	height (cm)	143.2	16.2	110.0	173.0	>0.4
V	38	height (cm)	141.0	13.9	115.0	170.0	
C	43	BMI (kg/m ²)	17.6	3.2	13.4	28.6	>0.3
V	38	BMI (kg/m ²)	17.1	2.3	12.6	23.6	
C	43	S1 (cm)	9.4	1.3	7.2	12.0	-
V	38	S1 (cm)	9.4	1.3	7.0	13.0	-
C	43	S2 (cm)	3.6	0.5	2.8	4.5	-
V	38	S2 (cm)	3.6	0.4	2.8	5.1	-

C - control, V - vitiligo, S1 - measurement, S2 - measurement

As presented in Table 2, the following respective parameters do not differ significantly as regards: age ($p > 0.5$), weight ($p > 0.2$), height ($p > 0.40$), body mass index (BMI) body weight coefficient expressed in kg/m^2 ($p > 0.3$). The measurements of spleen in di-

Table 2. Frequency in the changes in the spleen size in vitiligo patients with reference to the norm expressed in percent

n=38	<2.5		2.5 a 16.0		16-84		84-97.5		>97.5		2.5-97.5	
	f	%	f	%	f	%	f	%	f	%	f	%
S1	1	2.6	5	13.2	24	63.2	6	15.8	2	5.3	35	92.1
S2	0	0	7	18.4	27	71.0	2	5.3	2	5.3	36	94.7
EV		2.5		16.7		66.7		16.7		2.5		95

n - number of the cases, f - frequency, EV - expected values

mension 1 (S1) in children with vitiligo were not different from those in children in the control group and were 9.4 ± 1.3 cm on average in both groups, however in dimension 2 (S2) of spleen the size of the organ in the control group was 3.6 ± 0.5 cm whereas for the group of children with vitiligo - 3.6 ± 0.4 cm.

Table 3. The sizes of the spleen in vitiligo patients expressed in percent of the expected values in the control group

n=38	FROM	TO	M	SD	SE	D	t	p
S1	77.4	123.5	100.6	11.52	1.868	+0.6	0.321	>0.70
S2	77.7	130,3	100.6	12.05	1.954	+0.6	0.307	>0.70

n - the number of the cases, M - the mean value, SD - standard deviation, SE -standard error, D - the difference of the mean values with the standard values of our own control group taken as 100%, t - the value of t - function, p - probability

The oblong dimension of spleen (S1) was diminished below 2.5 percent in one child (2.6%), in 5 children it was stated within the range 2.5-16.0 percent (13.2%), in 24 children - 16-84 percent (i.e. 63.2% examined children), the dimensions within the range 84-97.5 percent were observed in 6 children (15.8%); instead, it was increased over 97.5 percent in 2 children (5.3%), within the range 2.5-97.5 percent there were 35 sizes of spleen in the examined children with vitiligo (92.1%).

The transverse dimension (S2) of spleen was not diminished below 2.5 percent in any of the children (0%), in 7 patients there were observed dimensions 2.5-16.0 percent (18.4% examined), 27 children had the spleen size 16-84 percent (71.0% examined children); in 2 children the dimension ranged from 84 to 97.5 percent (5.3%), in 2 of them the dimension was enlarged above 97.5 percent (5.3% examined). There were 36 children (94.7%) with the results between 2.5 and 97.5 percent. The frequency of theoretically expected results is presented at the bottom of Table 2.

Table 3 presents the results of the measurement of two dimensions of spleen in comparison to the results in the control group, which was assumed to be 100%. The range of the results for the oblong dimension (S1) varied from 77.4 to 123.5 cm, on average 100.6 ± 11.52 (SE 1.868), when compared to the percentage of due values with the difference $D+0.6$, with the t-function value 0.321, where probability was over 0.70 and it was not statistically significant. For the transverse dimension (S2) the range of the results varied from 77.7 to 130.3, on average 100.6 ± 12.5 (SE 1.954) with the difference $D+0.6$, with the t-function value 0.307, where probability was also above 0.70 and was not statistically significant.

DISCUSSION

In the course of vitiligo there is a considerable activation of the immune system in which a factor inhibiting the migration of lymphocytes, B and T suppressor cells and Langerhans cells, among others, play an important role. There is much evidence proving the role of autoimmunological aberrances in etiopathogenesis of vitiligo; it is confirmed by the research carried out on animals. In dogs, cats and horses suffering from vitiligo there were found antibodies against surface antigens of a molecular mass 85kd, occurring in pigment cells (4).

It is known that spleen has an immunological function in the organism, for example, catches auto- and allo-antigens. There are approx. 25% convertible bank of T-lymphocytes and approx. 10% - 15% from an analogous bank of B-lymphocytes found in spleen. The circulating T-lymphocytes stop in the spleen for 4-6 hours, while B-lymphocytes spend at least 24 hours in it (1).

T-lymphocytes in the white pulp concentrates mostly round the central arteriole creating a cuff analogous to the subcortical area of lymphatic glands. In the vicinity of the cuff in the central arteriole there are found lymph glands in which after an antigen stimu-

lation appear reproductive centres which are B-lymphocytes transformation and proliferation centres. Lymphoidal cells of the edge zone play an important role in catching antigens and, further, in delivering an antigen stimulation to appropriate T- and B-lymphocytes. An antigen stimulation leads to changes similar to these occurring in lymph glands. Spleen is also an important source of suppressor T-cells.

Taher et al. (3) stated in people in an active phase of vitiligo a large production of a factor inhibiting the migration of lymphocytes, considerably raised IgG level and also, in 80% cases, a high level of circulating immune complexes. An increased release of the factor inhibiting the migration of lymphocytes followed by an activity of B-lymphocytes, may lead to a hypergammaglobulinemia and the presence of circulating immune complexes (3).

In etiopathogenesis of acquired vitiligo some attention is paid to a possible role of disturbances of a cellular immunity. It has been proved that patients suffering from vitiligo have a statistically significantly lower number of helper T-cells and a lowered ratio of helper T-cells to suppressor ones. Grimes reports that the biggest decrease in the number of supportive T-cells occurred in the group of patients whose illness lasted less than a year and in those patients who had other stated antibodies—anti-thyroid and anti-nucleus (3). In our research we did not find any activation of one of the elements of the immune system - spleen - expressed by an enlargement of its dimensions in children suffering from vitiligo in comparison to children in the control group.

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STRESZCZENIE

Za pomocą badania ultrasonograficznego porównano wymiary śledziony u 38 dzieci chorujących na bielactwo z grupą 43 zdrowych dzieci w odpowiednim wieku i płci. Zakres wartości dla wymiaru poprzecznego S1 był w normie u 92,1% dzieci, natomiast dla wymiaru podłużnego S2 był w normie u 94,7% dzieci. W badanej grupie dzieci chorych na bielactwo wymiary śledziony i jej budowa oceniana badaniem ultrasonograficznym były prawidłowe.

