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Chair and Department of Dermatology, Medical University of Lublin

IRENA LECHOWSKA-MAZUR, ALDONA PIETRZAK,
JANUSZ URBAN, BARBARA LECEWICZ-TORUŃ

Does a correlation between transaminase activity and the size of the liver in psoriatic children exist?

Numerous diseases of internal organs are reflected in the skin (4). Many results show that hepatotropic viruses, especially these causing chronic diseases (hepatitis B virus-HBV and hepatitis C virus-HCV) can give symptoms in organs other than the liver and are connected with various dermatological diseases (6). In the course of hepatitis induced by B and C type viruses, different forms of dermatosis were described; single authors report that HCV infection may be the factor leading to the onset of psoriasis (1, 6, 8, 9–12, 14).

Diagnosis, classification and the estimation of the course of chronic hepatitis is one of the most difficult problems in internal medicine. Hitherto, the best criterion for diagnosis and prognosis is the result of histologic examination of the liver specimens (4). An ultrasonographic examination, as a non-invasive method of examination of the structure and possible distemper of the parenchyma of the liver, has been used since 1960s (12). For many years, the disorders of the liver cells were thought to be a possible etiopathogenic source of psoriasis. (Psoriasis was treated as lipoidosis with the liver cells and the cells of the intestines saturated with lipids). Later on, psoriasis was considered to be an immunological disease affecting only the cells of epidermis. At present, this disease is again assumed to be a systemic disease. Numerous studies gave information about the changes in the parenchyma of the liver and disorders of its activity in adult patients with psoriasis.These disorders were examined by means of the biopsy of the liver and in biochemical analysis of its function (2, 8, 12).

Single reports referred to the examination of the liver activity in psoriatic children (it was measured by the liver enzyme concentration). Not a single study examining the structure of the liver in psoriatic children by means of biopsy specimens has been found. Therefore, indirect methods of examining the activity and the sizes of the liver cells in ill children were adopted: a non-invasive ultrasonographic examination and an analysis of

the concentration of transaminases in the samples of the peripheral blood (12). The present extensive research on the estimation of the condition of the liver cells is undergoing constant modifications and its scope is enlarged (14).

In the present study the functioning of the liver cells was estimated in the examination of the blood (analysis of the enzyme concentration) and in the morphometric measurements of this organ in order to answer two questions: 1) Is there an increase in the concentration of liver enzymes in the course of psoriasis in children? 2) Is this potential increase in concentration reflected in the growth of the liver?

MATERIAL AND METHODS

56 children (6 – 15 years of age) with psoriasis and 32 healthy children (analogous age) in the control group were chosen for the research. The duration of the disease ranged from 2 months to 14 years. Young patients suffering from psoriasis were treated in the Department of Children Dermatology of the Medical University in Lublin. In each case a standard diagnosis system was used. In none of the cases the presence of HBS antigen was found. In the group of healthy children the existence of pathology of the liver and of the digestive system was excluded.

A laboratory analysis was performed in all the children during the first few hours of hospitalisation. The examination included the blood cell count, sedimentary ratio, glucose level, the McLaghan test, aminotransferase activity (ASPAT and ALAT) in the blood and the analysis of urine. Blood was sampled by venipuncture from the antecubital vein. After a standard preparation of the blood to a biochemical analysis, alanine and aspartate aminotransferase activity in the blood serum was marked with a colorometric method and with the McLaghan test (vortex of colloid glairs). In an appropriate buffer, the McLaghan test with glairs of serum creates a precipitated globulin-thymol-phospholipid complex. In order to estimate alanine and aspartate aminotranspherase activity, diagnostic sets of Cormay company, Cormay ALT-4LTS and ALT-10 LTS, were used.

STATISTICAL ANALYSIS

Two tests were used to make statistical analysis: the Mann-Whitney' s test for two samples and Spearman Rank Order Correlation. Because the norms for ultrasonographic examination were found to be inadequate (enlarged dimensions in the Polish population in relation to German norms which were fixed 15 years ago), new norms were settled with respect to our own control groups. To make the results objective, the norms are expressed in the percentage in relation to due values for a given age in Poland. Ultrasonographic measurements were performed on a Siemens Sonoline SL2 apparatus

with a 3.5 MHz transducer. Sonographic examinations of the liver were performed by sagittal scanning at the epigastrium. A detailed description of the procedures is presented in our previous paper (12).

RESULTS

Neither of the examined groups differed statistically significantly as to their height and body mass. Body mass index (BMI) of healthy children was 17.698±2.970, while it was 17.989±3.164 in the group with psoriasis. The results of the analysis are presented in Table 1.

Table 1. Parametres analysed during the examination

Parametre	Control group (n=32)	Psoriasis (n=56)	P
McLaghan u.	2.388 + 0.861	2.403 + 0.873	>0.9
ALAT	17.534 + 11.385	18.375 + 12.178	>0.9
ASPAT	23.316 + 8.916	23.459 + 9.975	>0.9
Liver 1	12.612 + 1.544	12.503 + 1.523	>0.7
Liver 2	11.209 + 1.451	11.025 + 1.564	>0.6
Liver 3	9.503 + 1.328	9.436 + 1.343	>0.7
NNL1	100.026 + 9.968	100.510 + 9.455	>0.9
NNL2	100.039 + 11.070	97.837 + 10.091	>0.2
NNL3	99.941 + 12.160	98.776 + 10.903	>0.6

Prior to the therapy of the psoriatic children the values in the McLaghan test were from 0.8 to 6.30 (on average 2.403±0.873 for the group, whereas, the range of the results in the control group was from 1.2 to 5.0 and mean concentration in the control group was 2.388±0.861. This difference was not statistically significant (p>0.9).

Mean ALAT concentration in the group of children with psoriasis was 18.375±12.178 (minimum 7 – maximum 67). Instead, in the control group it was respectively 17.534±11.385 (minimum 6 – maximum 63). The difference was not statistically significant (p>0.9). Mean ASPAT concentration in ill children was 23.459±9.975 (minimum 7 – maximum 54) and in the group of healthy children – 23.316±8.916 (the range of values from 10.20 to 53). The difference was not statistically significant (p>0.9). The size of the liver in line 1 (L1) expressed in cm in the group of children with psoriasis was 12.503±1.523 in comparison to 12.612±1.544 in the controls. The difference was not statistically significant (p>0.7). The size of the liver in line 2 (L2) in cm in the group of ill children was 11.025±1.564 in comparison to 11.209±1.451 in the controls. The difference was not statistically significant (p>0.6). The liver measured in line 3 (L3) in cm was 9.436±1.343 in ill children and in the group of healthy children – 9.503±1.328 cm. This difference was not statistically significant, either (p>0.7). The percentage of a due dimen-

sion for L1 (DDL1) was 100.510±9.455 in the group with psoriasis in comparison with the percentage of 100.026±9.968 in the controls. The difference was not statistically significant (p>0.9).

The percentage of a due dimension for L2 (DDL2) was 97.837±10.091 in the group of ill children in comparison to 100.039±11.070 in the control group. Again, this difference was not statistically significant (p>0.2). The percentage of a due dimension for L3 (DDL3) was 98.776±10.903 in the group of psoriatic children in relation to the controls (99.941±12.160). The analysed difference was not statistically significant (p>0.6).

The analysed correlation between the McLaghan units and BMI in the group of children with psoriasis was not statistically significant (the coefficient of correlation R= 0.002164, p>0.9). Similarly, no correlation between the Mc Laghan units and BMI in the group of healthy children was observed (the coefficient of correlation R=0.111396, p>0.5). The correlation between the McLaghan units and NNL1 in the group of children with psoriasis was not statistically significant (the coefficient of correlation R=0.200950, p>0.1). No correlation between the McLaghan units and NNL1 in the control group (R=0.129468, p>0.4) was observed. The correlation between the McLaghan units and NNL2 in the group of psoriatic children was not statistically significant, either (R=0.121696, p>0.3). No statistically significant correlation between the McLaghan units and NNL2 in the control group was stated (R=0.050967, p>0.7). The correlation between the McLaghan units and NNL3 in the group of children with psoriasis was not statistically significant (R=0.211256, p>0.1). No correlation between the McLaghan units and NNL3 in the group of healthy children was observed (R=0.058724, p>0.7). The correlation between ALAT and BMI in the group of children with psoriasis was not statistically significant (R=0.187947, p>0.1). Similarly, no correlation between ALAT and BMI in the control group was observed (R=0.084665, p>0.6). Also, the correlation between ALAT and NNL1 in the group of psoriatic children was not statistically significant (R=0.001183, p>0.9). The correlation between ALAT and NNL1 in the group of healthy children was not statistically significant (R=0.164739, p>0.3). The correlation between ALAT and NNL2 in the group of children with psoriasis was not statistically significant, either (R=0.028422, p>0.8). The correlation between ALAT and NNL2 in the control group was not statistically significant (R=0.181251, p>0.3). No statistically significant correlation between ALAT and NNL3 in the group of children with psoriasis was found (R=0.006634, p>0.9). A statistically significant correlation between ALAT and NNL3 was not stated, either in the group of healthy children (R=0.043339, p>0.8). However, a statistically significant correlation (R= 0.274602, p<0.05) between ASPAT and BMI in children with psoriasis was found. Yet, such a correlation between ASPAT and BMI was not observed in the group of healthy children (R=0.03394, p>0.9). The correlation between ASPAT and NNL1 in the group of children with psoriasis was not statistically significant (R=0.020057, p>0.8). Similarly, no correlation between ASPAT and NNL1 in the group of healthy children was stated (R=0.052371, p>0.7). The correlation between ASPAT and NNL2 in the group of psoriatic children did not turn out to be statistically

significant, either (R=0.123444, p>0.3). The correlation between ASPAT and NNL2 in the controls was not statistically significant, either (R=0.093544, p>0.6). The correlation between ASPAT and NNL3 in the group of children with psoriasis was not statistically significant (R=0.145363, p>0.2). The same refers to the correlation between ASPAT and NNL3 in the group of healthy children (R=0.007153, p>0.9).

DISCUSSION

Alanine and aspartate aminotransferase activity (ASPAT and ALAT) is commonly used as the best indicator of the damage of the liver which reflects the degree of the necrosis of the hepatocytes. The enzymes catalyse the transport of the α-amino residues of asparginian and alanine to the α-ketone residues of ketoglutar acid (5). ALAT is found mainly in the liver, while ASPAT in many tissues – the heart muscle, skeleton muscles, kidneys, brain and liver, among others. ASPAT is present both in mitochondrias and in hepatocyte cytoplasma. ALAT, instead, only in cytoplasma (5). To a certain degree aminotransferase activity grows in majority of diseases of the liver (5). Among cutaneous symptoms usually described in the course of cirrhosis of the liver, the following are usually mentioned: vascular angiomata, erythema of palms and feet, changes in the look of the nails (whitening of nail plates, loss of transparency, oblong striping), Dupuytren disease (3).

A mechanism of the appearance of cutaneous symptoms in cirrhosis of the liver remains hypothetical. A theory of endocrinic origin of stellatum angiomas is still discussed. Erythema of palms and feet (being probably equivalent of vascular angiomata in deep layers of the skin) and brown colouring of shins and of ankles do not have a clear physiopathologic explanation, either. Among other symptoms, Dupuytren disease appears to be related to deposits of immunological complexes of Ig A type in the *contractura* of the palm, Hippocrates fingers – with various chronic diseases of the lungs and changes in the look of nail plates – with disorders of estrogene, ferrum and/or C vitamin metabolism. Disappearance of cutaneous symptoms related to cirrhosis in patients after the transplantation of the liver is observed (3).

In some diseases of the liver there may exist 'biochemical silence' in case of damage which is not reflected in the changes of 'classical enzyme' activity (14).

At present, the state of the liver cell damage or possible disorders of its function are estimated on the basis of bilirubin concentration and so-called enzyme profile (14).

Attempts have been made to estimate the condition of the liver cells in the course of psoriasis on the basis of examination of McLaghan test concentration, aminotransferase and lipid of the blood serum in comparison to the concentrations observed in the healthy group. Also, the correlation between the morphometric measurements of the liver obtained in an ultrasonographic examination of children with psoriasis and of the group of healthy children was analysed. The analysis of the blood serum lipid concentration will be the aim of another work.

In the observed group of children with psoriasis neither an increase in the aminotransansferase activity, nor in the McLaghan test in comparison to healthy children was observed. In both groups single cases of increased concentrations in the McLaghan test and in aminotransferase activity were observed. Enlargement of the dimensions of the liver of children with psoriasis in none of the examined 3 lines in comparison to the group of healthy children were stated in spite of the fact that children had active and severe form of psoriasis.

REFERENCES

1. Białynicki-Birula R. et al.: Czy liszaj płaski wskazuje na obecność przewlekłego schorzenia wątroby? Post. Dermatol., XV,43, 1998.
2. Bienias L. et al.: Ocena sprawności metabolicznej wątroby u chorych na łuszczycę na podstawie próby antypirynowej. Przegl. Dermatol., 5, 301, 1990.
3. Bołdys H. et al.: Ewolucja zmian skórnych obserwowanych w marskości wątroby u chorych przed i po transplantacji wątroby. Pol. Arch. Med. Wewn., 89,151, 1993.
4. Fuchs H. Odczynowość immunologiczna skóry w przewlekłych zapaleniach wątroby. Annales Academiae Medicae Stetinensis, XXXVI, 62, 1990.
5. Gopal D. V. et al.: Ocena nieprawidłowości w badaniach biochemicznych wątroby. Medycyna po Dyplomie, 9, 32, 2000.
6. Jabłońska J.: Objawy pozawątrobowe u chorych z przewlekłymi wirusowymi zapaleniami wątroby. Terapia Hepatologia, 5, 22, 2000.
7. Jurecka-Tuleja B. et al.: N- końcowy peptyd prokolagenu typu III jako wskaźnik metabolizmu jako wskaźnik metabolizmu kolagenu ustrojowego. Diagn. Lab., 31, 383, 1995.
8. Lecewicz-Toruń B.: Łuszczyca wieku dziecięcego. Medipress, 4, 14, 1999.

9. Łozowski C. T. et al.: Zmiany w wątrobie w przebiegu chorób układowych. Terapia, 5, 19, 2001.
10. Nowak A. et al.: D. Przypadek świerzbiączki guzkowej Hyde w przebiegu przewlekłej infekcji wirusem hepatitis B. Post. Dermatol., XV, 309, 1998.
11. Omulecki A. et al.: Rola wirusa zapalenia wątroby typu C (HCV) w chorobach skóry. Przegl. Dermatol., 2, 153, 1997 .
12 Pietrzak A. et al.: Ultrasonographic estimation of the size of spleen in children with psoriasis. Ann. UMCS, sectio D, vol. 54, 1999.
13. Rujner J. et al.: Świąd skóry jako pierwszy objaw choroby Bylera u dwojga dzieci. Pediat. Pol., 3, 225, 1998.
14. Wojas-Pelc A. et al.: Stężenie kwasu cholowego w surowicy krwi jako parametr oceniający stan wątroby w przebiegu twardziny uogólnionej. Przegl. Dermatol., 1, 1, 1991.
15. Zagórska W. et al.: Zespół Gianotti-Crosti u trojga dzieci z wirusowym zapaleniem wątroby typu B. Przegl. Dermatol., 4, 335, 1996.

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SUMMARY

Psoriasis is a systemic disease. On the basis of the literature it has been stated that there is a possibility that a disease which is going on in the skin may be reflected by the increase in the activity of the hepatic cell. This activity was estimated by the McLaghan units, concentration of aspartate and alanine aminotransferases and morphometric measurements of the liver in 3 oblong dimensions. The study was conducted on 56 children suffering from psoriasis and 32 healthy ones matched with sex and age. None of the investigated parameters differs statistically between ill and healthy children. No association was stated between psoriasis and the enlargement of the liver dimensions by means of ultrasonography or the McLaghan units, ALAT and ASPAT.

Czy istnieje zależność pomiędzy aktywnością transaminaz a wielkością wątroby u dzieci chorych na łuszczycę?

Łuszczyca jest chorobą, która dotyczy całego organizmu. Na podstawie piśmiennictwa stwierdzono, iż istnieje możliwość, że proces chorobowy dotyczący skóry może być odzwierciedlony poprzez wzmożoną aktywność komórki wątroby. Aktywność tę oceniano za

pomocą stężenia tymolu, ALAT, ASPAT oraz pomiarów morfometrycznych wątroby w 3 płaszczyznach przekroju. Badania wykonano u 56 dzieci chorych na łuszczycę i 32 zdrowych dzieci dobranych wiekiem i płcią. W żadnym badanym parametrze nie stwierdzono różnic pomiędzy dziećmi chorymi a zdrowymi. Nie stwierdzono istnienia zależności pomiędzy łuszczycą a powiększeniem wymiarów wątroby ocenianej za pomocą usg jak również pomiędzy łuszczycą a próbą tymolową i transaminazami ALAT i ASPAT.