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Status indicators of t-cell immunity in hiv-infected persons and patients co-infected with HIV/HCV

Abstract: Features of T-cell immunity have been studied in HIV-infected patients (n=30) and in HIV-infected patients with chronic hepatitis C (n=30). As a control were healthy donors (n=32). In HIV-infected patients found significant decrease in CD4+ and SD45+ T lymphocytes and an increase in the relative and absolute number of CD3+ T lymphocytes. Patients with co-infection HIV/HCV established a significant reduction in the absolute content of CD4+ (p<0,001), CD45+ (p<0,01), and the relative content of CD4+ (p 0,001), CD45+ (p<0,001), as well as the increase in the absolute number of CD3+ (p<0,05) T lymphocytes. Layering HCV for HIV-infection largely worsens the condition of T-cell immunity, causing deep its deficit compensation.

Keywords: HIV-infection, co-infection HIV/HCV, T-cell immunity.

Hepatitis C virus (HCV) and human immunodeficiency virus (HIV) are characterized by their wide distribution and ability to cause health disorders of the working population, thus causing significant morbidity and mortality worldwide. Ukraine - one of the countries of Europe, leads the sad rating of the number of identified HIV positive and AIDS cases and deaths from the disease [1]. Chronic hepatitis C (CHC) is observed in 60-70% of HIV-infected individuals, due to the common modes of transmission of viruses. Co-infection with HIV / HCV is an important public health problem, since viruses, acting synergistically accelerate the progression of liver disease [2]. HIV accelerates the progression of chronic hepatitis C to cirrhosis and hepatocellular carcinoma, thus increases "liver" mortality. Violations of cell-mediated immunity plays a key role in the pathogenesis of HIV infection and have an influence on the strength of the immune system response to specific antigens [3; 4], because these studies focused on the study of the state of T-cell immunity in HIV-infected patients. Thus, insufficient knowledge about the impact of HCV on the performance of T-cell immunity in patients co-infected with HIV / HCV proves the feasibility of their comprehensive study in order to identify their interest in the pathogenesis of this disease.

Materials and methods. Study on the work carried out at the Department of Infectious Diseases of Kharkiv National Medical University, located at the Regional Clinical Hospital of Infectious Diseases of Kharkiv and Kharkiv regional center for prevention and control of AIDS. Features of T-cell immunity were studied in 60 patients: 30 HIV-infected patients and 30 patients co-infected with HIV / HCV. Among the patients surveyed, the number of men were 41 (68.3%), women - 19 (31.7%). Age of patients was 20-63 years. The comparison group consisted of 32 healthy subjects who were matched for age and sex with the patients studied groups.

Patients underwent studies using peripheral blood hematology analyzer ABX PENTRA 60c Plus (HORIBA ABX Diagnostics Inc., France); immunophenotyping using flow cytofluorometry EPICS ™ Xl ™ (Beckman Coulter, USA). Statistical analysis was performed using the software package «Statistica for Windows», 8.0. Methods that were used include: descriptive statistics (numerical description of variables - the arithmetic mean (M), average sampling error (m), definition of the significance of differences (p)), verifying by Student t-test, Fisher's representative samples, the method of correlation of structures [5].

Results. In HIV-infected individuals compared with controls, there is a significant decrease in the relative content of T-helper cells (CD4+) 1.6 times (p<0.001), CD45+ 1.8-fold (p<0.001) and an increase in relative and absolute number of total lymphocytes (CD3+) - 1.1-fold, respectively (p<0.01)

and 1.5 fold (p <0.001). Also a trend was set that does not reach the level of confidence in the form of lower absolute number of T-helper CD4+ (p>0.05) and CD45+ (p>0.05). Thus, in HIV-infected individuals there were declines in CD4+ and CD45+ T lymphocytes.

In patients co-infected with HIV/HCV, results showed significant difference of T-cell immunity in the form of lower relative content of CD4+ T lymphocytes in 2.1 times (p<0.001) and CD45+ T lymphocytes in 1.9 times (p<0.001), an absolute content CD45+ T lymphocytes in 1.2 times (p<0.01) and CD4+ T-lymphocytes by 1.8-fold (p <0.001), as well as increase in the absolute number of CD3+ T lymphocytes in 1.3 times (p<0.05). Also showed a trend toward an increase in the relative number of CD3+ T lymphocytes in 1.1 times (p>0.05).

Thus, patients in this group showed a decline in CD4+ T-lymphocytes and CD45+ T lymphocytes as a background compensation slight increase in the content of total T-lymphocytes (CD3+). Comprehensive assessment of the relation of these changes of T cell immunity is shown in Fig. 1.

Fig. 1 shows that the degree of deficiency of CD4+ and CD45+ T lymphocytes (t=5,85; p<0.001) is 3.25 times higher than the compensation phenomena as increase in the content of T-lymphocytes (t=1,80, p>0.05).

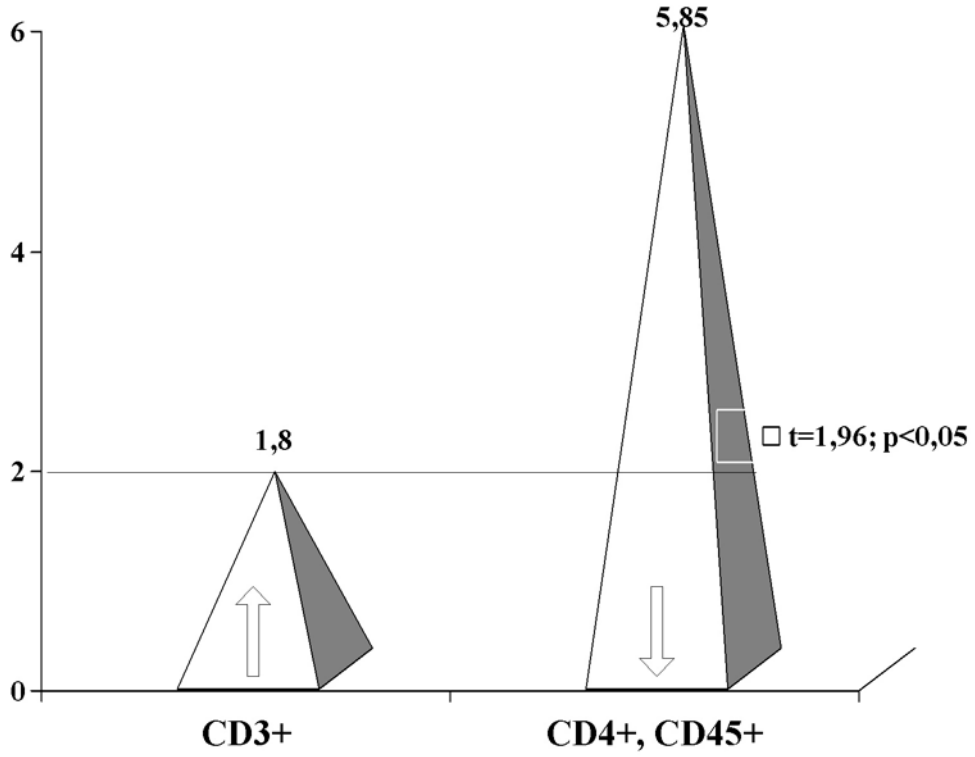

Fig. 1 Comprehensive assessment of the extent and direction of the deviation from the control of T-cell immunity in patients co-infected with HIV / HCV

↑ – increase, ↓ – decrease.

Note that a pronounced deficit of CD45+ T lymphocytes potentiate apoptosis processes and uninfected CD4+ T lymphocytes in HIV die preferably by apoptosis mechanism. It thus follows that in patients co-infected with HIV/HCV there is active involvement of both mechanisms of death of CD4+ T lymphocytes. Infected CD4+ T cells die largely by the mechanism of necrosis due to the cytotoxic effect of the viral proteins and uninfected CD4+ T cells die largely by the mechanism of apoptosis [3].

A comparison of the values of T-cell immunity in groups of patients showed that significant differences were observed between the content of CD4+ T lymphocytes. Thus in patients co-infected with HIV/HCV, compared with HIV-infected individuals, showed a reduction in the relative content of CD4+ T-cells 1.3-fold (p <0.05) and in absolute numbers 1.5-fold (P <0.05). Concerning other parameters, the trend did not reach the level of confidence, as there was a reduction in the absolute number of T-lymphocytes in 1.2 times (p>0.05), (relative to 1.1 times and the absolute 1.2 times (p>0,05) contents of CD45+ T lymphocytes.)

When comparing the ratio of the integrated assessment of compensatory and decompensatory events of T cell immunity in patients in established groups (Fig. 2), in HIV-infected persons a slight imbalance of these processes with a predominance of a deficiency of compensation (ratio 0.85) was noticed. Patients co-infected with HIV / HCV only showed the trend (t=1,80, p>0.05) with a compensatory increase in T lymphocytes, whereas the decrease of CD4+ and CD45+ T lymphocytes reaches significant values (t=5.85, p<0.001). Consequently, they have a profound deficiency compensation of T-cell immunity and, therefore, have a lower ratio value (0.31). So, co-infection of HCV with HIV largely worsens the condition of T-cell immunity, worsening the deficit compensation.

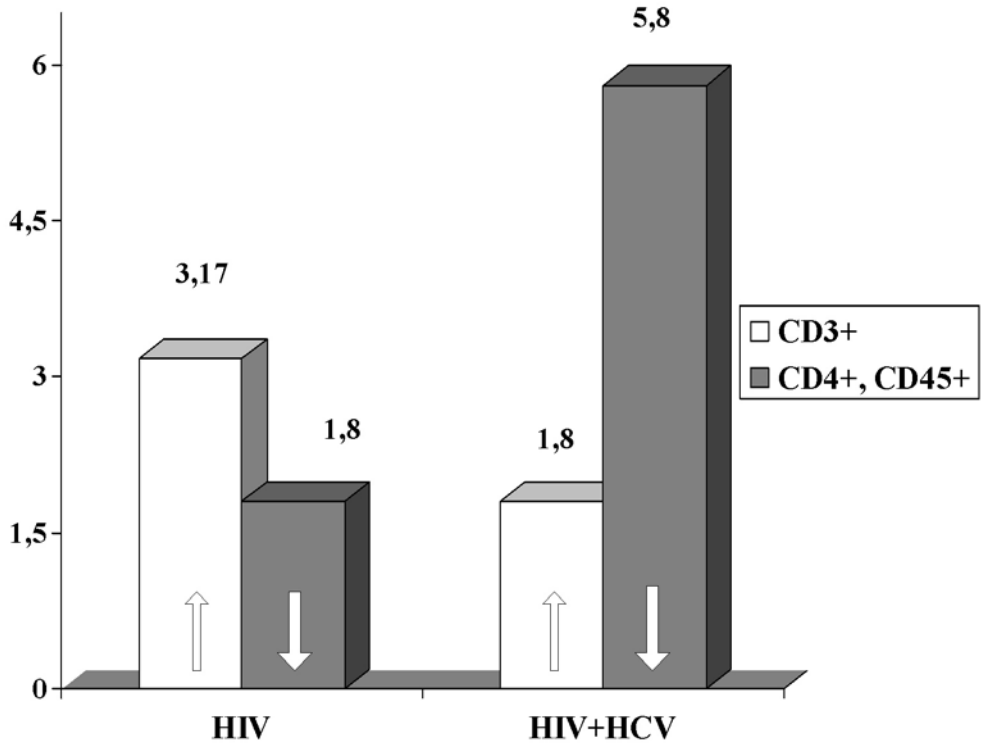

Fig. 2 Integrated assessment of the extent and direction of the deviation from the control of T-cell immunity in groups of patients

When considering the degree of deviation of rank structures from control values of T-cell immunity,it is established (Fig. 3) that in both groups the first position is occupied by a two rank deviation relative content of CD4+ and CD45+ T lymphocytes. By other indicators, rankdifferences were found in the groups. It can be concluded that the degree of increase in the absolute and relative content of CD3+ T lymphocytes in HIV-infected patients hold high ranks of third and fourth, and in patients co-infected with HIV/HCV, respectively, the penultimate (fifth) and the last (sixth) rank. On the contrary, the degree of reduction in the absolute number of CD4+ and CD45+ T-lymphocytes in HIV-infected persons held low ranking positions (fifth and sixth respectively), and in patients co-infected with HIV/HCV high third and fourth grade. The results suggest that in patients co-infected with HIV/HCV there is a weakened compensatory role of increasing production of T-lymphocytes (CD3+) and enhanced pathogenetic significance of reducing absolute CD4+ content and CD45+ T lymphocytes.

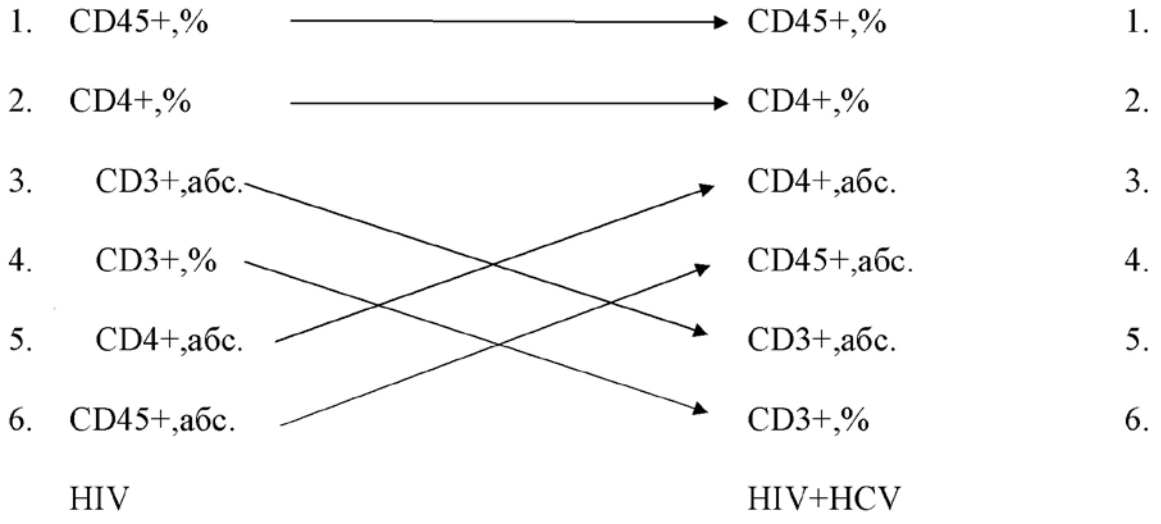

Fig. 3 The ranked structure of the degree of deviation from the control values of T-cell immunity in groups of patients

The mathematical expression, considered above showsthe distinctions of rank structures that can serve as rank correlation coefficient (ρs). Its values were equal to ρs=0,54 (p>0.05). From this it follows that the significant correlation between the ranked structures shown in Fig. 3, and there is no indication of substantial (46 %) differences. Thus, adherence to HCV HIV infection causes a significant increase in the depression of T-cell immunity, causing expressed its deficit compensation.

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Studying the role of complex echographic researches in diagnosis of chronic viral hepatitis in children

Abstract: Application of complex echography gives the chance to track change of size and structure of liver in children with CVH during its course, to define existence of fibrosis, to specify localization and depth of an arrangement of fibrous sites, to receive the image volume in real time and to distinguish possible complications and symptoms of portal hypertension at early stages.

Keywords: echography, elastography, liver, chronic hepatitis.

Actuality. The high level of morbidity with chronic viral hepatitis (CVH) presents the serious problem for public health in many countries of the world, because of their everywhere prevalence as symptomless severe and progressing from till to cirrhosis of liver (from 30 to 70%) and hepatocellular carcinoma (from 5 to 30% [3; 4].

The CVH's particular actuality is presented in pediatrics, where one of its causes is considered the inopportune, and, in some cases, as mistaken diagnosis of pathologic process in the liver.

It is caused with various clinical course of disease, similarity of symptoms with other diseases of digestive organs " scarcity" of objective features, insufficient coverage in literature on the question of pediatrics for screening methods of diagnosis, quite often absence of parallel between pathologic changes in the liver and disease's manifestation [4; 5; 7] Experience acquired in pediatric practice witnesses on necessity of wide popularity and general introduction of ultrasound diagnosis (USD).

The preference is given to ultrasound echography in combination with dopplerography (DG) of vessels of different system, that is not only successfully complements the two — dimensioned USI but gives possibility to reveal the delicate mechanisms of hemodynamic disorders in the cases not being diagnosed at use standard echography [1; 2; 6; 8]. From this point of view the determination of DG' role in complex evaluation of liver state at CVH in children is the most significant.

The questions of optimum combined noninvasive, ionizing, complex, echo graphic diagnosis of chronic diffuse diseases of liver in children, study the part of complex echography remain actual problem in chronic viral hepatitis in children.

Materials and methods. We examined 184 children with chronic viral hepatitis (CVH), among 150 (81%) children were with CHD. Boys were 102, girls were 82. 40 children were researched normal complex echo graphic anatomy of liver and spleen (control groups). All patients were in RSRPMC of pediatrics in Hepatology department and in clinic of TashPMI in planning surgical department.

For making diagnosis of chronic viral hepatitis in children together with general clinical laboratory ways the complex echo graphic studies were carried out, they include multi- slice seroscale echohepatography, dopplerography (impulse-wave, colour Doppler maping), 3D/4D echography of liver and spleen in children with chronic hepatitis on ultrasound diagnosis apparatus SSD-630" Aloka (Japan, Sterling Philips (Holland) " ISTYL-Toshiba (Japan), " Sonoscape 5000" (China) in clinic of TashPMI with use multifrequency convex and liner sensors.

Results. 184 children with chronic viral hepatitis (CVH) were in research group, among those were children with CVH and minimum level of activity 61 patients (32%), moderate were 64 (35%) and expressed were 62 (33%) level of process activity, their diagnosis was based on data of clinical, laboratory and complex ultrasound studies.

By the results of serocale echograpy of children with minimum activity of CVG it was revealed, that many echographic signs of liver and spleen were in norm limits, only on the side of gallbladder the thickness of bladder's walls (70,0%), echoheterogenous content (34,0%), kinkings in bottom, body and or neck (62,0%)

The clear vascular picture was kept, but at individual evaluation the changes of vascular architectonics were marked