of children with the decompansated caries we could see the significant increase of the saliva viscosity with the low speed of the saliva flow, which stimulated cumulating of the dental deposit which is a risk factor of the caries development in the children of school age. The data show positive dynamics of the preventive work. Dynamic of the indices of the caries intensity demonstrates reduction of the caries increase 54%, which is a very successful result.

Conclusions

The preventive program of the hygienic education of children provides significant improvement of the oral hygiene, which is witnessed by the numeral data and objective evaluation of the mouth cavity state. So, the carried out measures of the hygienic education are the effective means of caries decrease and periodontium disease decrease.

Thus, as the questionnaire analysis results show that the prevailing risk factors of caries emergence are: cleaning teeth less than 2 times a day and cleaning time up to 40 seconds, poor oral hygiene, low motivation to prevent stomatological diseases, much sweets, not using the additional means of hygiene. The mentioned in the work risk factors allow increasing the quality and effectiveness of the realized sanitary-prophilactic measures.

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The features of carbohydrate metabolism disorders in patients co-infected with HIV/HCV

Abstract: This article discussed the state of carbohydrate metabolism in HIV-infected persons, patients with chronic hepatitis C (CHC) and patients co-infected with HIV/HCV. The study of carbohydrate metabolism of blood was performed in 107 patients, including: CHC patients — 36 with HIV — 35, co-infection with HIV/HCV — 36. In the investigated patients identified carbohydrate metabolism disorders as an increase in serum glucose, insulin, glycosylated hemoglobin, level of insulin resistance. The most significant manifestations of disorders of carbohydrate metabolism were observed in patients co-infected with HIV/HCV ($t = 27.4$; $p < 0.001$), that exceed a specified changes in patients with HCV 1.53 times ($t = 17.9$; $p < 0.001$) and HIV-infected patients ($t = 12.8$; $p < 0.001$) 2.14 times.

Keywords: chronic hepatitis C, HIV infection, co-infection with HIV/HCV, carbohydrate metabolism.

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. HIV accelerates the progression of chronic hepatitis C to cirrhosis and hepatocellular carcinoma, thus increases "liver" mortality [2].

According to recent studies, the factors indicative of the progression of metabolic disorders in patient's co-infection with HIV/HCV include namely insulin resistance (IR), obesity, hypertension, dyslipidemia and hyperuricemia. Among the factors indicative of the progression of chronic hepatitis C (CHC), the leading position belongs to hepatic steatosis and IR, which may be virus-induced, and metabolic [4]. Viral IR is diagnosed in CHC patients without obesity with normal lipid metabolism and metabolic IR is associated with lipid metabolism disorders. HCV-induced liver steatosis is recorded in 40 % of patients with CHC. When infected with the third HCV genotype, hepatic steatosis often has a viral origin, and when infected with HCV genotype 1, metabolic steatosis with IR is more common [5].

The main risk factors for the metabolic syndrome in HIV-infected individuals are high viral load, use of drugs lopinavir/ritonavir and didanosine, increased body weight, increased levels of LDL cholesterol and/or triglyceride levels, patient age, and co-infection with HIV and HCV. Thus, HCV-infection in HIV-infected individuals is one of the major risk factors for metabolic disorders which plays a leading role in the pathogenesis and progression of the disease and proves the feasibility of a comprehensive study of carbohydrate metabolism in patients co-infected with HIV/HCV [6].

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.

The study of carbohydrate metabolism of blood was performed in 107 patients, including: CHC patients — 36 with HIV — 35, co-infection with HIV/HCV — 36. The age of patients ranged from 20 to 52 years old. The comparison group consisted of 32 healthy subjects. Blood samples were taken for the study after signing the informed consent of the patients.

The study of insulin in the blood serum was conducted with immunofluorescence assay, the determination of glycosylated hemoglobin (HbA1C) was carried out by ion-exchange chromatography. Determination of glucose in the blood serum was carried out by a colorimetric method using a reagent kit from the company "SpaynLab" (Spain).

The HOMA IR index was determined, which was calculated by the formula:
[(fasting glucose) x (fasting insulin)] mmol/l/22.5.
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 [7].

Results. In the investigated patients identified carbohydrate metabolism disorders as an increase in serum glucose, insulin, HbA1C, level of HOMA IR. Glucose in patients of all groups was significantlly higher than in control subjects. For example, in HIV-infected persons, it was (5.16 ± 0.11 mmol/l) in patients with chronic hepatitis C — 5.35 ± 0.15 mmol/l, and in patients co-infected with HIV/HCV — 5.95 ± 0,15 mmol/L. The insulin content was also increased in patients of all groups — in HIV-infected persons 9.26 ± 0.24 mkU/ml, in patients with chronic hepatitis C — 10.6 ± 0.89 mkU/L, and in patients co-infected with HIV/HCV — 11.9 ± 0.81 mkU/ml, respectively.

HbA1C levels in HIV-infected individuals was 6.18 ± 0.14 %, in patients with chronic hepatitis C — 6.36 ± 0.13 %, and in patients co-infected with HIV/HCV — 7.05 ± 0.15 %. These

values were significantly higher than in the control group (5.74 ± 0.17 %).

HOMA-IR index in the studied patients was increased as compared with the control subjects, and in HIV-infected persons it was 2.51 ± 0.21, in patients with chronic hepatitis C — 2.45 ± 0.17 and co-infection with HIV/HCV — 3.16 ± 0.24 respectively (Fig. 1).

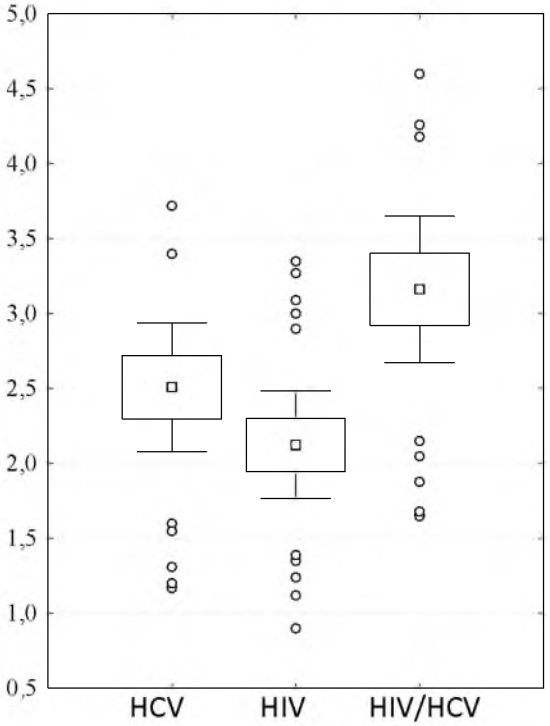

Fig. 1. The value of HOMA-IR in HIV-infected persons and patients with chronic hepatitis C co-infection HIV/HCV

Note: ☐ – Average; ⊥ – Mean ± standard error; – Mean ± confidence interval 0.95; ○ – emissions.

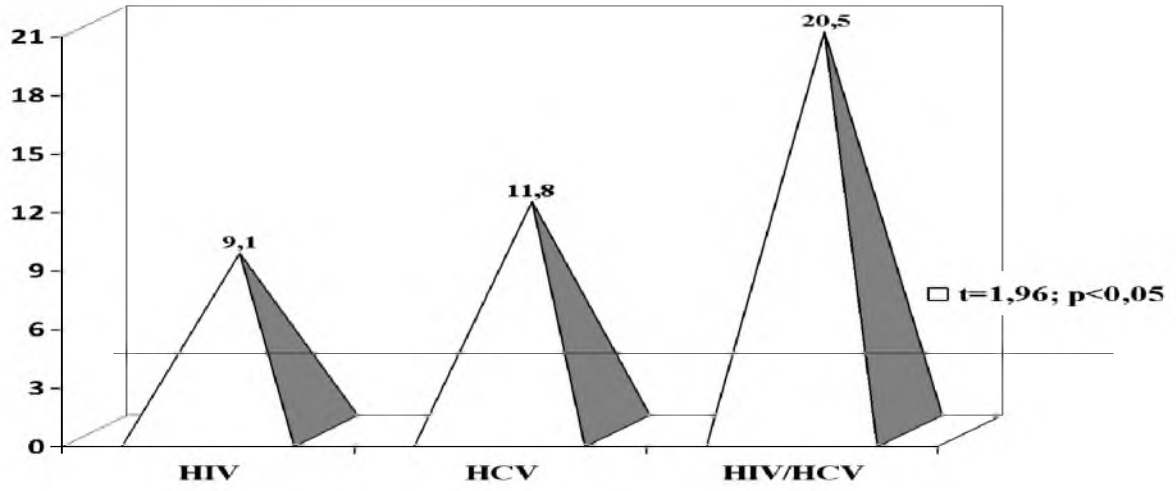

Fig. 2. Integrated assessment of the extent and direction of the deviation from the control of carbohydrate metabolism in HIV-infected persons, patients with chronic hepatitis C and co-infection with HIV/HCV

The mathematical expression of the degree of deviation from the control range of the carbohydrate content depending on the kind of pathology, may serve as mean values of the t-test.

The data in Fig. 2 shows that the greatest manifestation of disorders of carbohydrate metabolism was in patients with established in patients co-infected with HIV/HCV ($t = 27.4$; $p < 0.001$), which exceeds the specified changes in patients with CHC in 1.53 times ($t = 17.9$; $p < 0.001$) and HIV-infected patients ($t = 12.8$; $p < 0.001$) 2.14 times.

Conclusions

1. The HIV-infected persons, patients with chronic hepatitis C and co-infection with HIV/HCV

had carbohydrate metabolism disorders, namely significant increases in serum glucose, insulin, HbA1C and HOMA IR index values were observed.

2. The most significant manifestations of disorders of carbohydrate metabolism were observed in patients co-infected with HIV/HCV ($t = 27.4$; $p < 0.001$), which exceeds the specified changes in patients with CHC in 1.53 times ($t = 17.9$; $p < 0.001$) and HIV-infected patients ($t = 12.8$; $p < 0.001$) 2.14 times.

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