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Biochemical Composition Of Bile In Children Of Convalescents Of Viral Hepatitis «A»

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Abstract: The article presents research results of the biochemical changes in the composition of bile by children convalescent hepatitis A in the presence of disorders of the hepatobiliary system, where there is a decrease of bilirubin, bile acids, cholato-cholesterol coefficient (HHC) rate and an increase of cholesterol, increase the proportion of hydrophobic bile acids (BA) with a decrease in the proportion of hydrophilic bile acids and lower phospholipid content of bile, mainly due to the fraction phosphotidilholine, compared with the biochemical composition of bile of healthy individuals.

Keywords: viral hepatitis A, bile, bilirubin, bile acids, phospholipids

1. INTRODUCTION:

Viral hepatitis A (HAV) is one of the most urgent health problems, which is associated with a high level of spread of this infection: up to 30% of developed and up to 100% of developing countries are hyper endemic for this disease. According to WHO, 1.4 million cases of acute hepatitis A are reported annually worldwide. Data sero-epidemiological surveys indicate that the actual incidence of 3-10 times higher. Among all acute viral hepatitis, HAV accounts for more than 50% of cases in most countries [1], while in Uzbekistan this figure is 90% [2]. Since HAV does not lead to the chronic, there is a misconception that hepatitis A is not a dangerous disease, but it is this most common form of viral hepatitis that causes a significant level of morbidity and economic losses. Thus, in recent years, there has been a clear tendency to increase the frequency of formation of prolonged convalescence in HA with late normalization of the functional state of the liver [1], as well as the biliary system. Early diagnosis and treatment of pathology of the biliary system are of great clinical importance due to the possibility of transformation of functional disorders into organic pathology – chronic cholecystitis and gallstone disease, which occurs as a result of violation of the colloidal stability of bile and the addition of the inflammatory process [3]. In this regard, the prediction of adverse outcomes of HAV from the biliary system is relevant and justified [3, 4, 5].

Purpose of the study: To study changes in the biochemical composition of bile in children-convalescents of viral hepatitis A (cHAV) after non-drug and drug treatment.

2. MATERIALS AND METHODS OF RESEARCH:

The clinical part of the study was conducted in the period 2011-2012 in children's Association of the Republican specialized scientific-practical medical center of therapy and medical rehabilitation of Ministry of Health of Republic of Uzbekistan. The study included 60 children of cHAV with biliary tract pathology, which included biliary tract pathology dyskinesia, reactive cholecystitis, cholangitis, and residual hepatomegaly. The pathology of the biliary

tract was confirmed by the results of general clinical studies, biochemical blood tests, and instrumental methods (ultrasound of the abdominal cavity). As a comparison group, the indicators of 20 children with cHAV without biliary tract pathology were taken; as a control group, similar indicators of 20 practically healthy children were taken.

In children with cHAV, the pathology of biliary tract was more common at the age of 7-14 years (85%), with girls predominating (51.3%). Depending on the treatment, patients with biliary tract pathology (n=60) were divided into 3 groups: Group 1 consisted of 20 patients with cVGA who received only dietary nutrition (diet No. 5); group 2-20 patients with cHAV who received physiotherapy (electrophoresis with magnesia sulfate solution); Group 3-20 patients with cHAV who received combined therapy (physiotherapy and Phosphogliv).

Phosphogliv- a drug produced by Pharmstandart organizations are limited by liability (Russia), is a hepatoprotector with antiviral activity, containing components of plant origin: phosphatidylcholine and the sodium salt of glycyrrhizic acid [6]. Phosphogliv was prescribed to children under 3 years of age for ½ capsule 3 times a day, from 3 to 7 years-1 capsule 3 times a day, older than 7 years-2 capsules 2-3 times a day. The duration of the course was 1 month.

Assessment of biliary function of the liver was performed by fractional duodenal probing. Duodenal juice was analyzed before, during, and after administration of 33% magnesia sulfate solution. To study the biochemical parameters of bile, the portion "C" of bile was studied, since it, being a hepatic fraction, largely reflects the biochemical processes occurring in the hepatic parenchyma and in the Disse space. The bile acid spectrum was determined by thin-layer chromatography according to the method of A.I.Ivanov (1973). The study of the biochemical composition of bile included the determination of its key components, such as bilirubin, cholesterol and bile acids, with the determination of the cholatocholesterol coefficient. Determination of the phospholipid composition of bile consisted in identifying the content of total phospholipids and their fractions. For this purpose, lipids from bile were extracted by the Folch method in the modification of Bligh and Daer. Bilirubin in bile was determined by the Skakun N.P. method, its concentration (in mg%) was calculated using a calibration curve made up with a standard bilirubin solution. The spectrum of bile acids and phospholipids was also determined in bile.

The results of the study and discussion: The results of the study of the biochemical composition of bile are shown in Table 1.

Table 1

Indicators of the biochemical composition of bile

Indicators Groups of surveyed persons	**Bilirubin (мг%)**	**Cholesterol (мг%)**	**Bile acids (мг%)**	**Cholatocholesterol acid (conventional unit)**
practically healthy	14,5±0,5	46,8±3,5	254,0±9,8	5,4±0,10
convalescents of viral hepatitis A without biliary tract pathology	12,0 +0, 4*	50,0+ 4,0**	222,0+10,5*,**	4,44+0,15*,**
convalescents of viral hepatitis A c pathology of the biliary tract before treatment	6,5±0,4*	60,0±4,0	172,0±11,0*	2,95±0,25*
1- group	7,5±0,5*	60,9±4,3*,**	200,0±10,0*	3,28±0,10*

2- group	9,4±0,4*'**	3,0±4,5	94,0±10,0*	3,66±0,2*'**
3- group	11,5±0,5*'*	48,0± 4,5**	228,0±10,5*'**	4,75±0,15*'**

Note: * - significant in relation to indicators of healthy individuals
* * - significant in rvga in relation to indicators before treatment (p<0,05)

In the period of early recovery of viral hepatitis A in children with pathology of bile excretory tract in comparison with indicators of healthy children in the biochemical composition of bile bilirubin level was two times lower (P<0.05), decrease bile acids were detected in 68%, and increase cholesterol in 30% of patients, which led to a reduction cholatocholesterol coefficient (CCK) 2 times.

The results of the studies showed (Table 1) that the children of group 1 had an increase in the level of cholatocholesterol coefficient, but it was statistically insignificant. Have convalescents viral hepatitis A 2-group, there was an increase of bilirubin in the composition of bile by 44% (P<0.05). Differences in bile acid and cholesterol levels were unreliable. At the same time, cholatocholesterol coefficient increased by 24% compared to the results before treatment. In group 3 of cHAV, an increase in the specific weight of bilirubin by 50% (P<0.05), bile acids by 32% (P<0.05), and a decrease in cholesterol by 20% (P<0.05) was determined, which explains the significant increase in cholatocholesterol coefficient almost twice as compared to the indicators before treatment. When studying the spectrum of bile acids in cHAV, in comparison with similar indicators of bile in healthy children, significant changes in the studied indicators were also revealed. First of all, an increase in the proportion of cholic acids conjugated with taurine and glycine in cHAV and a corresponding decrease in the pool of conjugated deoxy - and henodeoxycholic acids attracted attention. For example, if in healthy individuals the ratio of cholic and deoxycholic (deoxy - and henodeoxycholic acids) was equal to 1:2.2, and in cHAV this indicator was 1:0.84. Thus, there was a significant increase in the pool of hydrophobic cholic acids in the bile.

We studied the spectrum of bile acids in the bile of children, convalescents of HAV. The results are shown in table 2.

Table 2

Composition of bile acids in bile (в %)

Indicators Groups of surveyed persons	GDC	GC	TDC	TC
practically healthy	49,2±2,5	26,7±1,3	20,0±0,8	4,1±0,4
convalescents of viral hepatitis A without biliary tract pathology	46, 0± 1, 8	27,4± 1,4	18,7± 0, 6	7,9±0, 5*
convalescents of viral hepatitis A c pathology of the biliary tract before treatment	3,4±1,1*	41,6±1,2*	11,3±0,4*	12,7±0,3*
1- group	36, 5± 1, 2*	38,5± 1,9*	12, 5± 0, 8*	12,5± 0,3*
2- group	38,2+ 0, 9*'**	[a]38,7± 1,2*	13,8± 0, 3*'**	9, 3± 0, 2*'**
3- group	45, 8± 1, 3**	30,2± 0,7*'**	18,4± 0, 4*'**	5,6±0, 3*'**

Note: * - significant in relation to indicators of healthy individuals

* * - significant in rvga in relation to indicators before treatment (p<0,05)

Studies have shown (table 2) that in group 1, there are shifts in the bile acid pool in the form of an increase in the fractions of conjugated deoxycholic bile acids and a decrease in the proportion of toxic cholic acids. Thus, in this group of patients, we observed an increase in the pool of glycodeoxycholic acid (GDC) and taurodeoxycholic acid (TDX) by 11% (P>0.05), compared with similar data before treatment. Of the toxic cholic acid fractions, a decrease in the glycocholic acid (GC) fraction by 9.2% (P>0.05) was observed, but these changes were unreliable. In group 2, we noted more positive developments. This was expressed in a significant decrease in the specific weight of GC fractions by 10% (P<0.05) and TC by 26.8% (P<0.05), which was accompanied by an increase in the pool of GDC and TDC fractions by 11% (P<0.05) and 10% (P<0.05), respectively.

In group 3, there was an increase in the proportion of GDC fractions by 24.9% (P<0.05), TDX by 38.6% (P<0.05). The content of GC and TC fractions was reduced by 27.5% (P<0.05) and 55.1% (P<0.001), respectively. Studies to determine the spectrum of bile acids in cHAV also revealed significant changes in the studied parameters.

When determining the phospholipid composition of bile in cHAV, a decrease in the amount of phospholipids in its composition was noted by 2.2 times compared to the indicators of healthy individuals. In the spectrum of phospholipids in cHAV, a significant decrease in the pool of the phosphatidylcholine (PC) fraction by 37.6% was observed, with an almost fourfold increase in the pool of the highly toxic lysophosphatidylcholine (LPC) fraction.

Thus, the conducted studies revealed that the degree of normalization of the biochemical composition of bile was the lowest in group 1 of cHAV. The positive effects obtained in the group of patients taking combined treatment seem to be provided not so much by a simple summation of the effects of the drug and physiotherapy, but also by more complex intracellular mechanisms of bile synthesis.

3. CONCLUSIONS:

1. In children with cHAV with biliary tract pathology, significant changes are observed in the biochemical composition of bile, such as a decrease in the content of bilirubin, bile acids, the coefficient of CCK and an increase in cholesterol. It is also characterized by an increase in the proportion of hydrophobic bile lysophosphatidylcholine acids with a decrease in the proportion of hydrophilic lysophosphatidylcholine and a decrease in the content of bile phospholipids, mainly due to the phosphotidylcholine fraction.
2. A comparative analysis of the effectiveness of treatment regimens showed that the most significant result is the combined physiotherapy (electrophoresis with magnesia sulfate solution) and drug treatment of cHAV (use of the drug Phosphogliv).

4. REFERENCES:

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