PREVALENCE OF HBV AND HCV INFECTION MARKERS AMONG PATIENTS WITH 2 TYPE DIABETES

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ABSTRACT

We studied frequency of HBV and HCV markers and biochemical profile of patients with type II diabetes (T2DM). There were examined 207 patients from different regions of Yakutia who were being consulted at Republican Endocrinology Hospital since January to May 2013 in Yakutsk. Among examined patients there is a high contamination with hepatitis B (71.5 %), C (10.8 %) or mixed viruses (7.5 %). The frequency of serological markers of viral hepatitis B and C among patients with T2DM is four times higher than among general population in the Republic. Combination of pathology (diabetes + Viral hepatitis) worsens liver and kidneys functions. Thus it can be considered that viral hepatitis is a risk factor for diagnosing and progressing of diabetes.

Keywords: markers of viral hepatitis B and C, diabetes, risk factor.

INTRODUCTION

In the XXI century along with threat of infectious diseases there is diabetes threatening international community. Diabetis is the most dangerous non-communicable disease with epidemic growth rate spread all over the world [6,7].

Risk factors for diabetes in childhood are infectious diseases such as red measles, mumps etc., including viral hepatitis.

Viral hepatitis is a serious public health problem because of its epidemic spread, ubiquitous detection and high level of morbidity with wide variability of disease progress from oligosymptomatic to fulminating forms with acute liver failure.

In Russia, the situation on viral hepatitis (VH) with parenteral mechanism of pathogens transmission is extremely unfavorable. Such situation fully applies to the population of the Republic of Sakha (Yakutia). For decades in the Republic there has been recorded high incidence of hepatitis B 2-3 times higher in accordance to All-Russian parameters. There is a trend to chronic viral hepatitis B and C growth.

Currently there is suggested a role of viral hepatitis in initiation of processes leading to development of diabetes. It is also known that hepatitis adversely affect the course of diabetes [5]. Clinicians noted interactions of these two problems about 40 years ago [2, 3, 4]. However, pathogenetic significance of such a frequent association of viral liver disease and diabetes so far has not been sufficiently studied yet [1].

Research objective: to study the incidence of HBV and HCV markers of infection and

biochemical profile in patients with type 2 diabetes mellitus (T2DM).

Tasks:

- To determine the frequency of HBV and HCV infections in patients with type 2 diabetes;
- To study the biochemical parameters of blood in patients with type 2 diabetes who are infected with hepatitis viruses B and C.

MATERIAL AND METHODS

The study included 207 patients with type 2 diabetes from different regions of Yakutia, who came to the Yakutsk Republic-wide Endocrinology Clinic during the period from January to May 2013 and submitted to a biochemical blood assay. 19.8% are men, 80.2 % are women. Mean age is 64,2 ± 1,7 years. For the comparison there was a group of 88 patients with dyscirculatory encephalopathy who were treated at Day Hospital of the Institute of Health, and 9167 people from various regions of the Sakha Republic (Yakutia). A study for the presence of markers of hepatitis B virus was done among all patients with type 2 diabetes and for the presence of markers of hepatitis C virus was done among 93 patients. We also ran biochemical blood assay resulting in the following: ALT - 200, AST - 198, chlorides - 164, cholesterol - 199, sugar - 200, Calcium - 139, protein - 200, urea - 201, bilirubin - 198.

Methods:

- Seroscopy using the immunoenzyme method to detect markers of parenteral viral hepatitis was conducted in immunology laboratory of the scientific institute “Health institute” (SIHI), NEFU.
- Related test systems of ZAO «Vector - Best" were used.
- Biochemical studies were conducted in the laboratories of the Republic-wide Endocrinology Clinic.
- Statistical methods. As the software statistical analysis of research materials we used the software package Statistica 8.0. The following methods of statistical analysis were applied: checking the normalcy of the distribution of quantitative traits using the Kolmogorov-Smirnov test with the Lilliefors correction and the Shapiro-Wilk test; checking the equality of the general variance using the Fisher's exact test; descriptive statistics; analysis of contingency tables; rank correlation analysis; the Mann-Whitney nonparametric variance analysis; comparing proportions test. Selected options listed below, have the following designations: M - mean, s - standard deviation, n - the size of the analyzed subgroups. The critical significance value was taken as 5%.

RESULTS AND DISCUSSION

In the result of studies HBs-antigenemia (HBsAg) was detected in 8.2% of patients with type 2 diabetes (Fig.1). Most of patients were infected with hepatitis B virus (HBV): in 71.5% there were identified antibodies to HBV cor-antigen (a-HBcorIgG) (Fig. 2); 10.8% of patients were

infected with hepatitis C virus (a-HCV) (Fig.3); 7.5% of patients had mixed infection with hepatitis B and C viruses (Fig. 4). The data obtained was compared to results of similar studies in Irkutsk region (Fig. 5). As can be seen from the figure, contamination with hepatitis B virus (HBV) among patients with type 2 diabetes (T2DM) in Yakutsk more than three times higher than among patients with type 2 diabetes in Irkutsk ($p = 0.0002$). Contamination with hepatitis C virus (HCV) and mixt infection is also slightly higher (4.8 and 5.4% respectively) but differences were not statistically significant ($p = 0.22$ and 0.06 respectively). When comparing the frequency of viral hepatitis (VH) among patients with diabetes mellitus and dyscirculatory encephalopathy differences were also not statistically significant (Table 1). In control group HBs-antigenemia was met slightly less (2.5%, $p = 0.2$), whereas the detection rate of a-HBcorJgG and a-HCV was much lower (4.5 and 4.7 times respectively, $p < 0.0001$). Average biochemical profiles of patients with type 2 diabetes and viral hepatitis are given in Table. 2. As seen from the table, the average blood glucose was above target, other parameters did not exceed normal range. The rank correlation analysis (Spearman) between all biochemical parameters revealed a positive correlation only between ALT and AST transaminases ($\rho = 0,6$; $p < 0.0001$).

We also studied influence of VH on biochemical profile of patients with type 2 diabetes. There was revealed that HBs-antigenemia level of creatinine in patients with type 2 diabetes is much higher than its absence (108.6 versus 96, $P = 0.009$) (Fig. 6). There was also higher AST level (37.6 vs. 21.1, $p = 0.022$) (Fig. 7). This once again proves that in combined pathology (diabetes mellitus + viral hepatitis) harmful interference on liver and kidney function increases.

CONCLUSION

There is a high contamination with parenteral viral hepatitis B (71.5%), C (10.8%) and both viruses (7.5%) among patients with type 2 diabetes. The frequency of serological markers detection of viral hepatitis B and C among patients with type 2 diabetes was four times higher than in general population of the Republic. Combined pathology (diabetes + viral hepatitis) worsens liver and kidneys functions. Thus, it can be assumed that viral hepatitis is a risk factor for nosegenesis of diabetes. Hereafter there is recommended monitoring study for pre-diabetes among patients with chronic viral hepatitis B, C and with past-infection of hepatitis B.

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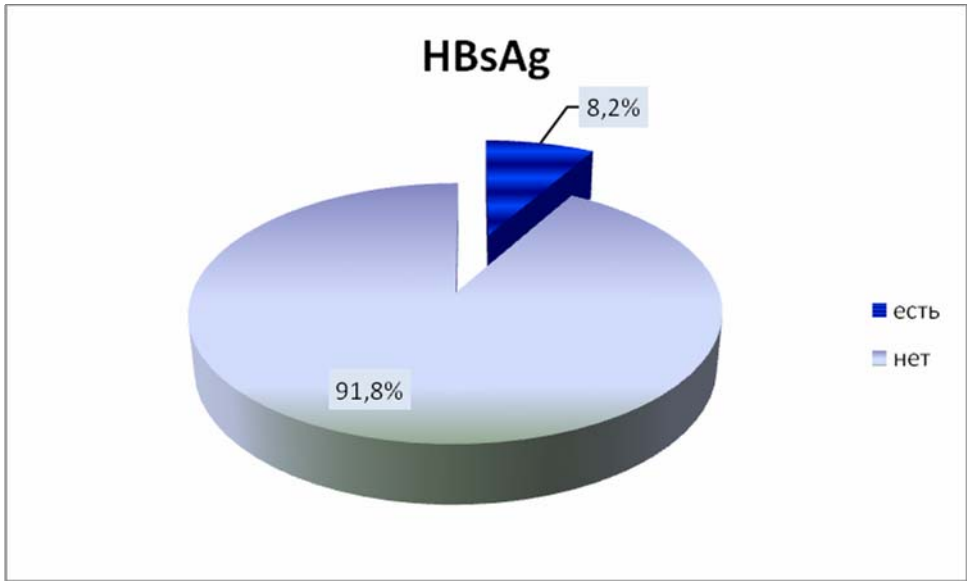

Fig. 1. Frequency of HBsAg among T2DM patients

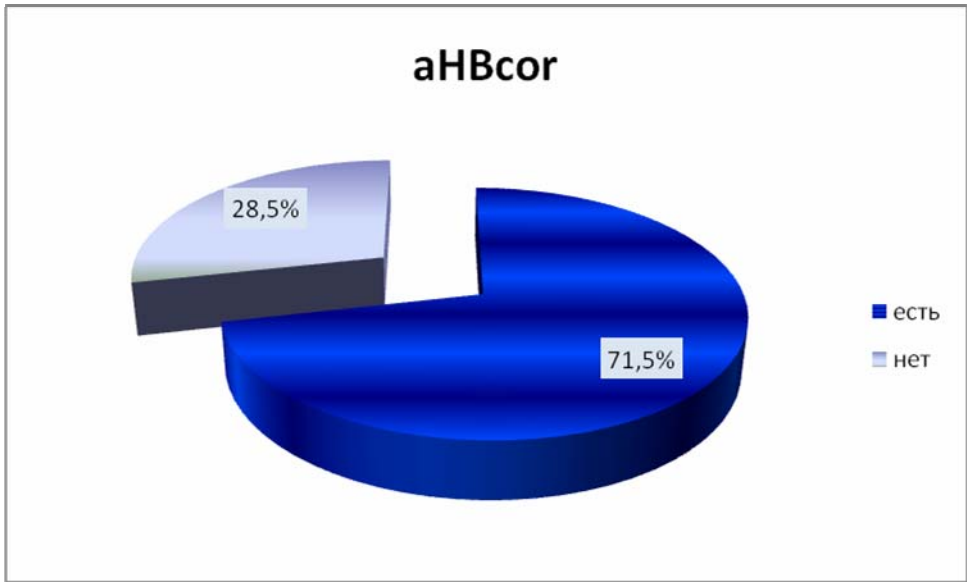

Fig. 2. Frequency of a-HBcor among T1DM patients

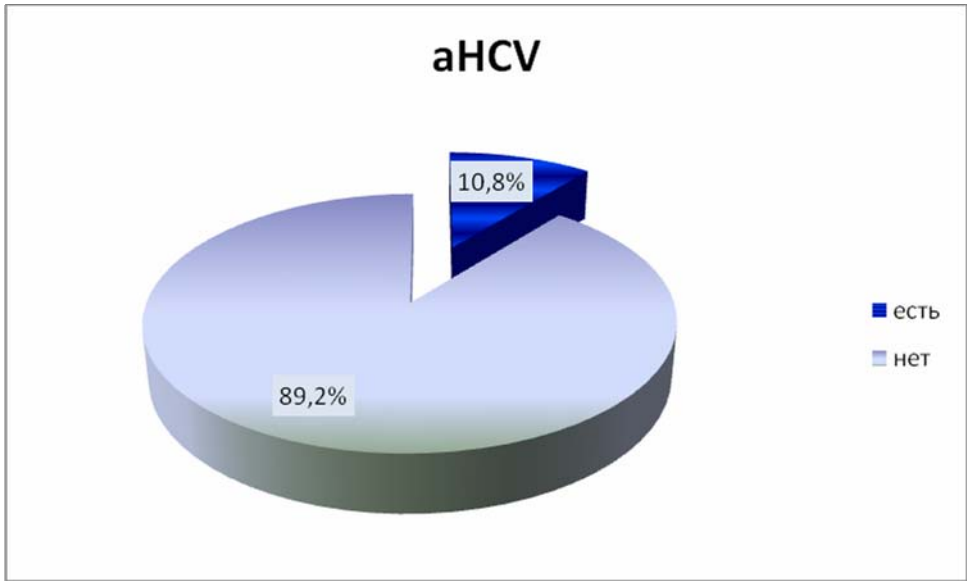

Fig. 3. Frequency of a-HCV among T1DM patients

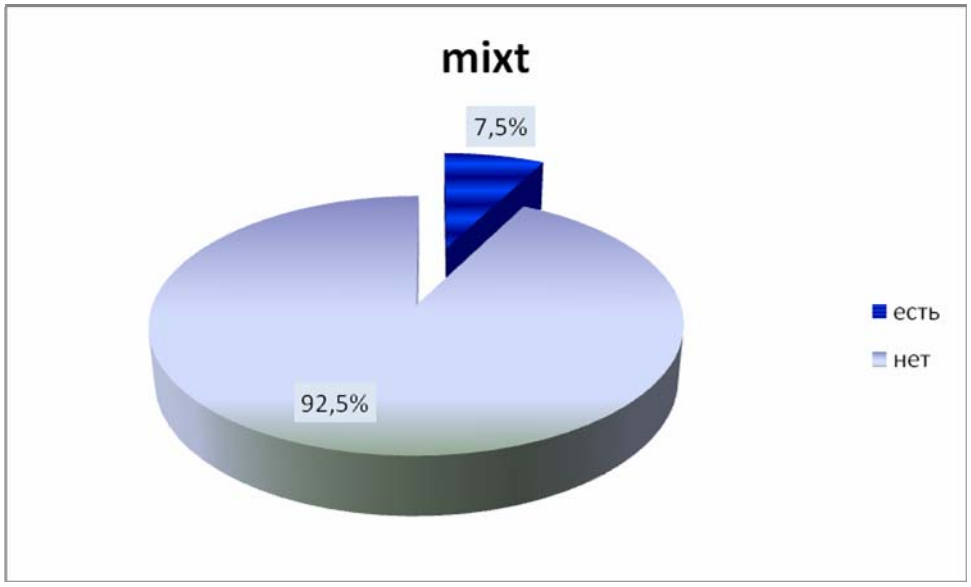

Fig. 4. Frequency of mixt infections among T2DM patients

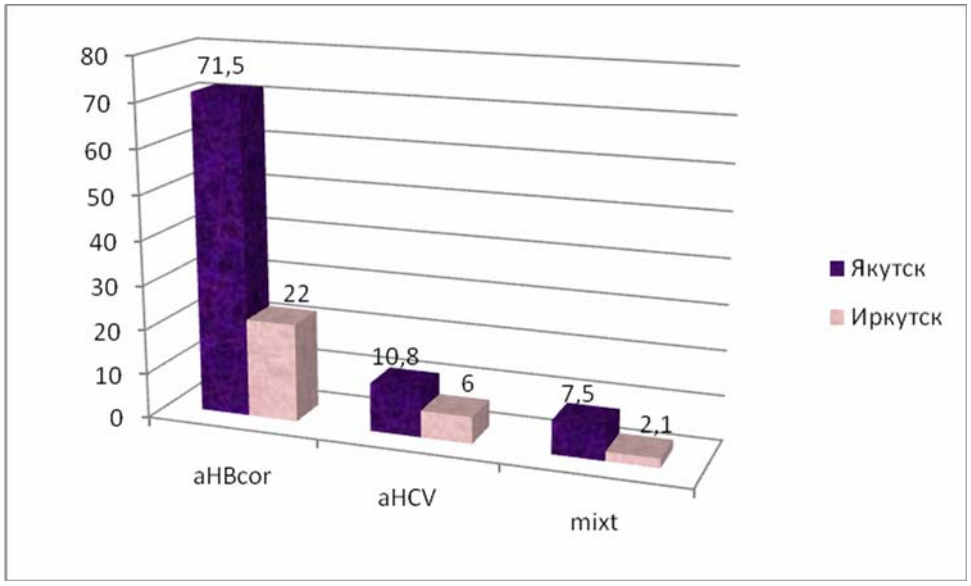

Рис. 5. Frequency of HBV and HCV - infections among patients with T1DM

Table 1

HBV and HCV- infections in different groups

	Diabetes (n=207)		Dyscirculatory encephalopathy (n=88)		chi-square	P	Test group (n=9167)		chi-square	P
	абс.	*%*	абс.	%			абс.	%		
HBsAg	*17*	*8,2*	4	4,5	0,8	0,4	524	5,7	1,9	0,2
a-HBcor	*148*	*71,5*	42	60,9	2,2	0,1	163	15,9	276,6	<0,0001
a-HCV	*10*	*10,8*	2	2,6	3,2	0,07	92	2,3	23,6	<0,0001

Table 1

Biochemical profile under combined pathology VH + T1DM

Biochemical measurement	N	Percentiles		
		25%	Median	75%
ALT	200	14,2	21,8	33,1
AST	198	18,8	22,5	28,0
Chlorides	164	103,0	107,0	113,4
Cholesterol	199	4,0	4,4	5,0
Sugar	200	6,8	8,1*	10,4
Calcium	139	2,2	2,3	2,4

Protein	200	76,1	80,5	84,2
Urea	201	6,9	7,6	8,2
General bilirubin	198	11,0	13,0	15,3
Direct bilirubin	198	1,8	2,0	3,6

*- above normal

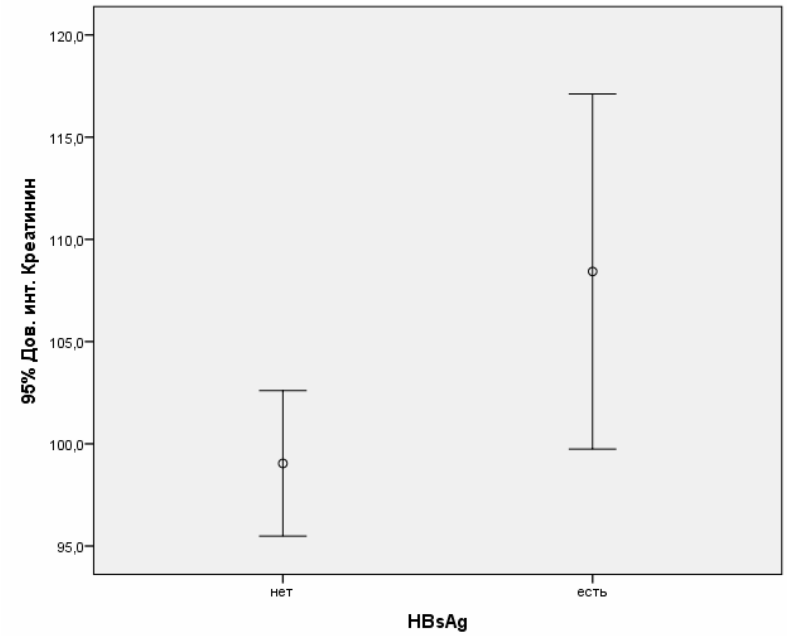

Fig. 6. Creatinine level according to HBsAg presence

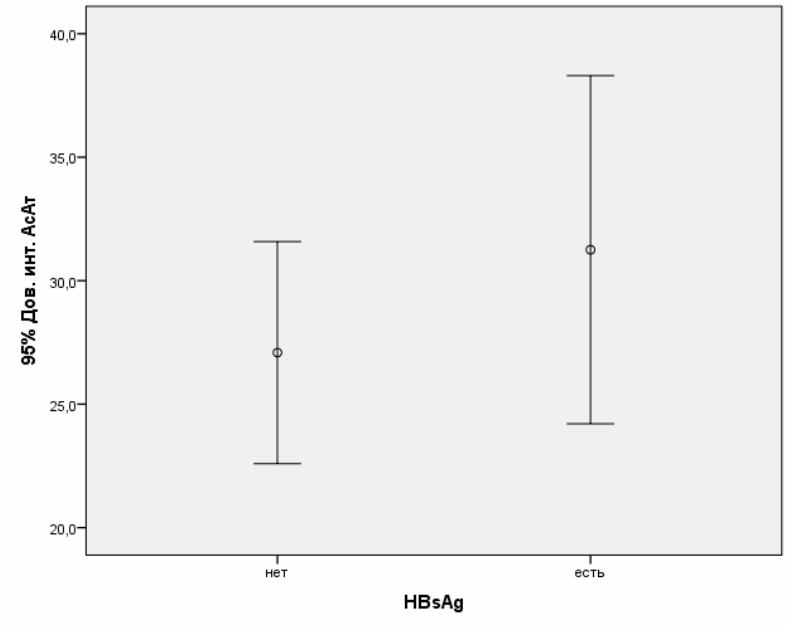

Fig.7. AST level according to HBsAg presence