

## STUDY OF SOME SANGUINE BIOCHEMICAL INDICES IN FEMALE PATIENTS AFFECTED BY ACUTE B VIRAL HEPATITIS

ANCA-MIRELA AMARIEI<sup>1</sup>, ELENA CIORNEA<sup>1\*</sup>, GABRIELA DUMITRU<sup>1</sup>

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**Abstract:** The study discusses the experiments devoted to some biochemical parameters from the sanguine tissue, in subjects of feminine sex belonging to three categories of age (31-40 years, 41-50 and 51-60 years, respectively) suffering from acute B viral hepatitis, investigated at the “Mavromati” Hospital and at the “Lux Ro” Medical Center of Botoșani. With the exception of uric acid and (total and direct) bilirubine, which evidence higher values than the superior limit of the physiologically normal interval, the other biochemical indices (glucose, cholesterol, triglycerides, urea and creatinine) occurred at the limit of the reference maximum, for all categories of age here considered.

### INTRODUCTION

The epidemiological dimension of the phenomenon gives to the hepatic diseases a social interest, thus exceeding the limits of a mere scientific interest. The research directions created in the field of epidemiology and medicine, starting from the studies developed in the last decades of the XX<sup>th</sup> century, brought remarkable contributions in establishing the world dimension of hepatic diseases, which came to be recognized as representing a major problem of public health, if considering both their proportions and the multiple complications that may appear during the evolution of the disease (Alter, 2003).

Hepatitis is therefore a serious problem of public health at worldwide level, an increasingly severe threatening for mankind. At global level, 500 million persons are being affected by the hepatic virus B or C, most of them being unaware of their condition, on knowing that hepatitis C is 10 times and hepatitis B 100 times more contagious than any HIV infection. The conclusion is therefore that, with the advance of mankind, new and complex challenges, regarding the discovery and medical diagnosis of various affections, have to be faced (Chiotan *et al.*, 2000; Maddrey, 2000).

The present study is devoted to the variation of some sanguine biochemical parameters of acute viral hepatitis B, considering, on one side, their involvement in the evolution of the disease and, on the other, the fact that it remains an acute medical problem as, yearly, more than 50 million people are infected with the hepatic virus B.

### MATERIALS AND METHOD

The investigations were performed on female patients affected by acute viral hepatitis B, with age between 31-60 years, in the clinical laboratories of the “Mavromati” County City of Botoșani and the “Lux Ro” Medical Center of Botoșani. There have been determined the values of some sanguine biochemical parameters known as having an important role in the evolution of hepatitis, such as: glucose, cholesterol, triglycerides, urea, uric acid, creatinine, (total and direct) bilirubine, by applying the colorimetric method and a Hitachi 912 ISE biochemical analyzer - which is a complex automated device needing no sample manipulation, thus minimizing the risk of accidents.

In a final stage, for obtaining results as close to the real value as possible, as well as for estimating the precision of the results obtained, the experimental data were systematized and processed statistically, by the Student test, a series of statistical indices, such as standard error, coefficient of mean value variation and probability being also calculated (Varvara *et al.*, 2001; Zamfirescu and Zamfirescu, 2008).

### RESULTS AND DISCUSSION

Depending on the pathological process they mainly evidence, the biochemical analyzes for liver exploration may be classified as:

- laboratory tests evidencing a chronic inflammatory process in the hepatic mesenchyma, morphologically corresponding to some lymphoplasmocitary infiltrations in the interstice;
- biochemical tests indicating an increased permeability of hepatocytes' membrane;
- analyzes evidencing functional liver insufficiency;
- tests showing some cholestasis (Cucuianu *et al.*, 1998).

The major factor in hepatitis pathology refers to the alteration of the parenchymatic hepatic cells, which causes alteration of the various metabolism processes, and their corresponding biochemical modifications (Paramo and Rocha, 1993).

The values of the main biochemical sanguine indices determined in female patients with ages between 31-60 years, suffering from acute viral hepatitis B, have been processed statistically and systematized in Table I.

In the hepatic cell, glucose is phosphorylated to glucose-6-phosphate, employed for maintaining the glycemy, or for the synthesis of glycogen, known as being deposited in liver (Cristea-Popa *et al.*, 1991). According to the literature data, in various liver affections, glucose transformation is slowed down while, in more advanced cases of hepatic insufficiency, there may appear hypoglycemy, and low tolerance to glucose, fructose, galactose (Mihele, 1997). The data of the present study show that, for all categories of age under investigation, the value of glycemy remained within normal limits (Table I). Thus, the 31-40 year group of age recorded a mean value of glucose of 77.24 mg%, the 41-50 year group - a 95.51 mg% value, and the last group of age (51-60 years) was characterized by a mean value of 109.7 mg%.

In spite of the essential role played by the liver in the synthesis of seric lipoproteins, an obvious decrease in the lipids and seric proteins occurs only in advanced cirrhoses (Cucuianu *et al.*, 1998). Analysis of the data listed in Table I shows that the value of seric cholesterol remained within the reference limits (150-250 mg%). Values close to the inferior limit of the reference interval were evidenced in the feminine subjects from the 41-50 year group of age, the other groups recording average values of seric cholesterol of 173.8 mg% (the 31-40 year group) and 222.9 mg%, respectively (the 51-60 year group).

The average values of triglycerides have also remained within the limits of normality (50-150 mg%), in most of the women being close to the inferior limit of the reference interval. Thus, in the 31-40 year group of age, the mean value was of 63.9 mg%, in the 41-50 year one - of 76.1 mg% while, in the 51-60 year group - of 106.9 mg%.

Another sanguine index considered for analysis was urea, the biosynthesis of which occurs exclusively in the liver where, from the ammonium resulted from desamination of aminoacids, together with carbon dioxide and in the presence of ATP and of bivalent magnesium ions, it forms carbamyl-phosphate, which enters the cycle of urea biosynthesis, thus representing one of the main mechanisms of ammonium detoxification (Cristea-Popa *et al.*, 1981).

The reference interval of uremy considered as physiologically normal ranges between 15-50 mg/100 mL, this concentration value remaining constant through the equilibrium between the function of liver - which synthesizes it - and that of the kidney - which excretes it (Artenie, 1991).

The literature of the field makes mention of the fact that the most frequent renal diseases caused by infection with the hepatic virus B occurred in patients with AgHBs associated to an chronic hepatitis (Jurcuț and Ruță, 1997; Grigorescu *et al.*, 1999; Kao *et al.*, 2000; 2002; Zoulim, 2003).

In this case, too, the concentration of sanguine urea determined in the female patients ranged within the limits of the reference intervals, the values recorded oscillating between 25.6 mg% and 46.294 mg%, respectively (Table I). Mention should be also made of the fact that, in the 41-50 year group of age, the average values of urea were quite close to the superior limit of the physiologically normal interval.

Table I. Values of some sanguine biochemical indices in female persons with acute B viral hepatitis

Biochemical indices	Normal values	Statistical indices	Group of age		
			31-40 years	41-50 years	51-60 years
Glucose	70-120 mg%	n	10	17	10
		X	77.24	95.517	109.7
		± SE	0.54857	0.62557	0.11836
		VC %	2.24	2.7	3.41
		t	-	21.967	24.88
		p	-	p<0.001	p<0.001
Cholesterol	150-250 mg%	n	10	17	10
		X	173.8	162.352	222.9
		± SE	0.62893	0.3632	0.56666
		VC %	1.14	0.92	0.8
		t	-	15.761	57.999
		p	-	p<0.001	p<0.001
Triglycerides	50-150 mg%	n	10	17	10
		X	63.9	76.117	106.9
		± SE	1.294	0.78535	0.97125
		VC %	6.4	4.25	2.87
		t	-	8.067	26.565
		p	-	p<0.001	p<0.001
Urea	15-50 mg%	n	10	17	10
		X	31.6	46.294	25.6
		± SE	1.107	0.26795	0.47609
		VC %	11.08	2.38	5.88
		t	-	12.895	4.977
		p	-	p<0.001	p<0.001
Uric acid	2.5-5 mg%	n	10	17	10
		X	3.45	5.961	8.2
		± SE	0.1108	0.04574	0.04714
		VC %	10.15	3.16	1.81
		t	-	20.952	39.446
		p	-	p<0.001	p<0.001
Creatinine	0.5-1.2 mg%	n	10	17	10
		X	0.778	1.065	1.02
		± SE	0.02855	0.00732	0.02905
		VC %	11.6	2.83	9
		t	-	9.766	5.94
		p	-	p<0.001	p<0.001
Total bilirubine	1-10 mg/L	n	10	17	10
		X	11.6	5.235	12.9
		± SE	0.61824	0.10604	0.45825
		VC %	16.85	8.35	11.23
		t	-	10.146	1.689
		p	-	p<0.001	0.1<p<0.2
Direct bilirubine	1-6 mg/L	n	10	17	10
		X	7.3	3.235	8.3
		± SE	0.3	0.10604	0.15275
		VC %	12.99	13.51	5.81
		t	-	12.774	2.97
		p	-	p<0.001	0.001<p<0.01

n = count; X = average value; SE = average standard error; CV = average variation coefficient; t = Student test; p = probability

As to the uric acid, it showed average values higher than the normal maximum in the 41-50 year (5.961 mg%) and 51.60 year groups of age (8.2 mg%), average values situated within the limits of the reference interval (3.45 mg%) being recorded only for the feminine subjects from the 31-40 year group of age.

Creatinine, a product resulting from the metabolic transformation of creatine (a proteic substance entering the composition of muscles and playing a special part in the mechanisms of muscular contraction), shows average values situated within the limits of the normality maximum (0.5-1.2 mg%). Consequently, in the 31-40 year group of age, a mean value of 0.778 mg% was recorded, while the 41-50 year group evidenced a value of 1.065 mg% and the 51-60 year group - of 1.02 mg%, quite close to that of the previous category of age.

According to literature data, hepatocellular icterus causes reversible or irreversible lesion of the hepatic parenchyma, which induces an increase of both conjugated and non-conjugated bilirubine. The installation of icterus indicates alteration of the hepatocyte functions, the hepatic disfunction influencing capturing, glycoconjugation and excretion of bilirubine (Pavel, 1982; Mihele, 1997).

Analysis of data on (direct and total) bilirubine shows normal values of this biochemical index only for the 41-50 year group of age (3.235 mg/L and 5.23 mg/L, respectively), while the values registered for the 31-40 year and 51-60 year groups of age exceed the superior limit of the reference interval.

## CONCLUSIONS

Analysis of the experimental results on the evolution of some sanguine biochemical parameters in female patients suffering from acute B viral hepatitis permitted drawing of the following conclusions:

- acute B viral hepatitis does not significantly influence the evolution of the sanguine biochemical indices under analysis, values higher than the maximum threshold of the reference interval considered as physiologically normal being recorded only for uric acid and for total and direct bilirubine;
- application of Student test evidenced some statistically significant differences among the three groups of age investigated, for all organic seric compounds considered.

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<sup>1</sup> Department of Biochemistry and Experimental Biology, Faculty of Biology, „Alexandru Ioan Cuza” University, Bd. Carol I, Nr. 20 A, 700506, Iași, Romania.

\* ciornea@uaic.ro

