

## INDIVIDUAL SERUM PROTEINS IN LIVER DISEASES

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The liver occupies a central place in protein metabolism. Most serum proteins are synthesized in hepatocytes. The elements of reticulo-histiocyte system and other hepatic structures participate actively in catabolism of serum proteins already realized their biological role. Protein synthesis, intracellular transport and excretion are disturbed in chronic liver diseases (3). Assessment of individual serum proteins (ISP) concentration provides valuable data about the functional state of the liver. Increased immunoglobulin level is a characteristic feature of dysproteinemia in many cases with liver diseases (17). Their enhanced synthesis in these diseases is a sign of an immune reaction. Recently, the significance of the investigation of serum immunoglobulins (Ig) as indices of humoral immune mechanisms concerning diagnosis and prognosis both rises in relation with the ascertaining of immune mechanisms in chronic alcoholic hepatic lesions (1, 4, 16, 19). With a view to clinical interpretation of dysproteinemia in liver diseases discussion of characteristic disturbances of ISP levels in various nosological units is warranted, indeed. Numerous authors (6—9, 11—14) show convincingly the importance of ISP assessment for the differential diagnosis of liver diseases, for evaluation of the course of the pathological processes and prognosis as well.

### Material and methods

A total of 360 patients with liver diseases were studied complexly clinico-laboratorily and morphologically in the profile Gastroenterological Clinic of the Higher Institute of Medicine, Varna during a 8-year period. Their mean age was 53 years. We excluded by means of all methods available other organic diseases which could cause abnormalities of individual serum protein levels and of immune processes in the organism. The following patients' groups were formed: patients with an acute viral hepatitis (AVH), chronic active hepatitis (CAH), chronic persistent hepatitis (CPH), liver steatosis (LS), liver cirrhosis (LC), hepatic carcinoma (HC), and extrahepatic cholestasis (EC). ISP were determined by using of specific reactions (8) but Igs by means of monospecific antisera with radial immunodiffusion according to Mancini, Carbonara and Heremans. Data were compared with these of control healthy individuals within reference values adopted in the literature. Patients were profoundly clinically discussed and a statistical analysis (variance, correlation, percentile and alternative one) was performed.

## Results and discussion

Our results showed that most sensitive reactions were observed when sialic acid (SA), cholinesterase (CE), hexosamines (HA) and fucose (F) from the class of glycoproteins were concerned. Their changes were distinctly expressed in almost all the groups excepting of CPH and LS patients only (see table 1).

SA was increased in patients with CAH, LC, LS, EC, and HC being most elevated in the latter two groups (fig. 1).

Table 1

Serum glycoproteins in patients with liver diseases and in control persons

Patients' group	n	Mean glycoprotein level						
		SA mg% (mmol)	Hp mg% (g/l)	Or mg% (g/l)	Cp UI (mkmol)	CE mU/ml (kE)	HA mg% (mmol)	F mg% (mmol)
Controls	60	66.75 (24.03)	99.66 (0.996)	4.57 (0.0457)	55.8 (3.48)	2960 (2.960)	71 (3.9689)	8.43 (0.5134)
VH	94	73.87 (26.59)	93.18 (0.931)	3.54 (0.0354)	67.02 (4.18)	2444 (2.444)	93.25 (5.2126)	13.03 (0.7935)
CAH	34	81 (29.16)	89 (0.89)	4.89 (0.0489)	72 (4.50)	2493 (2.493)	93 (5.1987)	10.24 (0.6236)
CPH	22	74 (26.64)	108 (1.03)	4.07 (0.0407)	58 (3.62)	3573 (3.573)	79.04 (4.4183)	9.16 (0.5578)
LC	64	76 (27.36)	77.62 (0.776)	3.5 (0.035)	65 (4.06)	18.07 (1.807)	77 (4.3043)	12.18 (0.7418)
LS	37	84 (30.24)	103 (1.03)	5.1 (0.051)	65 (4.06)	3200 (3.200)	78 (4.3602)	10.5 (0.6395)
EC	48	90 (32.40)	133.9 (1.339)	6.75 (0.0675)	84 (5.25)	2440 (2.440)	88 (4.9192)	9.25 (0.5633)
Neoplasms	30	99.8 (35.92)	100.16 (1.0016)	4.67 (0.0467)	74.56 (4.66)	1832 (18.32)	87.43 (4.8833)	11.68 (0.7113)

Orosomuroid was reduced down to the lower reference limit in AVH (medium severe and severe forms) and in LC patients where grave parenchymatous lesions were established. Orosomuroid was increased only in patients with EC syndrome which was due to inflammatory phenomena.

Hp level remained normal in all patients' groups. However, its mean level was lower in AVH, CAH and LC patients when compared with that of the controls due to inflammatory and destructive alterations and to reduced biosynthesis in damaged liver.

Ceruloplasmin (Cp) was in reference values with all the patients excepting HC and EC ones where it was increased. This increase could be due to hyperproduction, persistent cholangitis and hampered bile drainage because of tumours.

There was serum CE level reduction in LC, HC and severe AVH. Its activity changed parallelly to the severity of the pathological process when AVH was concerned. CE possessed no diagnostical value in the other patients' groups because it was within reference values in most cases.

HA were maximally increased in AVH and CAH, moderately — in EC and HC while remaining unchanged in rest patients (fig. 2).

F was enhanced in AVH and LC but its increase was slightlier in HC patients (fig. 3).

It was, therefore, evident that chronic liver diseases were characterized by both quantitative and qualitative differences of serum glycoprotein changes. We

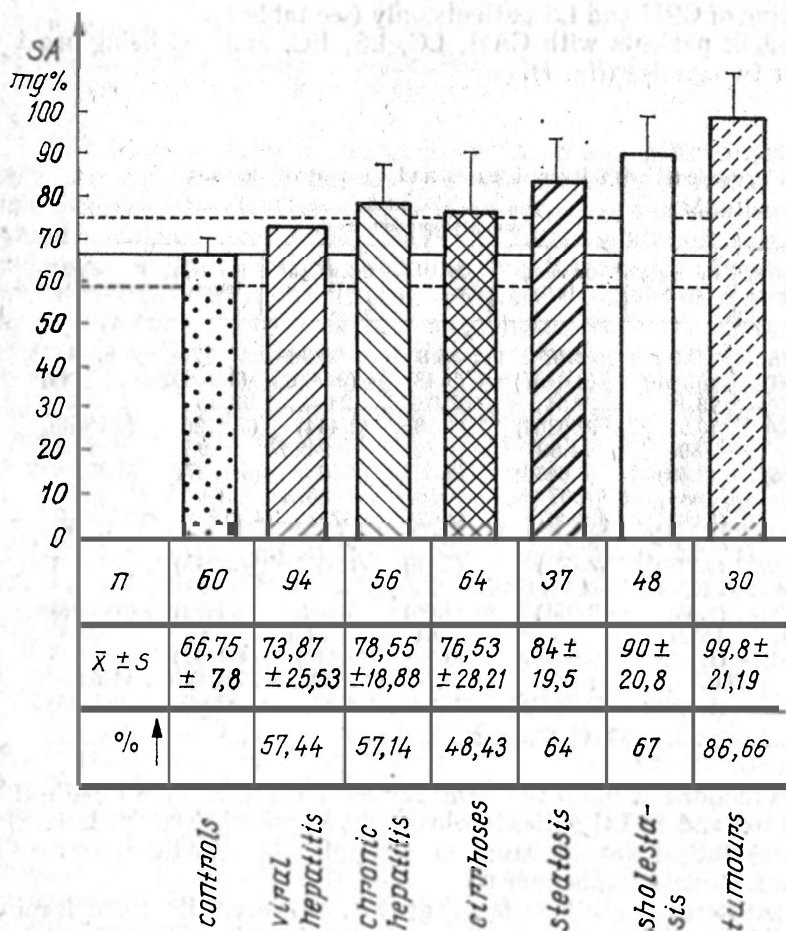


Fig. 1. Sialic acid (SA) in the serum of patients studied

found out that serum immunoglobulins IgG, IgM and IgA were increased in a different percentage of patients with chronic liver diseases. In any CAH cases and LC without ascites patients IgG was enhanced while it was observed in 94.8 per cent of LC cases with ascites to be elevated. Serum IgG was almost equally frequently increased in CPH, HC and EC patients while it was established less frequently in LS ones. Serum IgM was increased most often in CAH cases (86.4 per cent) whereas this increase was established no more than in the half of the other patients' groups. Serum IgA was increased in 100 per cent of CAH patients, as well as in EC patients where the cause was extrahepatic duct carcinoma, and in 87.5 per cent of LC cases. We found out serum IgA increase in patients with

chronic liver diseases in similar frequency to that of IgG. There was IgA increase in 81.8 per cent of HC patients probably due to the present EC. Serum IgG showed the highest level in CAH and LC and less expressed one in HC, CPH, EC, and LS patients. IgM was most enhanced in CAH patients whereas its level was con-

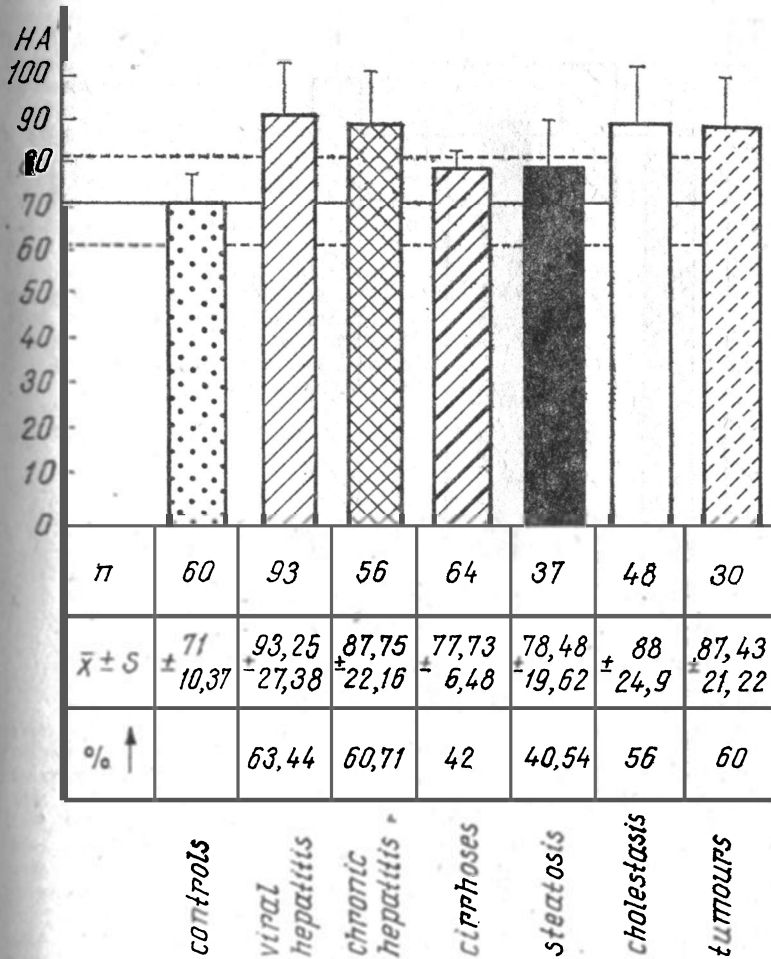


Fig. 2. Hexosamines (HA) in the serum of patients studied

considerably lower but still over the normal range in LC ones. IgM was not changed in other patients' groups.

Serum IgA was increased in CAH, HC, LC, and EC patients. Its increase was less expressed in CHP and LS cases.

Our study revealed the most significant abnormalities in CAH and LC patients among the cases with chronic liver diseases which was likely due to immune or autoimmune, respectively, mechanisms. Other investigators reported similar data in CAH patients (2, 5, 10, 15, 18, 20). Dynamic follow-up of immunoglobulins could provide information concerning the dynamics of the disease and the

degree of expressiveness of mesenchymal inflammatory reaction. By this way they can be useful in early diagnosis of chronic liver diseases. It is possible that immunologic deviations and suppression of certain immune mechanisms result in a lower percentage of increased IgM in single patients' groups.

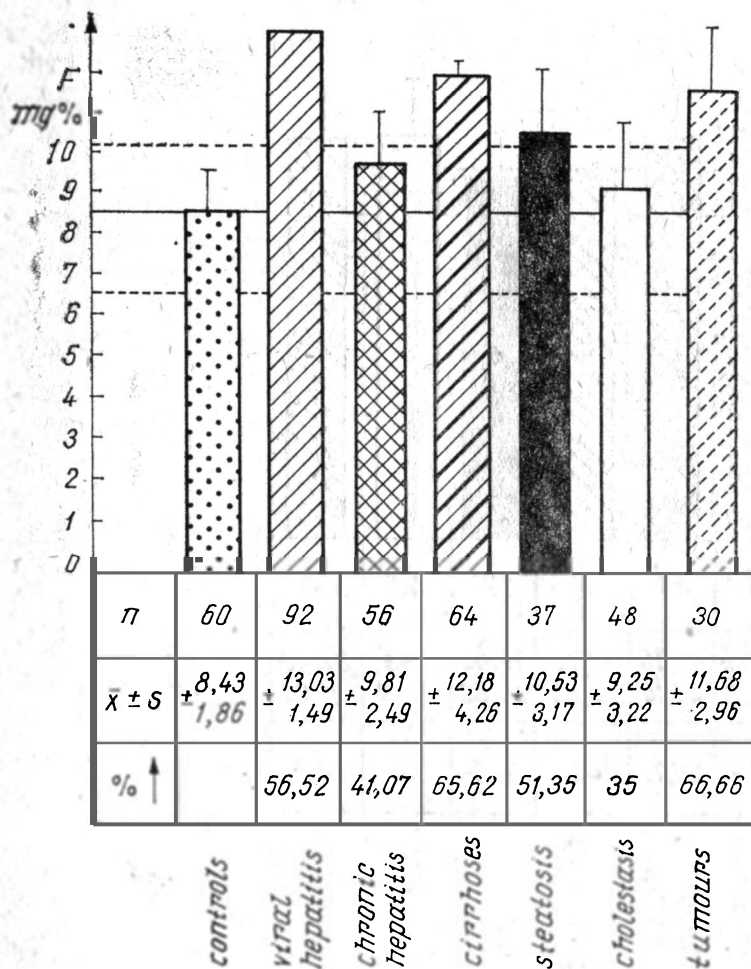


Fig. 3. Fucose (F) in the serum of patients studied

We can draw the following conclusions:

1. Abnormalities of serum glycoproteins and immunoglobulins argue mainly for the activity of the pathological process and the degree of liver damage.
2. Glycoproteins possess the highest information value when changed in patients with AVH, LC, EC, and HC but immunoglobulins — in CAH, CPH, LS, LC, EC, and HC cases.
3. The investigation of ISP helps the differential diagnosis of different chronic liver diseases which is important to determine the evolution and therapy of the illness.

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### ИЗМЕНЕНИЯ ИНДИВИДУАЛЬНЫХ СЫВОРОТОЧНЫХ БЕЛКОВ ПРИ ЗАБОЛЕВАНИЯХ ПЕЧЕНИ

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#### РЕЗЮМЕ

Исследовано 360 больных заболеваниями печени в профилированной гастроэнтерологической клинике и в инфекционной клинике. Средний возраст больных — 53 года. Обследованы группы больных острым вирусным гепатитом, хроническим активным гепатитом, хроническим персистирующим гепатитом, циррозом печени, стеатозом печени, раком печени и экстрагепатальным холестаазом. Была исследована также группа контрольных лиц. Для определения индивидуальных сывороточных белков использовались специфические химические реакции, а для определения иммуноглобулинов — иммунохимические. Отклонения от нормы иммуноглобулинов и гликопротеинов говорят об активности процесса болезни и о степени увреждения печени. Наибольшую диагностическую информативность содержат изменения гликопротеинов у больных острым вирусным гепатитом, циррозом печени, экстрагепатальным холестаазом и раком печени, а изменения иммуноглобулинов — у больных хроническим активным гепатитом, хроническим персистирующим гепатитом, стеатозом печени, циррозом печени, экстрагепатальным холестаазом и раком печени. Исследование гликопротеинов и иммуноглобулинов способствует проведению дифференциального диагноза различных хронических заболеваний, что имеет важное значение для определения эволюции и терапии заболевания.