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IMPROVING THE PREVENTION AND TREATMENT OF COMPLICATIONS OF SPONTANEOUS BACTERIAL PERITONITIS IN PATIENTS WITH LIVER CIRRHOSIS OF VIRAL ETIOLOGY

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ANNOTATION

Improving the prevention and treatment of complications of spontaneous bacterial peritonitis in patients with liver cirrhosis of viral etiology were studied.

118 patients with liver cirrhosis of viral etiology aged 18 to 69 years were examined. The distribution by sex in the groups showed that in the first group of 60 patients, 38 (63.3%) were male and 22 (36.7%) female, and in the second of 58 patients 27 (46.55%) and 31 (53.4%) respectively. The results of the conducted studies indicate that cytolytic changes in the liver, determined by the activity of serum transaminases and the cholestatic component of the disease, were more pronounced in patients with SBP.

Keywords: Spontaneous bacterial peritonitis, liver cirrhosis, preventionn.

INTRODUCTION

Viral infections, especially hepatitis B and C and infections caused by coronaviruses and herpes viruses, are widespread in the population [1,2]. In recent years, there has been the emergence of new viral infections that were previously endemic [3,4,5]. Spontaneous bacterial peritonitis (SBP) is a common and severe complication in patients with diseases such as liver disease and ascites. Approximately 32-40% of hospitalized patients with cirrhosis develop bacterial infections either on admission or during hospitalization [6]. Among these infections, 32-50% are community-acquired, 25-41% are healthcare-associated, and 25-37% are nosocomial [7,8].

It is important to note that approximately 25% of patients with cirrhosis and bacterial infections develop secondary infections during hospitalization, which can further complicate the clinical course of these patients and lead to increased short-term mortality. The most common infections in patients with cirrhosis are spontaneous bacterial peritonitis (20–35%; SBP), urinary tract infections (14–41%), pneumonia (8–17%), spontaneous bacteremia (8–17%), and skin and soft tissue infections (6–13%) [9, 10].

Diagnosis of bacterial complications of cirrhosis is often difficult due to the erased clinical picture of the disease. Sometimes infectious complications appear only as an aggravation of hepatic encephalopathy. Simple and affordable screening tests for bacterial infection in liver cirrhosis include C-reactive protein and procalcitonin (>0.5 ng/mL) [11,12].

Procalcitonin (PCT) has been proposed in highly cited studies as a potentially valuable serum biomarker for diagnosing bacterial infections in general and SBP in particular [13].

PCT is potentially a more specific marker of bacterial infection. PCT is produced by almost all tissues in response to endotoxin or mediators released in response to bacterial infections [interleukin (IL)-1b, tumor necrosis factor-alpha and IL-6]. It strongly correlates with the

severity of bacterial infections and can help distinguish bacterial infections from viral infection or other non-infectious causes [14,15,16,17].

Early diagnosis of SBP may improve the prognosis [18], as it is difficult to treat in patients with decompensated cirrhosis due to the discrepancy between clinical symptoms and biochemical parameters of ascites [19,20]

PURPOSE OF THE STUDY

To study the clinical and biochemical characteristics of spontaneous bacterial peritonitis in liver cirrhosis of viral etiology.

MATERIALS AND METHODS

The total number of study patients participating in this study was 118 people. Group I (main group) – patients with liver cirrhosis who had spontaneous bacterial peritonitis (n=60); Group II - patients with liver cirrhosis who did not have spontaneous bacterial peritonitis (n=58).

The presence of cirrhosis was confirmed by liver elastometry. The diagnosis of SBP was confirmed by the detection of polymorphonuclear leukocytes (PMNs) in the ascitic fluid in an amount of at least 250/mm3 and a positive culture result with the identification of one bacterial strain.

The distribution by sex in the groups showed that in the first group of 60 patients, 38 (63.3%) were male and 22 (36.7%) female, and in the second of 58 patients 27 (46.55%) and 31 (53.4%) respectively (Fig. 3.1). It should be noted that SPB prevailed in males.

The average age index of sick men of the 1st group was 48.4±10.1 years, and women 43.1±14.8. The age indicators of patients of the 2nd group did not differ from the first and amounted to 45.5±10.1 and 52.1±13.07, respectively

To confirm the diagnosis of liver cirrhosis, its etiology, stage of compensation and complications, the clinical picture and anamnesis of the disease were studied, a complex of clinical and laboratory tests was carried out (determination of the activity of aspartate aminotransferase (AST), alanine aminotransferase (AlAT), alkaline phosphatase (AP), gamma-glutamyl transpeptidase (GGTP) , bilirubin, cholesterol, total protein, protein fractions, creatinine, urea, glucose, CRP in blood serum. All these indicators were also determined in AF and instrumental (ultrasound, elastography) diagnostic methods. To match the index of fibrosis and cirrhosis according to METAVIR, we used classification scale.

All patients underwent diagnostic laparocentesis upon admission, followed by counting the number of neutrophils in the AF and inoculation on culture media.

RESULTS AND DISCUSSION

To assess blood parameters in dynamics, blood was taken from a peripheral vein in all groups of patients studied by us, to determine such signs of liver cirrhosis as a decrease in the number of leukocytes and erythrocytes, a marked decrease in hemoglobin levels, as well as a decrease in the number of platelets as a result of a violation of the coagulation system (Tab . one.).

In patients with cirrhosis of the liver, not complicated by SBP (group II), the leukocyte count was slightly increased, amounting to 10.7 ± 4.75, in contrast to patients with cirrhosis of the liver, complicated by SBP (group I), in whom the leukocyte count was much more, amounting

to 14.9±53.37, which is evidence of a systemic inflammatory process in the body in group II patients. This phenomenon also explains the increase in ESR (16.9±11.44) in patients of the first group, which also indicated the development of an inflammatory process in the body, while in patients of the first group, the ESR values were in the range of 5.8±11.44 mm /h (Tab. 1.)

Hemogram parameters in patients with liver cirrhosis of viral etiology in comparison groups (M±m)

Table 1.

Indicators	Result	
	1st group	2nd group
Hemoglobin, g/l	93,3±6,3	107±5,7
Erythrocytes, x10^{12}	5,44±1,7	7,86±0,9
C/P	1,1±0,07	0,9±0,05
Platelets, x10^{9}	112,2±9,78	154,5±10,7*
Leukocytes,x10^{9}	14,9±2,6	4,7±0,8*
Stab neutrophils, %	10,6±1,9	3,1±1,8*
Segmented neutrophils, %	51,1±6,7	57,4±7,6
Myelocytes, %	5,3±1,1	1,6±0,4*
Eosinophils, %	3,7±1,3	2,4±1,04
Lymphocytes, %	27,3±5,2	32,3±4,5
Monocytes ,%	4,1±1,5	3,7±1,1
ESR mm/h	16,9±2,8	5,8±1,6*

Note: *- values are significant in relation to the control group ($p<0.05$)

The course of cirrhosis is associated with clinical manifestations of coagulopathy. The absence of specific symptoms that allow diagnosing changes in the hemostasis system at an early stage necessitates a laboratory study of coagulogram parameters in each patient. Most often in clinical practice, the determination of the number of platelets, prothrombin time, partial thromboplastin time is used.

When conducting a comparative assessment of the general blood test in the studied groups, a significant decrease in the number of platelets in the 1st group 112.2±9.78 by 1.38 times was revealed, compared with the 2nd group 154.5±10.7 ($p<0$ .05). A more significant decrease in the level of platelets in the 1st group is due, on the one hand, to an increase in their breakdown in the spleen against the background of portal hypertension and splenomegaly, on the other hand, to the destruction of platelets during immunological reactions and a decrease in the synthesis of thrombopoietin in the liver (Table 1)

There was also a significant increase in the number of leukocytes in patients with SBP (group 1) 14.9±2.6 by 3.17 times than in patients without SBP (group 2) 4.7±0.8 ($p <0.05$). In addition, the proportion of stab neutrophils 10.6±1.9 and myelocytes 5.3±1.1 in the 1st group exceeded

the values in the 2nd group 3.1±1.8 and 1.6±0.4 significantly more than 3 times ($p<0.05$). This is due to the fact that during acute bacterial infections, the amount of these elements in the blood increases dramatically, less mature cells may appear, and the leukocyte formula shifts to the left. Intensive destruction of mature neutrophils in tissues leads to active production of younger cells by the bone marrow. In the blood, the number of both the leukocytes themselves and a separate fraction - neutrophils (Table 1.)

Significant excess of mean values of ESR in patients with SBP (Group 1) 16.9±2.8 compared to patients without SBP (Group 2) 5.8±1.6 was 2.9 times ($p<0.05$). An increase in ESR can be explained by the fact that in the inflammatory process of bacterial etiology, an increase in the blood plasma of certain inflammatory proteins, such as fibrinogen, ceruloplasmin, and immunoglobulins, is characteristic. Some of these proteins attach to erythrocytes, therefore,

In patients with SBP (Group 1), when studying the mean values of total 70.2±7.1, bound 35.2±4.8, and unbound bilirubin 45.6±4.2, an increase from 2 to 2.5 times was revealed compared with patients without SBP (Group 2) 27.7 ±8.6, 14.9±6.4 and 22.75±7.1, respectively ($p<0.05$). An increase in total bilirubin is almost always associated with the presence of liver pathologies, direct - means a violation of the outflow of bile, indirect - indicates a high rate of death of red blood cells.

The ALT index in patients of the 1st group averaged 108.7±6.4, which exceeds the average values of the 2nd group 78.6±5.7 by 1.38 times ($p<0.05$). An increase in ALT activity in the blood indicates damage or destruction of cells enriched with the enzyme.

The indicators obtained as a result of the conducted studies indicate that cytolytic changes in the liver, determined by the activity of serum transaminases and the cholestatic component of the disease, were more pronounced in patients with SBP.

Hypoproteinemia is a pathological condition characterized by a decrease in plasma total protein concentration of less than 64 g/l. According to literary sources, the causes of this pathological condition may be dysfunction of the kidneys and liver. The clinical picture can be varied - from an asymptomatic course to the appearance of peripheral edema, effusion in the abdominal, thoracic, pericardial cavities, and increased susceptibility to infections.

As we already know, the main organ where the formation of almost all proteins of the human body occurs is the liver. With massive death of hepatocytes, the synthetic function of the organ, including protein formation, is disrupted. First of all, the albumin fraction decreases. Hypoalbuminemia, along with other indicators, is one of the criteria for assessing the severity of liver failure. Based on this, in the course of the study, we evaluated the concentration of protein fractions in both groups of patients.

In patients in whom cirrhosis of the liver proceeded with the development of complications in the form of the development of SBP (Group 1), in contrast to patients in whom cirrhosis of the liver proceeded without the development of complications in the form of SBP (Group 2), hypoalbuminemia was observed, the concentration of total protein in the blood in the first group of patients was in the range of 27.2 ± 2.3, while in patients of the second group this indicator was 31.2 ± 4.7, which was also lower compared to the second group of patients and indicated a decrease in protein-forming function in group I patients.

In addition, the mean values of the amount of fibrinogen in patients with SBP (Group 1) 0.73±0.14 were significantly lower by 3.83 times than in the group of patients without SBP

(Group 2) 2.8±0.8 (p<0.05). It should be noted that the level of fibrinogen in the 2nd group fluctuated within the minimum values. Hypofibrinogenemia develops due to a decrease in the synthesis of fibrinogen, its increased consumption, as well as increased destruction during the activation of the fibrinolysis process.

CONCLUSIONS

The indicators obtained as a result of the conducted studies indicate that cytolytic changes in the liver, determined by the activity of serum transaminases and the cholestatic component of the disease, were more pronounced in patients with SBP and a decrease in the protein-forming function of the liver.

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