

Approval of the Method of Treatment of Spontaneous Bacterial Ascite Peritonitis with Etiology of Liver Cirrhosis

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Abstract Spontaneous bacterial ascites peritonitis (SBAP) is one of the most serious complications of liver cirrhosis, requiring urgent intervention. This article reviews current treatment options for SBAP with an emphasis on the etiology of liver cirrhosis. The focus is on the etiology of the disease, diagnostic approaches, and key principles of medical and surgical therapy. The role of preventing recurrence of SBAP in patients with liver cirrhosis is also discussed. *Materials and methods:* Data on the examination and treatment of 126 patients with spontaneous bacterial ascites peritonitis of liver cirrhosis etiology, who were treated during 2020-2024 in the surgical department of the Bukhara branch of the Bukhara State Medical Institute, Department of Surgical Diseases, Clinical Base, Bukhara branch of the Republican Scientific Center for Emergency Medical Care, were analyzed. All patients were divided into 2 groups according to the treatment method: I-comparison group (n=68) included patients with spontaneous bacterial ascites peritonitis of liver cirrhosis etiology, whose results of traditional treatment were retrospectively analyzed. In the II main group (n=58) in the treatment of patients with complications of spontaneous bacterial ascites peritonitis due to liver cirrhosis, in addition to the active conservative method, the effect of the Ulinastatin drug and puncture methods were used comprehensively. *Conclusion:* The prognosis for patients with SBAP depends on many factors, including the degree of cirrhotic transformation of the liver, the speed of treatment initiation, age, and comorbidities. It is important to remember that if treatment is not timely or adequately provided, SBAP can lead to sepsis, multiple organ failure, and death. Modern approaches to the treatment of SBAP include early diagnosis, empirical antibacterial therapy, supportive care, and relapse prevention. However, despite advances in medicine, the task of improving treatment outcomes through personalized approaches and prevention of complications remains relevant.

Keywords Spontaneous bacterial ascites peritonitis, Liver cirrhosis, Treatment, Antibacterial therapy, Relapse prevention, Diagnostics

1. Introduction

Nowadays, worldwide, spontaneous bacterial ascites peritonitis (SBAP) is one of the complications of liver cirrhosis that can be encountered in many cases, but it is difficult to diagnose, and with its high mortality rate, it is one of the urgent problems of modern surgery. At the global level, the lack of correct and accurate diagnostic criteria for this pathology and the fact that a clear course of treatment has not been determined, causes the death rate to increase even more. Spontaneous bacterial ascites peritonitis with liver cirrhosis etiology is the damage of ascitic fluid by microorganisms, and it is a complication observed with the absence of an

obvious source of abdominal infection without breaking the anatomical integrity of the abdominal organs and requiring surgical treatment [2,14,20,40].

Liver cirrhosis is the main pathogenetic factor of spontaneous bacterial peritonitis, which is the transfer (translocation) of microorganisms from the intestinal cavity to local lymph nodes, lymph and blood flow. In addition, factors such as portal hypertension and increased intra-abdominal pressure, excessive development of microorganisms in the intestinal cavity, increased permeability of the intestinal wall, decreased local immune response, decreased phagocytic activity of the liver's reticulo-endothelial system, and decreased protective function of ascites fluid contribute to bacterial translocation. also causes [17,19,21,22].

The phenomenon of bacterial translocation can occur in healthy people without causing clinically significant

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consequences, but with the development of JTs, bacterial translocation increases significantly and is an important link in the pathogenesis of liver cirrhosis itself and its complications [8,10,15,32,39]. When physiological bacterial translocation is observed in people without problems with the immune system, it is eliminated by local immune systems [30,40]. This phenomenon makes it possible to stimulate the immune system in healthy people [27,29].

In patients with cirrhosis of the liver, the phenomenon of bacterial translocation increases the risk of rapid development of microorganisms in the body and leads to an increase in the systemic inflammatory response, which in turn leads to aggravation of portal hypertension with increased hemostasis and microcirculation disorders [1,12,15,31].

Overgrowth of bacteria in the intestinal cavity of patients with liver cirrhosis leads to a decrease in intestinal motility, hypochlorhydria when using proton pump inhibitors (PNI), impaired secretion of bile acids accelerates these processes [3,23,32].

Microorganisms overcome the barrier of the intestinal wall and encounter resident macrophages, which represent the first line of defense of the abdominal cavity. If macrophages fail to destroy colonizing bacteria, the complement system is activated and cytokines are released [4,29,35].

The involved neutrophils recognize and destroy these microorganisms. But in the conditions of liver failure and the development of the cirrhotic process, due to the failure of the reticuloendothelial system, neutrophil dysfunction is observed, which cannot stop the colonization of bacteria and leads to the development of infection.

The absence of clinical symptoms in patients does not exclude infection in ascitic fluid (AS). The diagnosis of SBP is based on counting the number of neutrophils in AS. The number of neutrophils in AS with microscopic examination methods is significant. The determination of the culture of microorganisms not only confirms the diagnosis, but also makes it possible to use antibiotics rationally [20,23].

Empirical appointment of antibacterial drugs, after clarification of the microorganism culture, use of narrow-spectrum antibiotics gives a clear result in the treatment of this pathology. Even a single dose of broad-spectrum effective antibiotics can reduce AS cultures by 86% after 6 hours. In these cases, it is very important to determine the characteristics of resistance of microorganisms [29,37].

Diagnosis of SBAP patients based only on objective clinical data, without bacteriological examinations of AS, is not considered sufficient in patients with JTs and ascites [23]. Of course, it is advisable to conduct a paracentesis in patients and make a diagnosis by identifying neutrophils and microorganisms in AS. However, some clinicians do not perform paracentesis in patients with coagulation disorders because of the risk of bleeding. Scientists emphasize the importance of an individual approach to paracentesis in patients with JTs [21,27]. Paracentesis is mandatory for all patients with primary ascites, as well as for patients with persistent ascites or hospitalization for any complications of JTs [25,41].

2. Purpose of the Research

For the purpose of paracentesis, a puncture of the abdominal wall is performed 2 cm below the navel, on the right or left costal edge of the mid-corinal line, 2-4 cm above the anterior upper costal transition and medially. If possible, paracentesis should be performed under the control of ultrasound examination, as this method helps to find the safest area for puncture, it is necessary that a sufficient amount of ascites fluid is collected in this area and there are no intestinal rolls or parenchymatous organs. This is especially important for patients who are overweight or have scars on the anterior abdominal wall after multiple surgeries [18,19,29].

The accuracy of calculating the total number of leukocytes and the number of neutrophils in the ascitic fluid is entirely related to the high level of expertise of the specialist conducting the research. In addition, the implementation of cell counting and differentiation in ascitic fluid requires very responsible and strict control [28,33]. In carrying out this research, special conditions should be created for the doctor.

3. Materials and Methods

Data on the examination and treatment of 126 patients with spontaneous bacterial ascites peritonitis of liver cirrhosis etiology, who were treated during 2020-2024 in the surgical department of the Bukhara branch of the Bukhara State Medical Institute, Department of Surgical Diseases, Clinical Base, Bukhara branch of the Republican Scientific Center for Emergency Medical Care, were analyzed.

All patients were divided into 2 groups according to the treatment method:

I-comparison group (n=68) included patients with spontaneous bacterial ascites peritonitis of liver cirrhosis etiology, whose results of traditional treatment were retrospectively analyzed.

In the II main group (n=58) in the treatment of patients with complications of spontaneous bacterial ascites peritonitis due to liver cirrhosis, in addition to the active conservative method, the effect of the Ulinastatin drug and puncture methods were used comprehensively.

It should be noted that this main group includes patients treated in 2023-2024. In addition, in order to maintain the synchronicity of the patient groups involved in our study, patients with the following additional conditions were excluded: severe liver failure, hepatic encephalopathy grade III, ascites resistant type, extrahepatic PG, older than 70 years, platelets below 50×10^9 , if the spleen size of patients is below 160 cm², additional cardiovascular diseases, patients with diabetes mellitus, cases with oncological and serious serious diseases were not included.

4. Results and Discussion

The comparison group of our study included 566 patients with ascites peritonitis of liver cirrhosis etiology who were treated in the Bukhara branch of the Bukhara State Medical

Institute during 2020-2022 and who underwent complex treatment using traditional methods. As a result of retrospective analysis, it was shown that 68 of these 566 patients received treatment for spontaneous bacterial ascites peritonitis on the background of liver cirrhosis.

Therefore, the results of a retrospective analysis of the examination and treatment data of 68 patients with spontaneous bacterial ascites peritonitis of liver cirrhosis etiology were included in this comparison group. The average age of the patients was 44.3 ± 1.1 years. Among the patients, there was a predominance of males - 22 people. In all cases, PG had the character of intrahepatic block, i.e., JC, the cause of which was viral infection in 91.3% of cases and alcoholic and autoimmune liver cirrhosis in 8.7%. The comparison group of patients was analyzed according to gender in the following order: men - 43 (63.2%), women - 25 (36.7%) patients (Table 1).

Table 1. Treatment of spontaneous bacterial ascites peritonitis distribution by gender and age

Age	Comparison group			
	Man		Women	
	abs	M \pm m,%	Abs	M \pm m,%
18-29 age	5	7,3	4	5,8
30-44 age	22	32,3	16	23,5
45-69 age	16	23,5	5	3,4
P	$\chi^2 = 1,625; p = 0,444$			
All	43	63,2	25	36,7
P	$\chi^2 = 5,586; p = 0,018$			

Among the patients of the comparison group, young people aged 21-45 years were also observed ($\chi^2 = 5.586; p = 0.018$).

When the causes of PG syndrome were studied in the patients of the comparison group, the results showed that in 85.2% ($\chi^2 = 88.172; p = 0.000$) cases, the cause was CVD caused by viral hepatitis. In addition, in 11.7% of cases, CVD was observed in autoimmune conditions, and in 2.9% of cases, patients with toxic CVD after alcohol abuse were observed (Table 2).

Table 2. Distribution of comparison group patients according to etiology of portal hypertension

Etiology	Comparison group		P
	abs	M \pm m,%	
Liver cirrhosis of viral etiology	58	85,2 \pm 3,69	$\chi^2 = 88,172; p = 0,000$
Autoimmune hepatitis	8	11,7 \pm 3,33	
Liver cirrhosis of toxic etiology	2	2,9 \pm 1,71	
Total	68	100 \pm 0,0	

Based on the analysis of the results of the complex examinations, the etiology of JC and the degree of liver damage were analyzed using the Child-Pugh classification (Table 3).

The amount of ascites fluid in the abdominal cavity was determined based on the criteria of the International Club of Ascites (ICA).

We studied the patients divided into the following groups depending on the amount of ascites fluid in the abdominal cavity (Pearson Chi-square = 1.059; $p = 0.589$) (Table 3).

In this comparison group, 26 (38.2%) patients had a Child-Pugh liver functional status of class B (7-9 points), and 42 (61.8%) patients had a Child-Pugh liver functional status of class C (10-15 points) ($\chi^2 = 13.517; p = 0.000$). It should be noted that patients belonging to class A (5-6 points) were not included in our scientific work due to the fact that SBAP was not observed and they were not included in the research tasks. Thus, initial liver failure in the stage of subcompensation and decompensation was detected in patients (Table 3).

Table 3. Distribution of patients according to the Child-Pugh classification

Child-Pugh classification	Comparison group		
	abs	M \pm m,%	P
Class V	26	38,2 \pm 5,75	$\chi^2 = 13,517; p = 0,000$
Class C	42	61,8 \pm 5,75	
Total	68	100 \pm 0	

Patients with spontaneous bacterial ascites peritonitis of liver cirrhosis etiology in the comparison group were divided into severity levels according to the diagnostic criteria proposed by us (see Chapter 2) in the following order (Table 4).

Table 4. Diagnostic criteria for spontaneous bacterial ascites peritonitis of liver cirrhosis etiology

Severity level	Points	Distribution of comparison group patients	%
1 – medium heavy degree	6 – 8	23	33,8
2 – severe level	9 – 14	24	35,2
All	15 -18	21	30,8
		68	100

Based on the data in Table 4, we divided the comparison group of patients into 3 categories. Based on the diagnostic criteria, 33.8% of patients were classified as moderate severity 1, 31.5% as severe 2, and 30.8% as critical 3, with symptoms ranging from 9 to 14 points.

In order to clarify the diagnosis of all patients on the day of admission, the anamnesis of the disease, objective and subjective data, as well as the results of laboratory and ultrasound examinations were used.

Table 5. Objective vision data of comparison group patients

№	Symptoms	Encounter indicator
1.	Sharp pains in the abdomen	42 (61,7%)
2.	Subfebrile body temperature	58 (85,2%)
3.	Increased pain in the abdomen during movements	42 (61,7%)
4.	Unrelieved nausea and vomiting	34 (50%)
5.	Abdominal front wall muscle tension	12 (17,6%)
6.	Mendelian syndrome	31 (45,5%)
7.	Voskresensky symptom	32 (47%)
8.	Shchyotkin — Blumberg's symptom	11 (16%)

Objective examination data of the patients are presented in Table 5.

As can be seen from Table 5, the main characteristic symptoms of patients with spontaneous bacterial ascites peritonitis of JC etiology were sharply increasing subfebrile body temperature in 58 (85.2%) patients, abdominal pain in 42 (61.7%), increased abdominal pain during movements in 42 (61.7%), nausea and dizziness without relief in 34 (50%) patients. The results of clinical and laboratory analysis of all admitted patients were reviewed and were reflected in the following indicators (Table 6). These data show that in the comparison group of patients with CHD, signs of hypersplenism can be seen due to the hemoglobin level in the blood test being less than 85.72 ± 0.47 g/l, the number of erythrocytes less than $3.77 \times 10^{12}/l$, the platelet count less than $78 \times 10^9/l$, and the spleen length being on average 16.1 cm (Table 6).

Table 6. Clinical laboratory parameters of patients in the comparison group

	Comparison group (n=68)	p
Mine albumin, g/l	$35,0 \pm 1,1$	0,505
Prothrombin index, %	$56,5 \pm 0,98$	0,146
Total bilirubin, $\mu\text{mol}/l$	$36,8 \pm 1,72$	0,954
ALT, AST, mmol/l	$65,4 \pm 1,11$	0,505
Urea, mmol/l	$9,8 \pm 0,36$	0,160
Creatinine, $\mu\text{mol}/l$	$188,5 \pm 4,23$	0,468
Fibrinogen, g/l	$2,25 \pm 0,2$	0,699
Erythrocyte, 10^{12} cells/l	$3,77 \pm 0,31$	0,360
Hemoglobin	$85,72 \pm 0,47$	0,78
Leukocyte, 10^9 cells/l	$3,61 \pm 0,22$	0,458
Platelet, 10^9 cells/l	$78 \pm 1,52$	0,160
Erythrocyte sedimentation rate, mm/s	$20,5 \pm 0,78$	0,603
Spleen length, cm	$16,1 \pm 1,3$	0,116

(- $P < 0,05$)

It should be emphasized that in order to maintain the synchrony of the groups, patients with ascites peritonitis of various etiologies, which can be observed in the JC, were not included in our study.

In order to establish an accurate differential diagnosis, all patients were first subjected to ultrasound examination, and if necessary, they were referred for X-ray and MSCT examinations based on indications. Bacteriological analyzes were performed to determine the etiological factor of SBAP.

All patients in the comparison group were clinically diagnosed based on the results of objective and laboratory analyzes performed on the day of admission. A treatment plan was drawn up, and infusion, detoxification therapy, and infusion of minerals and protein preparations were prescribed to maintain the balance of mineral salts and proteins in the body.

For bacteriological examination and determination of the sensitivity of microorganisms to antibiotics, samples of ascites

fluid were taken, and sensitivity to 20 types of antibiotics was determined.

Based on bacteriological analysis of ascites fluid collected in the peritoneal cavity of patients in the comparison group, *E. coli* was identified as the etiological factor in 89% of cases. *Proteus* and *Klebsiella* were the next most common microorganisms.

5. Conclusions

Bacterial overgrowth in the small intestine against the background of liver cirrhosis, bacterial translocation, spontaneous bacterial peritonitis, development of systemic inflammation in the body leads to polyorgan failure, Child-Pugh class V and C mortality rate is 24% ($r=0.002$).

In the comprehensive treatment of spontaneous bacterial ascites peritonitis caused by liver cirrhosis, the use of the drug ulinostatatin reduces the systemic inflammatory reaction in the body, stabilizes changes in the immune system, increases the ability to regenerate liver cells, and at the same time eliminates liver failure.

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