

Clinical Course of Liver Cirrhosis in Torch-infected Patients and the Possibility of Correction Using “Polyana Kvasova” Mineral Water

Przebieg kliniczny marskości wątroby u pacjentów z wywiadem infekcji z grupy TORCH i możliwość zastosowania wody mineralnej “Polyana Kvasova”

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SUMMARY

Aim: To investigate the peculiarities of clinical and laboratory changes in liver cirrhosis in TORCH-infected patients and their dynamics against the background of complex therapy with the use of Polyana Kvasova mineral water (MW).

Materials and Methods: 64 patients with alcohol-related LC were examined. The study was carried out in two stages. At the 1st stage, the examined patients with LC were divided into two groups depending on the presence or absence of TORCH infections to determine the characteristics of the clinical course of LC in these patients. Group I included patients with LC (n=30), who were not diagnosed with TORCH infection, and group II included patients with LC who tested positive for antibodies to infections of the TORCH group (n=34). The data of patients of group II were divided into two subgroups, depending on the treatment performed. Patients of subgroup IIA (n=16) received only basic therapy (BT), and patients of subgroup IIB (n=18) were additionally prescribed 100 ml of warm, still carbonated bicarbonate-sodium Polyana Kvasova mineral water (MW), 15-20 minutes before meals 6 times a day. The duration of the treatment and observation of patients at the second stage of the study was 1 month.

Results: In patients with LC of group II, signs of jaundice, pain and dyspeptic syndromes were statistically significantly more often detected - $p < 0.05$. In group II of patients with LC, a more pronounced, statistically significant increase in the indicators of cholestatic syndrome. A more significant reduction in the manifestations of dyspeptic and pain syndrome, as well as the severity of jaundice, was observed in LC patients of the IIB subgroup who, in addition to BT, were prescribed Polyana Kvasova MW. A significant decrease in laboratory markers of cholestatic syndrome was established (TBIL level by 20.0 ± 0.6 mmol/L; ALP by 84.0 ± 1.8 IU/L, GGT by 48.7 ± 1.5 U/L) in the subgroup of patients, who in addition to BT were prescribed MW.

Conclusions: 1. In TORCH-infected patients, alcohol-related liver cirrhosis is more often detected at the stage of subcompensation (class C according to Child-Pugh) and is clinically detected by signs of dyspeptic and pain syndromes, as well as laboratory manifestations of cholestatic syndrome and jaundice syndrome. 2. The use of Polyana Kvasova MW as part of the complex therapy of patients with alcohol-related liver cirrhosis in combination with TORCH infection is a pathogenetically based and safe method for reducing the severity of dyspeptic and pain syndromes, as well as clinical and laboratory signs of jaundice in these patients.

Key words: liver cirrhosis, TORCH-infections, treatment, mineral water

Słowa kluczowe: marskość wątroby, infekcje TORCH, leczenie, woda mineralna

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INTRODUCTION

The term TORCH-infections was first proposed by Andres Nahmias in 1971, to include infections, both bacterial and viral, capable of causing damage to the fetus and the newborn. This group of pathogens includes: T – *Toxoplasmosis*; O – Other (*syphilis, tuberculosis, chlamydia, listeriosis, urea* and

mycoplasmosis, viral hepatitis A, B, papillomavirus infection, HIV infection, HP – Helicobacter pylori and many others); R – *Rubella*; C – *Cytomegalovirus (CMV)*; H – *Herpes simplex virus (HSV)*. The list of Other diseases, as a component of the TORCH complex, is increasingly expanding. TORCH infections have the ability to replicate in all cells of the body (in endothelium,

epithelial and nerve cells, leukocytes, monocytes, fibroblasts and macrophages). It should be noted that these "delicate" infections can persist in the human body for years, and sometimes even decades, without showing any specific symptoms, provoking damage to organs and systems of the body, which can be diagnosed only when the patient seeks medical care for another disease or accidentally [1].

Acute liver decompensation is the main cause of hospitalization in patients with liver cirrhosis (LC), and it has been defined as the rapid development of at least one clinical complication between ascites, hepatic encephalopathy, gastrointestinal haemorrhage and bacterial infection. One of the keys to adequate management of hepatic decompensation is the prompt identification of its precipitating event, if any. This can be a direct liver injury (ie, a binge causing alcoholic hepatitis, drug-induced liver toxicity, superimposed viral hepatitis, portal vein thrombosis, ischaemia) or the consequence of systemic insults such as surgery, variceal bleeding or infection. In a significant proportion of patients (up to 43% of more severe cases), the precipitant factor remains undetected [2].

TORCH infections most often affect the central nervous system, organs of the visual system, reticuloendothelial system, very often the liver, especially in patients with weakened immunity. Toxoplasma infection can primarily be accompanied by liver damage. Among the manifestations of toxoplasmosis, persistent hepatomegaly is most often detected; IgM antibodies are detected in the blood, the content of total bilirubin and the activity of transaminases increase. At the same time, there is often lymphadenopathy, fever, and leukocytosis [1]. In young children, TORCH-induced lesions prevail in the structure of viral hepatitis, with cytomegalovirus (cytomegalovirus, CMV) hepatitis having the largest share. There is an opinion that CMV hepatitis plays a leading role in the genesis of biliary atresia [3].

Therefore, the persistence of TORCH infection in patients with liver damage can aggravate the clinical course of the disease, as well as provoke the formation/progression of complications, especially in liver cirrhosis. The search for alternative treatment regimens to reduce the severity of clinical signs of the combined course of TORCH infection and LC is a relevant and highly demanded method of treating these patients.

AIM

The aim is to investigate the peculiarities of clinical and laboratory changes in liver cirrhosis in TORCH-infected patients and their dynamics against the background of complex therapy with the use of Polyana Kvasova mineral water (MW).

MATERIALS AND METHODS

64 patients with alcohol-related cirrhosis were examined at the clinical base of the Department of Propedeutics of Internal Diseases of the Medical Faculty of Uzhhorod University (Gastroenterology and Surgery department of the Municipal Non-Profit Enterprise "Transcarpathian Regional Clinical Hospital named after Andrii Novak" of Transcarpathian Regional Council, patients who underwent a routine examination at the Municipal Non-Profit Enterprise "Uzhhorod City Maternity Hospital" of Uzhhorod

City Council, and were also under outpatient observation at a family doctor at their place of residence) in 2019-2022. All the examined patients were female, the average age was 46.5 ± 8.3 years. The control group included 20 practically healthy women whose average age was 45.3 ± 6.1 years.

All studies were performed with the consent of the patients, and the methodology was in accordance with the Helsinki Declaration of Human Rights of 1975 and its revision of 1983, the Council of Europe Convention on Human Rights and Biomedicine, and the legislation of Ukraine.

All patients were examined using anthropometric, general clinical, laboratory and instrumental research methods. The severity of LC was assessed according to the Child-Turcotte classification in the modification of Pugh (1973), taking into account the level of bilirubin, albumin, prothrombin index and the presence or absence of ascites and hepatic encephalopathy. All patients underwent a 13C-methacetin breath test (13C-MBT) to determine the degree of liver damage. Breath samples were analyzed on an infrared spectroscope IRIS (IZINTA, Hungary). With the help of 13C-MBT, the functioning hepatocyte mass (FHM) was determined in each examined patient. FHM 100% indicates normal liver function; FHM 50-100% indicates a moderate decrease in liver function (Child A); FHM 20-50% indicates a pronounced decrease in liver function (Child B); FHM <20% indicates a severe decrease in liver function (Child C). The sensitivity and specificity of 13C-MBT is high and is more than 99%.

The levels of IgM and IgG antibodies to TORCH group infections (to rubella, to herpes type 1/2, to toxoplasma, to cytomegalovirus) were determined in the examined patients prior to the comprehensive treatment using an immunoenzymatic analysis. Screening for Hepatitis B virus and Hepatitis C virus were also conducted (Patients who tested positive were excluded from this study).

The study was carried out in two stages. At the 1st stage, the examined patients with LC were divided into two groups depending on the presence or absence of TORCH infections to determine the characteristics of the clinical course of LC in these patients. Group I included patients with LC (n=30), who were not diagnosed with TORCH infection, and group II included patients with LC who tested positive for antibodies to infections of the TORCH group (n=34).

In the second stage of the study, only patients with LC were selected, who had antibodies to TORCH infections (group II, n=34). The provision of medical care to patients with LC was carried out in accordance with the clinical treatment protocol of the Ministry of Health of Ukraine dated 13.06.2005 No. 271. The patients received basic therapy (BT) against the background of alcohol refusal, diet, basic LC treatment, which was selected individually, taking into account the degree of severity of the pathological process, as well as the presence or absence of relevant complications. Basic therapy included the prescription of hepatoprotectors (essential phospholipids, amino acid preparations), detoxification and vitamin therapy (group B vitamins), diuretics (spironolactone, furosemide), enterosorbents, lactulose, β -blocker (propranolol) in individual

dosage. The data of patients of group II were divided into two subgroups, depending on the treatment performed. Patients of subgroup IIA (n=16) received only BT, and patients of subgroup IIB (n=18) were additionally prescribed 100 ml of warm, still carbonated bicarbonate-sodium Polyana Kvasova mineral water (MW), 15-20 minutes before meals 6 times a day. The duration of the treatment and observation of patients at the second stage of the study was 1 month.

The analysis and processing of the results of the examination of patients was carried out by the computer program Statistics 10.0 (StatSoftInc, USA) for Windows, using parametric and non-parametric methods of evaluating the obtained results.

RESULTS

During the examination of patients with LC of both groups, signs of asthenovegetative, pain, dyspeptic syndromes and jaundice syndrome were revealed, which manifested as complaints of general weakness, headache, sleep disturbances, rapid fatigue, memory decline, pain and discomfort in the upper abdomen (mainly on the right), swelling and increase in the size of the abdomen, nausea, vomiting, loss of appetite, weight loss, feeling of bitterness in the mouth, yellowness of the sclera and skin, itching of the skin in Figure 1.

In patients with LC of group II, signs of jaundice, pain and dyspeptic syndromes were statistically significantly more often detected – p<0.05.

The analysis of the results of laboratory indicators of blood serum revealed an increase in the activity of transaminases (alanine aminotransferase (ALT), aspartate aminotransferase (AST), gamma-glutamyltransferase (GGT), as well as the level of total bilirubin (TBIL) and alkaline phosphatase (ALP) (Table 1).

In group II of patients with LC, a more pronounced, statistically significant increase in the indicators of cholestatic syndrome (TBIL, ALP, GGT) and transaminases in blood serum was established, compared to patients of group I (patients with LC who are not carriers of TORCH infection).

After analyzing the results of clinical and laboratory-instrumental examination methods, the patients were divided according to degrees of severity according to the Child-Pugh classes (Figure 2).

Among the patients of group I, there was a preponderance of patients with Child-Pugh class A of LC (compensation stage), namely – 56.7%, and among the II group examined

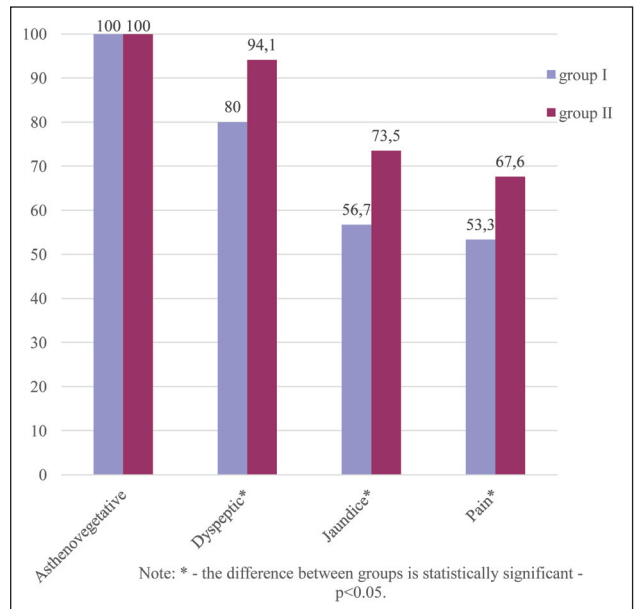


Figure 1. Frequency of detection of clinical syndromes in the examined patients (%)

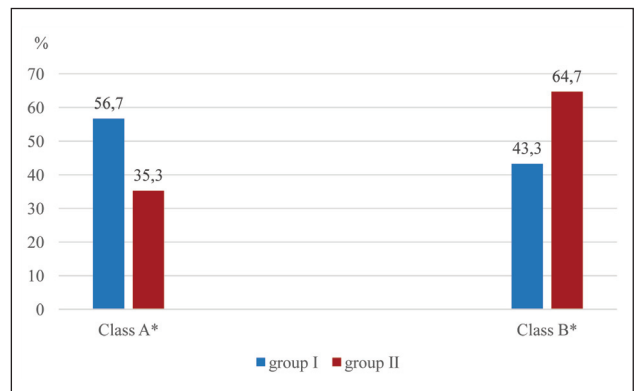


Figure 2. Distribution of the examined patients with liver cirrhosis according to Child-Pugh classes

Note: the difference between indicators in patients I and II is significant: * – p<0.01.

patients with Child-Pugh class B of LC (subcompensation stage) – 64, 7% (p<0.01).

Therefore, the persistence of TORCH infection in patients with alcohol-related LC contributes to a more severe course of liver damage according to the results of general clinical examinations.

Table 1. Changes in blood laboratory indicators in the examined patients with liver cirrhosis

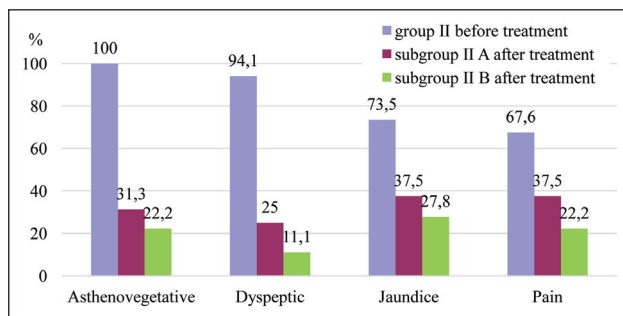
Indicator	The examined patients		
	Control group (n=20)	Patients with liver cirrhosis	
		group I (n=30)	group II (n=34)
ALT (U)	27.4±2.0	68.3±3.2**	74.8±1.3**
AST (U)	31.4±7.2	71.7±2.8**	91.2±7.7**,+
TBIL (mmol/L)	12.7±1.7	28.4±1.1*	39.7±0.6**,+
ALP (IU/L)	67.3±5.5	129.8±2.2**	168.1±0.9**,+
GGT (U/L)	32.8±1.1	72.7±1.6**	96.5±1.2**,+

Note: significant difference between indicators of the control group and patients with LC: * – p<0.05, ** – p<0.01; + - the differences between the specified parameter in patients of the I and II groups are significant (p<0.05).

Table 2. Dynamics of blood laboratory indicators in the examined LC patients of group II following treatment

Indicator	The examined patients		
	group II (n=34) before treatment	after treatment	
		subgroup IIA (n=16)	subgroup IIB (n=18)
ALT (U)	74.8±1.3	439±2.5*	44.9±1.8*
AST (U)	91.2±7.7	61.9±1.7*	58.2±3.1*
TBIL (mmol/L)	39.7±0.6	27.9±2.0*	19.7±1.2**,+
ALP (IU/L)	168.1±0.9	112.7±2.5*	82.1±2.7**,+
GGT (U/L)	96.5±1.2	63.6±2.0*	47.8±2.7*,+

Note: the significant difference between indicators in LC patients with after treatment is significant: * – $p < 0.05$, ** – $p < 0.01$; + – the differences between the specified parameter in patients with subgroups IIA and IIB after treatment are significant ($p < 0.05$).

**Figure 3.** Dynamics of clinical syndromes in the examined patients of group II after treatment (%)

In the data of patients (group II), the decompensation of the cirrhotic process occurs more quickly, the signs of cytolytic and cholestatic syndromes are more pronounced, which indicates the progression of damage to the liver parenchyma, and an increase in the load on the biliary system.

The results of the treatment (according to the second stage of the scientific study) indicate a decrease in the severity of clinical symptoms on the background of a decrease in the activity of cytolytic, cholestatic syndromes and jaundice syndrome (Figure 3 and Table 2).

A more significant reduction in the manifestations of dyspeptic and pain syndrome, as well as the severity of jaundice, was observed in LC patients of the IIB subgroup who, in addition to BT, were prescribed Polyana Kvasova MW. They noted a decrease in the intensity of pain sensations, discomfort in the right hypochondrium already at the end of the 1st week of complex treatment, while in patients of the IIA subgroup, a decrease in clinical symptoms was noted only in the 2nd-3rd week of treatment.

A significant decrease in laboratory markers of cholestatic syndrome was established (TBIL level by 20.0 ± 0.6 mmol/L; ALP by 84.0 ± 1.8 IU/L, GGT by 48.7 ± 1.5 U/L) in the subgroup of patients, who in addition to BT were prescribed Polyana Kvasova MW.

Therefore, the additional inclusion of Polyana Kvasova MW in the complex treatment in patients with alcohol-related LC in combination with TORCH infection is an effective method for reducing the severity of clinical symptoms, as well as laboratory findings indicating damage to the biliary system of these patients.

DISCUSSION

The life cycles of TORCH agents are different from each other, and the TORCH infections are believed to have lifelong influences. For CMV infection, lifelong latency is established after acute infection in infected hosts. The natural cycle of initial infection is related to an increased IgG level and decreased IgM level, while women with IgG-seropositive CMV infection could not be absolutely protected against reactivation or reinfection of the same pathogen [4]. Most studies have focused only on the effects of TORCH infection during pregnancy, and many observations have shown that TORCH infection is responsible for several adverse prenatal and neonatal events, including miscarriage, malformations, and neurodevelopmental abnormalities. However, insufficient attention has been paid to the study of a special group of patients, specifically the study of the impact of TORCH infection on the mother's body before and after pregnancy. At the same time, the issue of the impact of TORCH infections on the host's body when the immune response is weakened, including liver cirrhosis, is particularly relevant.

Research shows that persistence of cytomegalovirus infection and toxoplasmosis is associated with damage to the liver and biliary tract, which is often clinically manifested by jaundice and hyperbilirubinemia [5]. The results of our observations indicate a higher frequency of signs of cholestatic syndrome (hyperbilirubinemia, increased levels of alkaline phosphatase, gamma-glutamyltransferase) in LC patients, with confirmed antibodies to TORCH infection. At the same time, in this category of patients, LC is more often detected at the stage of subcompensation (class B according to Child-Pugh). Also, this group of examined patients had more pronounced clinical signs of LC (dyspeptic manifestations, pain syndrome and jaundice).

The use of Polyana Kvasova MW as part of the complex treatment of patients with LC and TORCH infection is a pathogenetically based and effective method for this category of patients due to its therapeutic properties. It is believed that sodium bicarbonate waters have a universal effect on the body [6]. Sodium hydrogen carbonate MW is a natural buffer solution based on the bicarbonate buffer system ($\text{HCO}_3^-/\text{CO}_2$ or $\text{HCO}_3^-/\text{H}_2\text{CO}_3$). This system is one of the three main buffer systems of the body and accounts for about 53% of the buffer capacity of all buffer systems of human whole blood. Polyana Kvasova mineral water is carbonated (1681 mg/L), of medium

mineralization (10.6 g/L), sodium bicarbonate, with an increased content of boron (in the form of metaboric acid) (0.195 g/L) and biologically active doses of fluorine (0.002 g/L). It has a slightly alkaline pH of 6.8, a high buffering and neutralizing capacity (81 mmol/L and 105 mmol/L, respectively), and the HCO₃⁻ content of 7076 mg/L [7- 9].

Due to its remarkable antacid and buffering properties, Polyana Kvasova MW is an efficient remedy for diseases of the stomach with increased acidity, reflux esophagitis, accompanying changes in the form of cholestasis and pancreatostasis, as well as for chronic pancreatitis, hepatosis, hepatitis, and diabetes. Internal intake of MW increases the adaptive and compensatory capabilities of the body [6, 8]. When choosing a drinking MW regimen, the level of free carbon dioxide, and water temperature should be taken into account, as well as the purpose for which MW is prescribed, and the functional state of the digestive organs. The higher the water temperature, the higher its pH – from 6.5 to 7.0 on average. In the same way, pH increases with removing carbon dioxide from MW by storing it in open containers.

The obtained results indicate the safety and efficiency of the course of Polyana Kvasova MW as part of complex therapy for patients with LC and TORCH infection, which contributes to a more pronounced reduction of clinical signs of the disease already in the early stages of the treatment, as well as to the improvement of laboratory blood parameters. It should be noted that no side effects from the complex treatment prescribed by us have been established in these patients, which is significant in the combination of liver damage and persistence of TORCH infection.

CONCLUSIONS

In TORCH-infected patients, alcohol-related liver cirrhosis is more often detected at the stage of subcompensation (class C according to Child-Pugh) and is clinically detected by signs of dyspeptic and pain syndromes, as well as laboratory manifestations of cholestatic syndrome and jaundice syndrome.

The use of Polyana Kvasova MW as part of the complex therapy of patients with alcohol-related liver cirrhosis in combination with TORCH infection is a pathogenetically based and safe method for reducing the severity of dyspeptic and pain syndromes, as well as clinical and laboratory signs of jaundice in these patients.

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Conflict of interest:

The Authors declare no conflict of interest

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