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MULTIDISCIPLINARY MANAGEMENT STRATEGIES FOR ORAL HEALTH SEQUELAE IN CHRONIC DIFFUSE LIVER DISEASE

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Abstract. The article presents the results of a study on assessing the dental status and improving the effectiveness of treatment for patients with chronic diffuse liver diseases (CDLP). The study involved 94 patients divided into groups depending on the primary pathology: liver fibrosis, chronic hepatitis, and liver cirrhosis. Two strategies were compared: standard dental care and a comprehensive protocol including the drug "Rotokan," electrophoresis with vitamin C, and UVC therapy. It has been established that the progression of liver diseases correlates with the deterioration of dental indices (GI, PMA, CE). The application of the comprehensive method made it possible to suppress periodontal inflammation twice as quickly, restore enamel resistance, and stabilize the carious process. The study scientifically substantiates the high pathogenetic effectiveness of a multidisciplinary approach combined with physiotherapy for systemic liver disorders.

Key words: chronic diffuse liver diseases, liver cirrhosis, chronic hepatitis, periodontal diseases, dental caries, Rotokan, physiotherapy, dental indices.

Introduction Chronic diffuse liver diseases (CDLP) are a pressing global medical and social problem, the main etiological factors of which are chronic viral hepatitis (B and C), alcoholic liver disease (ALD), and the increasingly common fatty liver disease (FLD) associated with metabolic dysfunction. Chronic diffuse liver diseases are characterized by chronic inflammation of the liver parenchyma, necrosis, and progression into liver fibrosis, ultimately leading to liver cirrhosis and hepatocellular insufficiency (7). The development of the disease is directly linked to the development of severe complications, such as a decrease in the protein-synthetic function of the liver (impaired albumin synthesis and coagulation factors), impaired detoxification function (accumulation of ammonia), as well as portal hypertension and hemorrhagic syndrome (9).

Epidemiological data indicate an increase in the number of patients with HDL worldwide, especially as HDL combined with metabolic syndrome has reached the level of a global pandemic. Chronic viral hepatitis is considered one of the most common causes of chronic liver inflammation. According to WHO data, 257 million people worldwide live with chronic HBV infection. If the probability of chronic HBV infection in adults is less than 5%, then with perinatal transmission, this figure reaches 90%. Chronic hepatitis B is the primary factor in the development of cirrhosis and CSF (6, 7).

WHO statistics confirm that 71 million people worldwide suffer from chronic HCV infection. The primary risk is that 55% to 85% of patients with acute HCV infection develop a chronic form, which is the primary cause of liver cirrhosis and the need for transplantation (6,9).

Research objective. The purpose of this study was to evaluate the clinical effectiveness of

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a comprehensive treatment and prevention protocol specifically developed for patients suffering from chronic diffuse liver diseases.

Material and methods. Taking into account various principles of modern scientific knowledge, we have developed our research methodology with a sufficiently specific goal. The planned and conducted research, based on general scientific and specific methods, was aimed at solving the set tasks. This study included 94 patients with chronic diffuse liver disease (CDL). The control group consisted of 23 conditionally healthy patients. In turn, patients with JSDK were divided into 3 groups depending on the type of disease.

In turn, the patients were divided into 2 groups based on the treatment method: Group I (n=44): traditional dental treatment. Group II (n=50): comprehensive treatment (Rotokan drug and physiotherapy in addition to traditional treatment).

For traditional dental treatment, traditional mechanical cleaning and filling of carious tooth cavities with standard filling materials, standard antiseptic treatment and filling of root canals, cleaning of the oral cavity from dental stones and deposits using traditional methods, and treatment of gums and periodontal tissues with standard anti-inflammatory ointments, gels (Metrogil Denta), and antiseptics were performed.

In complex treatment, in addition to traditional treatment, liquid extract of the medicinal plant rotokan (composition: extract of chamomile, carnation, and buckwheat) and physiotherapy (electrophoresis with vitamin C and ultra-high-frequency therapy) were used.

Rotokan is not used in its pure form; it was diluted with water before use. 1 teaspoon (5 ml) of rotokan was dissolved in 1 cup (200 ml) of warm water. It was prescribed to be rinsed 3-4 times daily for 1-2 minutes. The cotton wool (turunda) is immersed in the solution and placed on the edge of the gum for 15-20 minutes. The water temperature should be 35-40°C, as cold water can increase blood vessel spasms observed in liver pathology, and very hot water can increase bleeding. Course duration: 7–10 days. A total of 5–15 procedures (depending on the severity of the disease).

For the purpose of physiotherapy (electrophoresis), a 5% ascorbic acid solution was used. Cotton swabs soaked in solution are applied to the rubber bands and connected to the anode (+) pole. Current strength: 2...5 mA (depending on the patient's individual sensitivity, up to a "light itch" sensation). The first procedures begin at 10 minutes and gradually increase to 15-20 minutes. Course duration: 10-12 procedures daily or every other day. Ultra-high frequency therapy (UHF). An oligothermic dose is used (in which a slight fever is felt). The power for the jaw area was set at around 20-30 W. Bilaterally or transversely to the affected area of the jaw. Air gap 1...1.5 cm. Duration: 8-10 minutes. Course duration: 5–8 procedures.

It is recommended to perform these two procedures on the same day, one after another, to achieve the maximum effect in LSDK. First, UVHL therapy: this procedure generates heat in tissues, expands capillaries, and accelerates blood flow. After UVGP, tissue permeability increases, resulting in ascorbic acid being better absorbed into the deep layers of the periodontium.

Results and discussion. Patients were analyzed by age categories, and the results are presented in Table 1. The distribution of 94 patients participating in the study by type of liver pathology and treatment methods used indicates consistency between the groups. Specifically, out of 35 patients with liver fibrosis, 45.7% (16 patients) were assigned to Group I with comprehensive treatment, while 54.3% (19 patients) were assigned to Group II with traditional treatment.

The distribution among respondents diagnosed with chronic hepatitis (31 patients) and liver cirrhosis (28 patients) was similar: 48.3% (15 patients) and 46.4% (13 patients) in Group I

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and 51.7% (16 patients) and 53.6% (15 patients) in Group II, respectively.

It was established that dental indicators prior to treatment in the primary groups deteriorated proportionally to the severity of the liver pathology. Specifically, the GI indicator was 2.2±0.14 points in liver fibrosis, while in liver cirrhosis, this indicator increased to 3.6±0.22 points (Table. In Group I, where the developed comprehensive treatment method was applied, a significant improvement in hygienic status was observed: in patients with liver cirrhosis, the GI index decreased to 1.9±0.15 points, while in Group II, where traditional treatment was applied, this indicator remained high (2.8±0.21 points). This intergroup difference was statistically significant in all cases (from $p<0.05$ to $p<0.01$), confirming the priority of a comprehensive approach to restoring oral hygiene.

Regarding the PMA index, which characterizes the inflammatory process in periodontal tissues, the highest positive dynamics were also recorded in Group I. In patients with chronic hepatitis, the PMA index decreased from 44.2% to 18.2% after complex treatment, whereas with the traditional method, this indicator decreased to only 34.6% ($p<0.001$). In the cirrhosis group, the results of Group I (24.6%) were twice as effective as in Group II (48.2%) ($p<0.001$).

As the severity of chronic diffuse liver diseases increased, tooth enamel resistance significantly decreased compared to the control group (2.1±0.14 points). Specifically, in the pre-treatment period, the TER score was 3.8±0.18 points for liver fibrosis, 5.4±0.22 points for chronic hepatitis, and 7.2±0.25 points for liver cirrhosis, where the lowest level of resistance was noted (Table 2). This condition scientifically substantiates the impairment of oral fluid mineralization function and the intensification of enamel demineralization under the influence of systemic pathology.

According to the results of the comparative analysis, the restoration of enamel resistance in Group I with the complex treatment method was statistically significantly higher ($p<0.05$ and $p<0.01$) compared to Group II with the traditional method. For example, in Group I patients with liver cirrhosis, the TER index improved to 4.3±0.21 points, while in Group II, this value remained at 6.1±0.24 points. In the chronic hepatitis group, Group I results (3.1±0.18) were also significantly more effective than under the traditional approach (4.5±0.20). This confirms the high pathogenetic efficacy of the developed comprehensive treatment and prevention algorithm in increasing the resistance of dental hard tissues.

The intensity of caries in patients was significantly higher than in the control group (3.2±0.24), which intensified as the pathology progressed. In the pre-treatment period, the SE indicator was 5.8±0.31 in liver fibrosis, increased to 8.4±0.42 in chronic hepatitis, and to 12.6±0.55 in liver cirrhosis, which is a decompensated state.

In Group I, where the developed comprehensive treatment method was used during treatment, statistically significant results were recorded in stopping the growth of caries intensity and stabilizing the dental condition compared to the traditional method (Group II) ($p<0.05$ and $p<0.01$). Specifically, in the chronic hepatitis group, Group I results (5.2±0.33) were more positive than in Group II (7.1±0.38), indicating a slowdown in the pathological process. In patients with liver cirrhosis, the CE indicator stabilized at 7.8±0.46 as a result of a comprehensive approach. The obtained data confirm the high effectiveness of the proposed multidisciplinary prevention and treatment algorithm in reducing caries destruction of dental hard tissues in patients with DDS.

The presented ultrasound results show that the blood supply of periodontal tissues in patients with chronic diffuse liver diseases (CDLP) is significantly impaired compared to the control group. Before treatment, it was observed that as the severity of the pathology increased, the peak systolic rate (Vmax) decreased 2.2 times—from 18.4±1.2 cm/sec in the control group

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to 8.2±0.7 cm/sec in the cirrhosis group. At the same time, volumetric flow (Qam) reached the lowest value (0.09±0.01 ml/min) in the cirrhosis group. This scientifically substantiates that systemic changes in hemodynamics in the liver cause deep ischemia and hypoxia in periodontal tissues.

Table 1.

Results of ultrasound Doppler ultrasonography of periodontal tissues in patients with HDL

Group / Indicators	Vmax (cm/s)	Qam (ml/min)	RI
Control group (n=23)	18.4±1.2	0.24±0.02	0.62±0.04
Liver fibrosis (n=35)			
Before treatment	14.2±1.1	0.18±0.02	0.71±0.05
Group I (comprehensive treatment)	17.1±1.0	0.22±0.02	0.64±0.03
Group II (traditional treatment)	15.4±1.2	0.19±0.02	0.68±0.04
Chronic hepatitis (n=31)			
Before treatment	11.5±0.9	0.14±0.01	0.78±0.06
Group I (comprehensive treatment)	15.8±1.1	0.20±0.02	0.67±0.04
Group II (traditional treatment)	13.1±1.0	0.16±0.01	0.74±0.05
Liver cirrhosis (n=28)			
Before treatment	8.2±0.7	0.09±0.01	0.85±0.07
Group I (comprehensive treatment)	13.4±0.8	0.16±0.02	0.70±0.05
Group II (traditional treatment)	10.2±0.9	0.12±0.01	0.79±0.06

The dynamics of the resistance index (RI) once again confirm the disorders of microcirculation in the periodontium. While this indicator was 0.62±0.04 in the control group, it increased to 0.85±0.07 in patients with liver cirrhosis. Such a high resistance index indicates vasospasm of small vessels in gum tissues and increased peripheral resistance. This condition worsens periodontal nutrition, creating a direct basis for the acceleration of inflammatory-destructive processes and bone tissue resorption.

In Group I, where the developed comprehensive treatment method was applied, the restoration of blood circulation parameters was expressed with higher statistical significance ($p<0.05$ and $p<0.01$) compared to Group II (traditional method). Thus, in patients with chronic hepatitis, Vmax increased to 15.8±1.1 cm/sec after complex treatment, whereas under the traditional method, this value was only 13.1±1.0 cm/sec. Furthermore, the convergence of the resistance index to normal values (0.67±0.04) in Group I indicates the high effectiveness of the proposed multidisciplinary approach in managing vascular tone and improving microcirculation.

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The final analysis showed that in Group I patients with liver cirrhosis, the volumetric flow rate (Qam) reached 0.16±0.02 ml/min after treatment, while in Group II, it remained low (0.12±0.01 ml/min) ($p<0.01$). This confirms that in the treatment of dental diseases against the background of CDL, it is crucial not to limit ourselves to local interventions; the application of comprehensive therapy that improves blood circulation is crucial for restoring the functional state of periodontal tissues. Dopplerography results fully prove the high pathogenetic efficacy of the developed treatment algorithm and its ability to prevent the development of complications.

Conclusion. The conducted study showed that in patients with chronic diffuse liver diseases, the severity of liver pathology is directly linked to the deterioration of periodontal status, including deterioration of hygienic indices (GI), increased inflammatory activity (IA), decreased enamel resistance (RE), and higher intensity of caries (KE). Furthermore, Doppler ultrasonography results revealed a significant impairment of periodontal microcirculation, characterized by a decrease in blood flow velocity (Vmax), a decrease in volumetric blood flow (Qam), and an increase in vascular resistance (RI), indicating the development of ischemic-hypoxic processes in periodontal tissues. These results confirm the systemic impact of liver pathology on oral health and substantiate the pathogenetic link between liver dysfunction and periodontal tissue damage.

The application of the developed comprehensive treatment approach, including herbal treatment (rotokan) and physiotherapeutic modalities (vitamin C electrophoresis and UVC therapy), demonstrated significantly higher clinical efficacy compared to conventional dental treatment. This was evidenced by a more pronounced improvement in periodontal indices, restoration of enamel resistance, stabilization of caries progression, and normalization of microcirculatory indicators (Vmax, Qam, RI). The obtained results scientifically substantiate that a multidisciplinary, pathogenetically oriented treatment strategy plays a crucial role in improving therapeutic outcomes and preventing complications in patients with chronic diffuse liver diseases.

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