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CLINICAL EFFICIENCY OF MINERAL WATERS IN COMPLEX TREATMENT OF NON-ALCOHOL FATAL DISEASE LIVER

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Abstract

The article presents an experimental substantiation of the efficiency of the use of boric carbon dioxide hydrocarbonate sodium mineral water of average mineralization in rats with a model of non-alcoholic fatty liver disease. As a result of the experimental research, improvement of the morphological picture of the liver under the influence of the course drinking of mineral water has been proved. During clinical studies there was an improvement in the clinical course of the disease, the restoration of the functional state of the liver, a decrease in signs of dyslipidemia and insulin resistance, and a decrease in the level of leptin.

Key words: nonalcoholic fatty liver disease, mineral water, insulin resistance, dyslipidemia

In modern gastroenterology, great attention is paid to non-alcoholic fatty liver disease (NAFLD) because it is ranked first in terms of widespread among all diffuse liver diseases and plays a key pathogenetic role in the development and progression of the metabolic syndrome, type 2 diabetes mellitus, is accompanied by obesity, arterial hypertension and the like [1, 10, 13]. It is known that on the basis of the development of NAFLD, the key importance is attached to the phenomenon of insulin resistance [7, 10, 11, 15].

Treatment of NAFLD provides for the appointment of a low-calorie diet, exercise regime and long-term use (3-6-12 months). Classes of drugs like statins, insulin syntheses, as well as hepatoprotectors and antioxidants [7, 10, 13, 14]. However, the results of such therapy are not always satisfactory and the side effects of certain classes of drugs and their prolonged use lead clinicians to look for new technologists for the treatment of this pathology.

Meanwhile, the possibilities of mineral waters (MW) in the treatment of NAFLD are almost undetermined, although it is known that MW is able to restore carbohydrate metabolism, harmonize redox processes, improve the bile and bile functions of the digestive system [2, 3, 6], without providing side effects and allergic reactions without overloading the patient's body with chemicals [5, 8, 9].

In this regard, the aim of the work was to study the effectiveness of boric carbonate bicarbonate-sodium mineral water of medium mineralization (Polyana Kvasova) during non-alcoholic fatty liver disease in the experiment and further substantiate the effectiveness of its use in the complex treatment of patients with NAFLD.

Materials and methods. Experimental studies were performed on 40 white Wistar rats in accordance with the recommendations and rules regulated by the relevant documents [4, 12].

In clinical studies, the study used general clinical examinations, studies of biochemical parameters of liver function, the study of the level of adiponectin and leptin. For a quantitative assessment of the severity of IR, the HOMA-IR index was used. Ultrasonographic studies were performed.

The results of our research showed that the development of NAFLD in the experiment is characterized by the development of fatty degeneration of hepatocytes (presence of vacuoles, cytoplasm of the breast), inflammatory changes (accumulation of lymphocytes) and inactivation of reparative (absence of dual-core hepatocytes) and detoxification processes. At the same time, the activity of the main redox enzymes in the liver tissue changes. In part of the hepatocytes, it weakens, in part, it is kept at the control level, it provides drugs with a spotted appearance.

The use of the studied MW gave a positive effect on the structural and functional characteristics of the liver, expressed by a sharp weakening or disappearance of signs of fatty degeneration, a decrease in signs of inflammation and the restoration of the uniform activity of enzymes over the entire cut of the lobe.

These positive results served as the basis for conducting clinical trials.

Under supervision, there were 60 patients with NAFLD, which was detected for the first time. Of these, 45.00% of patients (27 people) had non-alcoholic steatohepatitis with a minimal degree of activity; in the remaining patients, non-alcoholic steatosis of the liver was observed.

The first group (the main group) was 30 people; in the complex of spa treatment (diet therapy, physical exercise regime) they received mineral water from wells №9, v.Solochyn, Svalyava district, Transcarpathian region ("Polyana Kvasova"). The water intake time was determined by the acid-forming function of the stomach: 30-45-60 minutes each before meals.

The second group (control) was 30 people, in the treatment complex received only diet and exercise.

The course of treatment was 21-24 days.

Results and its discussion. Among the patients, women predominated (63.33%), the average age was (54.56 ± 3.04) years. Concomitant pathology was represented by acid-related diseases in 53.33% of persons (duodenal ulcer, gastroesophageal reflux disease, chronic non-atrophic gastritis) and biliary pathology (68.33%).

Before treatment, patients had dyspeptic (46.66% of patients) and pain (71.66% of patients) syndromes.

The study of the functional state of the liver to treatment showed disorders of pigment metabolism in 33.33% of patients due to an increase in total bilirubin (24.72 ± 2.08) μmol / l, an increase in alkaline phosphatase and GGT to 1.5 N in 31.66% of patients.

Disruption of the blood lipid spectrum was observed in all patients, which was characterized by elevated levels of total cholesterol ((6.66 ± 0.42) mmol / l), triglycerides ((2.17 ± 0.14) mmol / l) and ß-lipoproteins ((74.25 ± 2.88) units), LDL ((4.27 ± 0.24) mmol / l) and a decrease in HDL ((1.19 ± 0.07) mmol / l).

Signs of insulin resistance were determined in 76.66% of patients. At the same time, the fasting serum glucose level averaged over the group (5.63 ± 0.49) mmol / l. The insulin level averaged (18.76 ± 2.47) MDU / ml. The HOMA-IR index is on average equal to (4.69 ± 0.36) units, which exceeded the normal values of the indicator by 1.7 times.

The patient's leptin level was elevated and averaged (35.12 ± 2.34) ng / ml, the adiponectin level was reduced to an average of (11.48 ± 1.22) ng / ml.

Table 1 - Dynamics of indicators of insulin resistance under the influence of treatment in patients with NAFLD, (M ± m), n = 60

Indicators	Under the influence of treatment with the use of MW, n=30			Under the influence of basic treatment, n=30		
	Before treatment	After treatment	P	Before treatment	After treatment	P
Glucose on an empty stomach, mmol / l	5,69±0,44	5,23±0,23	>0,05	5,52±0,36	5,87±0,42	> 0,5
Insulin, MKU / ml	19,82±2,02	13,49±1,60	<0,05	18,34±0,82	16,67±0,94	> 0,1
Index HOMA-IR, u	5,26±0,43	3,56±0,44	<0,02	4,29±0,44	4,11±0,56	> 0,1

Note. The value of P was calculated between the indicators before and after treatment.

Internal course intake of mineral water contributed to the improvement of the clinical course of the underlying disease, as well as leveling signs of concomitant pathology of the esophagogastroduodenal ($p < 0.001$) and digestive ($p < 0.003$) systems.

Analysis of the state of carbohydrate metabolism showed a decrease in insulin resistance in patients of the main group, which was not observed in patients of the control group. Thus, there was a tendency to a decrease in the level of serum glucose ($p > 0.05$) and insulin concentration ($p < 0.05$), due to which a decrease in the HOMA-IR index was observed ($p < 0.02$).

Against the background of the restoration of carbohydrate metabolism, an improvement in the blood lipid spectrum occurred, namely, a significant decrease in the concentration of total cholesterol ($p < 0.05$) and LDL ($p < 0.02$), a tendency to a decrease in triglyceride levels and ß-lipoproteins ($p > 0\ 05$).

Along with this, there was a recovery in the concentration of total bilirubin ($p < 0.05$), a tendency to a decrease in the levels of alkaline phosphatase and GGT ($p > 0.05$).

Changes in the level of leptin in the main group experienced probable dynamics - after treatment, its level averaged 28.88 ± 2.34 ng / ml ($p < 0.05$), unfortunately, the level of adiponectin did not change significantly.

Summarizing the above, it can be argued that alkaline mineral waters can be successfully used in the prevention and treatment of patients with NAFLD with concomitant

pathology of the esophagogastroduodenal and biliary system, for effective correction, primarily insulin resistance, as the leading pathogenetic factor of the pathological process, as well as restoration of the functional state liver and lipid metabolism, reducing leptin levels, as a proinflammatory and profibrogenic factor, improvement of the course and prognosis of major and concomitant diseases of the digestive organs, prevention of development of type 2 diabetes.

References:

1. Babak O.YA., Kolesnikova Ye.V., Sytnik K.A., Kurinnaya Ye.G. Profilakticheskiye meropriyatiya pri nealkogol'noy zhirovoy bolezni pecheni: sushchestvuyet li sposob snizit' risk razvitiya zabolevaniya? // Suchasna gastroyenterologíya – 2013. – № 5. - S. 112-117. (in Russian)

2. Yefimenko N.V. Mekhanizmy deystviya pit'yevykh mineral'nykh vod i ikh rol' v kurortnoy gastroenterologii // Kurortnaya meditsina. – 2015. - № 3. – S. 2-7. (in Russian)

3. Mineral′ni vody Ukrayiny / Za red. E.O. Kolesnyka, K.D. Babova. — K.: Kupriyanova, 2005. — 576 s. (in Ukrainian)

4. Nakaz MOZ Ukrayiny № 692 vid 28.09.2009 r. «Pro zatverdzhennya metodychnykh rekomendatsiy z metodiv doslidzhen′ biolohichnoyi diyi pryrodnykh likuval′nykh resursiv ta preformovanykh likuval′nykh zasobiv». (in Ukrainian)

5. Osnovy kurortolohiyi: Posibnyk dlya studentiv ta likariv. Za redaktsiyeyu M.V. Lobody, E.O. Kolesnyka. — K.: Vydavets′ Kupriyanova O.O., 2003. — 512 s. (in Ukrainian)

6. Osobennosti biologicheskogo deystviya mineral'nykh vod razlichnoy mineralizatsii / K. D. Babov, T. A. Zolotareva, B. A. Nasibulin i dr. — K.: KIM, 2009. — 60 s. (in Russian)

7. Perederiy V.G., Tkach S.M. Prakticheskaya gastroenterologiya: rukovodstvo dlya vrachey. – Vinnitsa: SPD Kashtelyanov A.I.. 2011. – 776 s. (in Russian)

8. Fizioterapiya i kurortologiya / pod red. V. M. Bogolyubova. Kniga I. — M.: Izdatel'stvo BIONOM, 2008. — 408 s. (in Russian)

9. Frolkov V.K., Mikhaylyuk O.V. Prirodnyye i fizicheskiye faktory v korrektsii obmena veshchestv u patsiyentov s metabolicheskim sindromom. // Fizioterapiya, bal'neologiya i reabilitatsiya. — 2014. — №4. — S. 11—14. (in Russian)

10. Kharchenko N.V., Fadeyenko G.D., Skripnik I.N., Kurinnaya Ye.G. Materialy mezhdunarodnogo kongressa po izucheniyu zabolevaniy pecheni Yevropeyskoy assotsiatsii po izucheniyu pecheni. // Suchasna gastroyenterologíya. — 2014. — № 3. — S. 107—112. (in Russian)

11. Byrne C.D., Targher G. NAFLD: a multisystem disease // J. Hepatology. – 2015. – Vol. 62. – P. – 47-64.

12. Directive 2010/63/ EU of the European Parliament and of the Council of 22 September 2010 on the protection of animals used for scientific purposes (Text with EEA relevance) // Official Journal. – 2010. – L. 276. – P. 0033-0079.

13. Mili S, Stimac D. Nonalcoholic fatty liver disease/steatohepatitis: epidemiology, pathogenesis, clinical presentation, treatment/ Dig Dis 2012; 30 (2): 158-62.

14. Nouredding M., Mato J.M., Lu S.C. Nonalcoholic fatty liver disease: Update on pathogenesis, diagnosis, treatment and the role of S-adenosylmethionine // Exp. Biol.Med. – 2015. - Vol. 240 (6). – P. 809-820.

15. Pastori D., Polimeni I., Baratta F. et al. The efficacy and safety of statins for the treatment of nonalcoholic fatty liver disease // Dig. Liv. Dis. – 2015. - Vol. 47. – P. 4-11.