

Acta Balneologica

CZASOPISMO POLSKIEGO TOWARZYSTWA BALNEOLOGII I MEDYCyny FIZYKALNEJ
JOURNAL OF THE POLISH BALNEOLOGY AND PHYSICAL MEDICINE ASSOCIATION

TOM LXIV
TOM LXIV

NUMER 4 (170)/2022
NUMBER 4 (170)/2022

DWUMIESIĘCZNIK
BIMONTHLY

LIPIEC-SIERPIEŃ
JULY-AUGUST



Aluna Publishing

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MEDDOM PRESS
tel. 604-208-453
barbadom@wp.pl

**OPRACOWANIE GRAFICZNE/
/GRAPHIC DESIGN:**

Piotr Dobrzyński
www.poligrafia.nets.pl

PRENUMERATA/SUBSCRIPTION:

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Application of “Polyana Kvasova” Mineral Water in the Complex Therapy of Patients with Gastro-esophageal Reflux Disease and Osteochondrosis of the Spine

Zastosowanie wody mineralnej „Polyana Kvasova” w kompleksowej terapii pacjentów z chorobą refluksową przełyku i osteochondrozą kręgosłupa

DOI: 10.36740/ABAL202204104

Yelyzaveta S. Sirchak, Yaroslav F. Filak, Vasiliy Ye. Barani, Oleksandr I. Hetsko, Yaroslav O. Mykhalko, Nelli V. Bedey, Inna S. Borisova, Andriy V. Ilko

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SUMMARY

Aim: To investigate the effectiveness of complex therapy using “Polyana Kvasova” mineral water in patients with GERD and osteochondrosis (OH) of the cervical and thoracic spine.

Materials and Methods: The examined patients included 56 *Helicobacter pylori* (HP)-positive patients with GERD and OH of the cervical and thoracic spine. The examined patients were divided into 2 groups depending on the scheme of complex treatment. All HP-positive patients with GERD and OH underwent standard triple anti-helicobacter therapy and itopride hydrochloride. Group I patients (n=26) received only the above-mentioned regimen. Patients of the II group (n=30) were additionally prescribed 100-150 ml of “Polyana Kvasova” carbonated bicarbonate-sodium mineral water (MW) as a natural antacid, warm, still 4 times a day (1.5 hours before meals and after 45 minutes after – both in the morning and evening) within 1 month.

Results: The complex therapy carried out had a positive effect on the endoscopic picture of GERD in patients with cervical and thoracic OH. The decrease in the severity of RE was accompanied by an increase in the number of GERD patients in whom the erosive form of reflux esophagitis was not detected during repeated fibroesophagogastroduodenoscopy (FEGDS) (mainly in the II group of examined patients – 10.0% of patients, $p < 0.05$). The additional prescription of “Polyana Kvasova” MW to the complex treatment increased the frequency of eradication of HP infection by 9.2% – $p < 0.05$ at the background of more pronounced normalization of clinical and endoscopic signs of GERD.

Conclusions: 1. GERD is often manifested by atypical extraesophageal symptoms (up to 25.0-27.3% of cases) in patients with OH of the cervical and thoracic spine. 2. The use of standard triple AHT in combination with itopride hydrochloride is an effective method of correcting esophageal and extraesophageal clinical manifestations of GERD in patients with cervical and thoracic spine OH. 3. The additional prescription of “Polyana Kvasova” MW as part of the complex therapy of patients with GERD and OH of the cervical and thoracic regions is a safe, effective method for reducing clinical symptoms, the severity of esophageal lesions with repeated FEGD, and also contributes to increasing the frequency of HP infection eradication in the data patients.

Key words: gastroesophageal reflux disease, osteochondrosis, treatment, mineral water

Słowa kluczowe: choroba refluksowa przełyku, osteochondroza, leczenie, woda mineralna

Acta Balneol, TOM LXIV, Nr 4(170);2022:301-305

INTRODUCTION

Osteochondrosis (OH) of spine is also one of the most common diseases among the adult population, which affects from 40 to 80% of the world's inhabitants. Manifestations of OH are back pain, headaches, which are seen in 25-30% of patients after 30 years old [1, 2]. According to modern recommendations,

patients are prescribed non-steroidal anti-inflammatory drugs (NSAIDs) to reduce pain and improve the quality of life in case of the musculoskeletal system damage. Side effects of NSAIDs are very often observed during treatment with this group of drugs. The main negative property of all NSAIDs is a high risk of digestive tract disorders. Thus, dyspepsia is observed in 30-40%

of patients receiving NSAIDs, in 10-20% – erosions and ulcers of the stomach and duodenum, in 2-5% – bleeding and perforation. Dyspepsia is the main reason for discontinuation of NSAIDs in more than 50% of cases. Most often, this symptom is noted in patients with a history of digestive tract pathology [3].

Gastroesophageal reflux disease (GERD) is a polyetiological disease, the basis of which is the predominance of aggression factors over mucous membrane protection factors of the esophagus [4, 5]. Among the main factors in the development of GERD, obesity, pregnancy, stress, smoking, and diaphragmatic hernia are most often distinguished [6]. The nature of food (fatty, fried food, chocolate, coffee, alcohol, spices), medications (antibiotics, ascorbic acid, calcium channel blockers, antidepressants, and NSAIDs) also contribute to the development of GERD [7].

Nowadays proton pump inhibitors (PPIs) occupy a leading place in the treatment of acid-dependent diseases. At the same time, certain difficulties arise in the GERD patient's treatment [8]. The esophageal erosions healing time in many patients can reach 8-12 weeks, and some patients are refractory to taking antisecretory drugs [9]. Choosing treatment tactics for patients with combined pathology, when the appointment of drugs from the group of NSAIDs is inevitable, special attention should be paid to Helicobacter infection, the persistence of which can aggravate the clinical signs of GERD. Therefore, the search for alternative treatment schemes for patients with comorbid pathology is a particularly urgent issue for the modern medical community.

AIM

The aim of the study is to investigate the effectiveness of complex therapy using "Polyana Kvasova" mineral water in patients with GERD and OH of the cervical and thoracic spine.

MATERIALS AND METHODS

At the clinical base of the Department of Internal Diseases Propaedeutics of the Medical Faculty of the SHEI "UzhNU" (gastroenterological, endocrinological, neurological department of the KNP "ZOKL named after A. Novak" TRC and patients who were under outpatient observation by a family doctor at their residence place) during 2019-2022 years, 56 *Helicobacter pylori* (HP)-positive patients with GERD and OH of the cervical and thoracic spine were examined. Among the examined patients, there were 32 (57.1%) men, 24 (42.9%) women. The average age was 43.6±4.2 years. The control group included 20 practically healthy people (12 men (60.0%), 8 women (40.0%)). The average age was 44.1±5.2 years.

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

All examined patients were subjected to anthropometric, general clinical, laboratory and instrumental methods of examination. OH of the cervical and thoracic spine was diagnosed based on physical, general clinical examination methods, as well as the results of computed tomography of the spine.

The diagnosis of GERD was established according to the criteria of the unified clinical protocol (order of the Ministry of Health of

Ukraine dated 31.10.2013 № 943) taking into account complaints, endoscopic examination data, etc. To confirm the diagnosis, the examined patients underwent fibroesophagogastroduodenoscopy (FEGDS) using endoscopy equipment Pentax ERM-3300 video processor and flexible fiber endoscopes Pentax E-2430, GIF-K20. Also, 24-hour pH monitoring according to Prof. V.N. Chernobrov's method was performed.

The Los Angeles (LA) classification (1998) was used for endoscopic assessment of the degree of damage to the esophagus:

Grade A – single erosion ≤5 mm;

Grade B – ≥1 erosion > 5 mm long that does not occupy the entire space between 2 adjacent folds of the esophagus;

Grade C – ≥1 erosion that occupies the entire space between ≥2 folds of the esophagus and ≤75% of the perimeter of the esophagus;

Grade D – erosions or ulcers occupying ≥75% of the esophageal perimeter [10].

In the examined patients, HP-infection was diagnosed using a rapid urease test (CLO-test) before the comprehensive treatment. The effectiveness of eradication therapy was assessed 4 weeks after treatment using the ¹³C-urea breath test (¹³C-UBT) (IZINTA, Hungary).

The examined patients with GERD and OH of the cervical and thoracic spine were divided into 2 groups depending on the scheme of complex treatment. All HP-positive patients with GERD and OH of the cervical and thoracic spine underwent standard triple anti-helicobacter therapy (AHT) for 14 days (Pantoprazole ("Ulsepan" by World Medicine) 40 mg twice a day + Amoxicillin 1000 mg twice a day + Clarithromycin 500 mg twice a day 30-40 minutes before meals) in combination with Saccharomyces boulardii ("Lotardi" by Ananta Medicare, India) 1 capsule (500 mg) twice a day. Treatment with pantoprazole was continued for up to 1 month at 40 mg once a day in the morning 40 minutes before meals. To normalize the work of the upper parts of the gastrointestinal tract, itopride hydrochloride ("Motoprid" of the firm "Kyyivskyi Vitaminnyi Zavod", Ukraine) was prescribed 50 mg 3 times a day before meals for 1 month. Group I patients (n=26) received only the above-mentioned regimen. Patients of the II group (n=30) were additionally prescribed 100-150 ml of "Polyana Kvasova" carbonated bicarbonate-sodium mineral water (MW) as a natural antacid, warm, still 4 times a day (1.5 hours before meals and after 45 minutes after – both in the morning and evening) within 1 month.

Changes in clinical symptoms were assessed in the dynamics, as well as at the end of the comprehensive treatment (after 4 weeks). The effectiveness of the performed AHT was determined 1 month after the complex treatment.

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

RESULTS

The leading clinical manifestation of digestive system upper parts damage in examined patients with GERD and OH of

the cervical and thoracic spine before treatment was acid belching, heartburn and dysphagia, which are considered typical manifestations of reflux disease. After a detailed analysis, it was established that some of the examined patients with GERD and OH of the cervical and thoracic spine often complain of a sore throat, hoarseness, a lump in the throat, as well as a dry cough, the presence of chest pain along the esophagus, disturbances of the heart work, which occurs more often after the consumption of fatty, fried food, carbonated drinks and coffee, which we considered as extraesophageal manifestations of GERD. These complaints before treatment in the examined patients indicated a typical extraesophageal GERD manifestation in Table 1.

The prescription of AHT in combination with itopride hydrochloride in patients with cervical and thoracic spine OH had a positive effect on the GERD clinical picture. It should be noted a significant reduction in the manifestations of dysphagia, heartburn, as well as extraesophageal manifestations of reflux disease, such as a hoarseness, dry cough, interruptions in the work of the heart already at the end of the 2nd week of complex treatment in both groups of examined patients. At the same time, the more pronounced therapeutic effect of the performed complex treatment was in patients of the II group, who additionally received MW "Polyana Kvasova".

The diagnosis of GERD was confirmed in all patients with the help of FEGDS before the comprehensive treatment initiation.

During endoscopic examination, gastroesophageal reflux and reflux esophagitis (RE) of various degrees of severity were observed in all patients with cervical and thoracic OH (Table 2).

During endoscopic examination of patients with cervical and thoracic spine OH combined with GERD, the degree of RE severity before treatment often corresponded to LA-B and LA-C degrees. The endoscopic picture of the examined patients with combined pathology was characterized by generalized, persistent edema, hyperemia of the mucous membrane along with multiple hemorrhagic elements. It has also been established that duodenogastric reflux (DGR) and esophageal candidiasis are often found in patients with GERD in combination with OH.

The complex therapy carried out had a positive effect on the endoscopic picture of GERD in patients with cervical and thoracic OH. The decrease in the severity of RE was accompanied by an increase in the number of GERD patients in whom the erosive form of reflux esophagitis was not detected during repeated FEGDS (mainly in the II group of examined patients - 10.0% of patients, $p < 0.05$). Complex therapy using MW "Polyana Kvasova" also led to a significant decrease in the number of patients with DGR (by 26.6%, respectively - $p < 0.01$).

The most objective method of evaluating the performed AHT is the frequency of HP infection eradication after a course of treatment in Figure 1.

Table 1. Dynamics of GERD clinical signs in examined patients with OH of the cervical and thoracic spine under the influence of complex therapy

	Examined patients with GERD and OH			
	I group (n=26)		II group (n=30)	
	before treatment	after treatment	before treatment	after treatment
Typical manifestation of GERD	57,70%		60,0 %	
- heartburn	86,7 %	26,7 %**	88,9 %	16,7 %**,+
- belching sour	66,7 %	20,0 %**	72,2 %	16,7 %**
- dysphagia	50,0 %	13,3 %**	55,6 %	5,6 %**,+
Atypical manifestation of GERD	42,3 %		40,0 %	
Dental	27,3 %		25,0 %	
- dental caries	66,7 %	33,3 %**	66,7 %	33,3 %**
- periodontal disease	66,7 %	-	66,7 %	-
- stomatitis	100,0 %	33,3 %**	100,0 %	-
Otolaryngological	36,3 %		33,3 %	
- tickling in the throat	75,0 %	-	100,0 %	25,0 %**
- hoarseness	75,0 %	25,0 %**	75,0 %	-
- a lump in the throat	100,0 %	50,0 %**	75,0 %	-
- chronic cough	50,0 %	25,0 %*	50,0 %	25,0 %*
Cardiac	18,2 %		16,7 %	
- retrosternal pain along the esophagus	100,0 %	50,0 %**	100,0 %	-
- interruptions in the work of the heart	100,0 %	-	100,0 %	-
Bronchopulmonary	18,2 %		25,0 %	
- dry cough	100,0 %	-	100,0 %	-
- night apnea attacks	50,0 %	50,0 %	66,7 %	33,3 %**,+

Note: the difference between indicators in patients before and after treatment is significant: * - $p < 0.05$; ** - $p < 0.01$; the difference between indicators in patients of the I and II groups after treatment is significant: + - $p < 0.05$

Table 2. Dynamics of endoscopic changes in examined patients with GERD and OH of the cervical and lumbar spine under the influence of complex therapy

Endoscopic signs	Examined patients with GERD and OH			
	I group (n=26)		II group (n=30)	
	before treatment	after treatment (after 4 weeks)	before treatment	after treatment (after 4 weeks)
Reflux esophagitis (degree of severity according to the LA classification):				
Absence of the esophagus damage	–	–	–	10,0 %
LA–A	19,2 %	50,0 %**	16,7 %	56,7 %**
LA–B	50,0 %	34,6 %*	50,0 %	23,3 %**,+
LA–C	30,8 %	15,4 %*	30,0 %	10,0 %**
LA–D	–	–	3,3 %	–
Candidal esophagitis	26,1 %	7,7 %**	23,3 %	6,7 %**
DGR	42,3 %	34,6 %*	43,3 %	16,7 %**,++

Note: the difference between indicators in patients before and after treatment is significant: * – $p < 0.05$; ** – $p < 0.01$; the difference between indicators in patients of the I and II groups after treatment is significant: + – $p < 0.05$; ++ – $p < 0.01$



Figure 1. Frequency of HP infection eradication after comprehensive treatment

Note: the difference between indicators in patients of the I and II groups after treatment is significant: * – $p < 0.05$

A high frequency of eradication of HP infection in patients with GERD and OH of the cervical and thoracic spine on the background of standard triple AHT in combination with *Saccharomyces boulardii* was established. However, the additional prescription of “Polyana Kvasova” MW to the complex treatment increased the frequency of eradication of HP infection by 9.2% – $p < 0.05$ at the background of more pronounced normalization of clinical and endoscopic signs of GERD.

DISCUSSION

Patients who require long-term use of NSAIDs to reduce the severity of pain syndrome, including those with OH, represent a special contingent of patients with high comorbidity, including damage to the digestive organs, which requires a complex approach in terms of diagnosis and treatment. The prescription of AHT in combination with itopride hydrochloride to patients with GERD and OH of the cervical and thoracic spine is an effective method for rapid clinical symptoms severity reducing. At the same time, the inclusion of natural remedies that affects several pathogenetic links of comorbid pathology in the complex treatment, is an important element of the therapy of these patients, and is safe for long-term use.

“Polyana Kvasova” is carbonated (1681 mg/l), medium mineralization (10.6 g/l), sodium bicarbonate mineral water, with an increased content of boron (in the form of metaboric acid) (0.195 g/l) and biologically active doses of fluoride (0.002 g/l) [11-14]. It has a slightly alkaline pH of 6.8, a high buffering and neutralizing capacity (81 mmol/l and 105 mmol/l, respectively), the HCO_3 content – is 7076 mg/l. The buffer capacity of MW is several times higher than antacids of cavity action, which are widely used in clinical practice (Almagel, Gastrofarm, Vicalin) [14].

It is known that carbonated sodium bicarbonate MWs are natural antacids, which reduce the acidity of gastric juice. The expression of antacid properties of MW depends not so much on water mineralization as on the level of hydrocarbons. “Polyana Kvasova” neutralizes the increased stomach acidity, which is equivalent to the effect of a 1% baking soda solution in terms of the alkalization depth, but the neutral environment in the stomach is maintained much longer than after taking a solution of baking soda. When neutralizing hydrochloric acid in the stomach cavity under the influence of MW, the direct irritating effect of the acid on mucous membrane of the stomach and duodenum is weakened and the pH rises to 3.5-5.0. Such shallow alkalization of gastric contents is more physiological and has less effect on the functional connections of the stomach with other digestive organs. When acidity decreases, proteolysis caused by the action of pepsin is inhibited, the peptic effect of gastric juice on mucous membrane of the esophagus, stomach, pancreas, biliary system, and proximal duodenum is weakened or lost [11, 14].

The anti-helicobacter effect of “Polyana Kvasova” water has been proven due to the bactericidal effect of metaboric acid [13]. Due to its remarkable antacid and buffering properties, “Polyana Kvasova” MW is the most effective for diseases of the stomach with increased acidity, reflux esophagitis, accompanying changes in the form of cholestasis and pancreatic stasis, as well as for chronic pancreatitis, hepatitis, hepatitis, and diabetes.

The results of our research also indicate the high effectiveness of the additional prescription of “Polyana Kvasova” MW as part of the

complex therapy of patients with GERD and OH of the cervical and thoracic spine. The obtained data indicate a more pronounced positive dynamics of both esophageal and extraesophageal manifestations of GERD in OH, which, accordingly, is accompanied by a more pronounced positive changes of the esophagus mucous membrane in case of repeated FEGDS. Attention is also drawn to the significant reduction in the DGR manifestations on the background of taking "Polyana Kvasova" MW, and it should also be noted the increase in the frequency of HP infection eradication by 9.2% in patients with combined pathology. Therefore, the complex therapy of patients with GERD and OH of the cervical and thoracic spine using MW "Polyana Kvasova" is both effective and safe method of treatment for patients with combined pathology.

CONCLUSIONS

1. GERD is often manifested by atypical extraesophageal symptoms (up to 25.0-27.3% of cases) in patients with OH of the cervical and thoracic spine.
2. The use of standard triple AHT in combination with itopride hydrochloride is an effective method of correcting esophageal and extraesophageal clinical manifestations of GERD in patients with cervical and thoracic spine OH.
3. The additional prescription of "Polyana Kvasova" MW as part of the complex therapy of patients with GERD and OH of the cervical and thoracic regions is a safe, effective method for reducing clinical symptoms, the severity of esophageal lesions with repeated FEGDS, and also contributes to increasing the frequency of HP infection eradication in the data patients.

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The study was performed within the framework of the scientific topics "Polymorbid Pathology of Digestive System Diseases, Features of Pathogenesis and the Possibility of Correction" (state registration number 0118U004365) researched by the Department of Propedeutics of Internal Diseases of State University "Uzhhorod National University" and "Clinical and Pathogenetic Features of Polymorbid Diseases in the Digestive System and Development of Differentiated Therapy Scheme in the Conditions of the COVID-19 Pandemic" (state registration number 0121U110177).

Conflict of interest:

The Authors declare no conflict of interest

Received: 15.02.2022

Accepted: 16.07.2022

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