

D.D. Kazarin*, A.E. Shklyayev, Yu. V. Gorbunov

Izhevsk State Medical Academy under the Ministry of Health of Russia,
Department of Faculty Therapy with the courses of endocrinology and hematology,
Izhevsk, Russia

EATING DISORDERS IN PATIENTS WITH CHRONIC GASTRITIS AND TYPE 2 DIABETES MELLITUS

Abstract

Diabetes mellitus holds one of the leading positions among the current problems of modern medicine. Despite the obvious success in studying diabetes in the last decades, its prevalence has become pandemic. In spite of the use of modern methods of therapy, a rather high frequency of diabetes mellitus complications from various organs and systems, the pathological changes in which largely determine the course of the disease and patient's quality of life remains. Issues of eating disorders and their correction play an important role in the complex therapy of patients with diabetes mellitus.

Objective: determination of the characteristics and relationship of eating disorders with gastroenterological symptoms and glucose levels in patients with chronic gastritis in type 2 diabetes. **Materials and methods:** dynamic study of the eating behavior and quality of life in 66 patients with chronic gastritis in type 2 diabetes mellitus was conducted using GSRS, SF-36 and DEBQ questionnaires. The level of glucose on an empty stomach and after eating was also measured, the frequency of self-measurement of glucose level and the presence of diabetes mellitus complications were determined. **Results:** the identified correlation relationships suggest that gastrointestinal symptoms characteristic of chronic gastritis with type 2 diabetes mellitus worsen the physical and psychological components of health, which provokes a breakdown and a violation of the diet in this category of patients. **Conclusion:** chronic gastritis in patients with type 2 diabetes mellitus aggravates the prognosis of diabetes and exacerbates eating disorders, which requires observation of an endocrinologist, as well as a gastroenterologist and psychotherapist in the management of such patients.

Key words: *quality of life, eating behavior, chronic gastritis, type 2 diabetes mellitus*

Conflict of interests

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DM — diabetes mellitus, CG — chronic gastritis

*Contacts: Daniil D. Kazarin, e-mail: ddkazarin@mail.ru

Introduction

For patients suffering from diabetes mellitus (DM), the issues of eating disorders are of key importance, primarily because nutritional errors worsen the control of diabetes, cause hyperglycemia, which provokes many different disorders, including angio-, retino- and polyneuropathy. In the treatise of the VIII century called Zhud-Shi it was noted that «polyuria» is more common in those patients who are prone to malnutrition and follow a low-activity lifestyle [1]. At the same time, the frequency of gastric pathology in patients with DM is higher than in the general population, and gastroenterological disorders are more or less present in the vast majority of said patients [2]. Patients with combined pathology of the upper gastrointestinal tract and endocrine system are at risk of eating disorders. The condition of the gastrointestinal tract seriously affects the processes of nutrition and eating behavior, since the endocrine cells of the gastric mucosa are a source of gastrointestinal hormones — regulators of appetite and eating behavior. Chronic gastritis (CG) is characterized by inflammatory and dystrophic changes in the gastric mucosa, leading to disorders of endocrine function and, consequently, secretion of regulatory GI hormones.

In addition, type 2 diabetes is a disease associated with an impaired action of insulin, ghrelin and leptin, which are hormones that regulate appetite and eating behavior. In the formation of insulin resistance, ghrelin levels remain elevated even after eating, leading to chronic hunger (mainly hunger for carbohydrates), excessive food intake, weight gain, and eventually — to obesity. Excess weight has a significant impact on the course of type 2 diabetes, greatly reducing the efficacy of its treatment. The presence of eating disorders affects the control of DM, so it is important for clinical specialists in the management of this group of patients [3]. In obesity, in turn, insulin resistance increases, its frequency and severity increases with the increase in the mass of adipose tissue, especially in the visceral region [4]. A pathophysiological «vicious circle» is formed. The leading factor in the development of obesity is eating disorders (ED).

Currently, there are three types of eating disorders: external, restrictive and emotional. External ED is manifested by an increased reaction of the patient

not to internal homeostatic stimuli for eating (glucose level, blood free fatty acids, etc.), but to external stimuli (beautiful table, eating person, attractive food advertising) [4].

Another type of disorder is emotional ED (hyperphagic reaction to stress or emotional tension). In this case, the stimulus to food intake is not physical hunger, but psychological discomfort. Eating soothes, distracts, improves mood — in other words, serves as a «therapy» of emotional discomfort. Emotional ED can be manifested by episodes of overeating (compulsive ED), or overeating, clearly confined to the evening and night time (night eating syndrome) [5].

Another type of ED is restrictive, characterized by excessive food self-restriction, to which patients with DM are often prone [6]. The emotional imbalance that occurs during following strict diets by such patients is called dietary depression [7]. Dietary depression leads to the abandonment of further compliance with the diet and the change in period of restrictive ED with periods of overeating with a new intensive weight gain.

The issue of ED in patients with type 2 DM and CG is currently little studied, but there are some studies of ED in type 2 DM [8].

Taking into account the above, it is very important to study the eating behavior in patients with CG and type 2 DM in order to improve the efficacy of therapy for these diseases.

Objective: to determine the relationship of gastroenterological symptoms with eating disorders in patients with CG in type 2 DM.

Materials and methods

The study was conducted in the Endocrinology and Gastroenterology Departments of Budgetary Institution of the First Clinical Hospital of Ministry of Health of Udmurtia in Izhevsk.

Two groups of patients were identified: Group I — patients with CG and type 2 DM ($n = 34$ people), Group II — patients with CG without type 2 DM ($n = 32$ people). The groups were comparable in age (47.8 ± 5.8 years in the first group, 42 ± 6.1 years in the second group) and gender composition (6 % and 8 % of males in Group I and II, respectively). Among patients of Group I,

68.75 % (BMI >35 kg/m²) suffered from obesity of the second and third degree, among patients of Group II — 6 %.

To verify the diagnosis of chronic gastritis all the patients underwent EGD (the Olympus fiberscope, Japan) with biopsy of the gastric mucosa. EGD was carried out in fasting condition in the morning, and patients did not take a meal for at least 6 hours and water for 2 hours before the study. Detection of *Helicobacter pylori* infection was carried out in the feces by a single-stage immunochromatographic assay to identify specific antigens. All patients underwent histologic examination of antral mucosa and gastric body samples. Two gastric biopsy samples were examined from each part. Biopsy samples were fixed in 10 % neutral formalin, and paraffin embedded according to the conventional method. Deparaffinized slices with thickness of 4–5 µm were stained with hematoxylin and eosin, then with slice zoom of 400 the degree of infiltration with granulocytes, mononuclear cells, as well as the presence of atrophy and/or metaplasia was determined. Pathological changes were assessed by a semi-quantitative method using visual analogue scale (VAS) in accordance with the updated Sydney System (Houston, 1994) [9].

The presence of EDs was determined using DEBQ (The Dutch Eating Behaviour Questionnaire), developed at the Faculty of Human Nutrition and the Faculty of Social Psychology in Agricultural University (the Netherlands) for the detection of restrictive, external and emotional eating behavior. The results of studies by local scientists [6, 10] confirm that DEBQ meets the criteria of validity and reliability.

Both groups also used the GSRS questionnaire on gastroenterological symptoms and the SF-36 ques-

tionnaire on quality of life, the use of which is justified in a number of works [11, 12]. Fasting and postprandial glucose levels were also measured, and the frequency of self-measured blood glucose and presence of diabetes complications were additionally determined in Group I. From patients in both groups, informed consent was obtained for examination and treatment, according to the order of the Ministry of Health of the Russian Federation No. 173/1 dated July 25, 2012 «On informed voluntary consent for medical care».

Statistical analysis was performed using IBM SPSS Statistics package for Windows version 17.0.1. Non-parametric methods of statistical processing were used, since the distribution in both samples was not normal according to the Kolmogorov-Smirnov test ($p = 0.72$ and $p = 0.94$, respectively). The reliability of the differences was determined by the U-Mann-Whitney test, correlation relationships — by the Spearman rank correlation test. The results were considered reliable at $p < 0.05$.

Results and discussion

In 100 % of patients enrolled, immunochromatographic assay revealed *Helicobacter pylori* infection in feces. There were changes of different degree in the gastric mucosa in all patients in both groups according to EGD. In the vast majority of patients, focal gastritis of gastric antrum or body and mucosal hyperemia were identified. In addition, some patients had signs of pyloritis, duodenitis, as well as indirect signs of gastroparesis, in particular, the presence of the food taken the day before (patients took their last meal no more than 6 hours before the endoscopic examination). The results are presented in Table 1.

Table 1. Indicators of gastroscopic studies in patients with type 2 diabetes

Endoscopic signs	Number of patients	
	Group I (n = 34), %	Group II (n = 32), %
Mucosal hyperemia	94±2.1	98±2.3
Focal gastritis of gastric body	82±1.4	80±1.8
Focal gastritis of gastric antrum	79±0.8	81±1.1
Pyloritis	21±1.7	23±0.9
Duodenitis	15±1.1	13±1.9
Signs of gastroparesis	34±2.2	30±1.9

Table 2. Indicators of histological examination of biopsy samples of the gastric mucosa in patients with type 2 diabetes

Parameter	Points on the visual analogue scale	
	Gastric body	Gastric antrum
Degree of infiltration with granulocytes	2.86±0.92	2.25±0.24
Degree of infiltration with mononuclear cells	2.03±0.36	1.74±0.41
Atrophy	1.97±0.24	0.52±0.09
Metaplasia	0	0

According to EGD results, based on U-Mann-Whitney test, no significant differences between the groups of patients were initially revealed, which indicates the comparability of the samples (U-Mann-Whitney = 18.0; $p = 0.84$).

According to histological data, the vast majority of patients had signs of chronic gastritis, while a small part of patients (9.8 %) had signs of atrophy. There were no changes corresponding to intestinal metaplasia of the gastric mucosa at the time of the study. The results are presented in Table 2.

Among patients of Group I, 87 % of patients had eating disorders. Structure of eating disorders in patients in Group I: restrictive type of ED (58 % of patients), external ED (49 % of patients), emotional type of ED (37.5 % of patients).

Patients in Group II were dominated by emotional type of ED — 39 %, restrictive and external types of ED were identified in 18 % and 27 %, respectively, and in general, eating disorders were observed in 36 % of patients in this group.

Eating behavior in patients of Groups I and II has significant differences in restrictive and external types ($p = 0.031$ and $p = 0.046$, respectively). Patients with CG and type 2 DM in comparison with patients without endocrine pathology are more likely to have restrictive ED. In particular, the need for a strict diet and restrictions in consumption of several products is replaced by a relapse. Also, in patients with CG and type 2 DM, in contrast to patients without endocrine pathology, there is a higher rate of ED of the external type, that is, an increased reaction to external food stimuli, regardless of hunger.

There were no significant differences between the groups in frequency of emotional ED ($p = 0.39$).

All the obtained results (ED, gastroenterological symptoms according to the GSRS questionnaire, quality of life assessment according to

the SF-36 questionnaire, glycated hemoglobin level (HbA1c), fasting and post-meal glucose levels), as well as the frequency of self-measuring of blood glucose and the presence of diabetes complications in Group I patients were subjected to correlation analysis according to the Spearman test. In Group I, moderate direct correlation between the restrictive ED and the total rate of gastroenterological symptoms ($p = 0.437$ at $p = 0.016$), the frequency of self-measuring of blood glucose ($p = 0.65$ at $p = 0.002$) and fasting and post-meal glucose level ($p = 0.63$ at $p = 0.003$ and $p = 0.613$ at $p = 0.0018$, respectively) and the inverse correlation with the mental health component ($p = -0.522$ at $p = 0.002$) were found.

In Group II, weak direct correlations between emotional ED and total rate of gastrointestinal symptoms ($p = 0.216$ at $p = 0.059$) were revealed. The level of the “ p ” significance in this case allows us to speak only about the tendency to the reliability of the result and does not allow us to unambiguously exclude the error of type I (“ α ”). There were no other correlations according to Spearman’s rank test in Group II.

Conclusion

The data of EGD and histological examination indicate that patients with type 2 diabetes often suffer from chronic gastritis, including atrophic gastritis associated with *Helicobacter pylori* infection, and mainly in this group of patients the gastric body is affected. At the same time, in patients who participated in the study no signs of intestinal metaplasia of the gastric mucosa were shown.

The revealed correlations suggest that gastroenterological symptoms typical for CG (abdominal pain, heartburn, bitter taste in the mouth, etc.) create

physical discomfort, which provokes a relapse and diet failure, generally, the use of a large amount of sweet, saturated with carbohydrates food. Since the diet with type 2 diabetes is quite strict (restrictive), its failure, which caused an increase in blood glucose levels, generates guilt and anxiety associated with the mental health component identified by the SF-36 questionnaire. Patients begin to self-measure blood glucose level more often, which is increased due to diet disorders, which in turn also generates anxiety and nervousness.

Thus, CG in patients with type 2 DM aggravates the prognosis of diabetes and exacerbates eating disorders in this category of patients. With the combination of CG and type 2 DM, correction of eating behavior becomes an important but difficult task. Eating disorders are associated with somatic, endocrine and psychoemotional disorders, which requires monitoring by an endocrinologist, gastroenterologist and psychotherapist in the management of this group of patients.

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