DIAGNOSIS OF FUNCTIONAL DISORDERS OF THE GASTROINTESTINAL TRACT IN PATIENTS WITH CONSTIPATION AND CHOICE OF TREATMENT TACTICS (LITERATURE REVIEW)

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Abstract. *Diagnosis of functional gastrointestinal (GI) disorders in patients with constipation and the choice of treatment tactics is an important task in modern gastroenterology. Constipation can be the result of many factors, including disorders of intestinal motility, changes in microflora, stress reactions and improper nutrition. This review presents diagnostic methods and the basis of treatment of functional gastrointestinal disorders associated with constipation.*

Keywords: *diagnosis, functional disorders, GI tract, constipation, treatment, manometry, microflora, diet therapy, pharmacotherapy, probiotics, physiotherapy.*

ДИАГНОСТИКА ФУНКЦИОНАЛЬНЫХ НАРУШЕНИЙ ЖЕЛУДОЧНО-КИШЕЧНОГО ТРАКТА У БОЛЬНЫХ С ЗАПОРАМИ И ВЫБОР ТАКТИКИ ЛЕЧЕНИЯ (ОБЗОР ЛИТЕРАТУРЫ)

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Аннотация. *Диагностика функциональных нарушений желудочно-кишечного тракта (ЖКТ) у пациентов с запорами и выбор тактики лечения является важной задачей современной гастроэнтерологии. Запоры могут быть следствием многих факторов, включая нарушения моторики кишечника, изменения микрофлоры, стрессовые реакции и неправильное питание. В обзоре представлены методы диагностики и основы лечения функциональных расстройств желудочно-кишечного тракта, сопровождающихся запорами.*

Ключевые слова: *диагностика, функциональные расстройства, ЖКТ, запоры, лечение, манометрия, микрофлора, диетотерапия, фармакотерапия, пробиотики, физиотерапия.*

QABZIYAT BILAN OG'RIGAN BEMORLARDA OSHQOZON-ICHAK TRAKTI FUNKSIONAL BUZILISHLARINING DIAGNOSTIKASI VA DAVOLASH TAKTIKALARINI TANLASH

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Annotasiya. *Qabziyat bilan og'rigan bemorlarda oshqozon-ichak traktining funktsional buzilishlarini tashxislash va davolash taktikasini tanlash zamonaviy gastroenterologiyaning muhim vazifasidir. Qabziyat ko'plab omillar, jumladan, ichak motorikasining buzilishi, mikrofloraning o'zgarishi, stress reaktsiyalari va noto'g'ri ovqatlanish natijasida yuzaga kelishi mumkin. Sharhda ich qotishi bilan kechadigan oshqozon-ichak traktining funktsional buzilishlarini davolashning diagnostika usullari va tamoyillari keltirilgan.*

Kalit so'zlar: *diagnostika, funktsional buzilishlar, oshqozon-ichak trakti, qabziyat, davolash, manometriya, mikroflora, dietoterapiya, farmakoterapiya, probiyotiklar, fizioterapiya.*

Introduction.

Chronic constipation (CP) is one of the most frequent gastroenterologic problems. Its incidence ranges from 3 to 31% depending on gender and age cohort, reaching an average of 14% in adults [1, 2]. Today, the trend of increasing prevalence of CP is noted not only in European countries, but also in the Asian region, where, due to cultural peculiarities of nutrition, constipation was until recently a relatively rare phenomenon [2].

There are no official epidemiologic data on the prevalence of CP in Uzbekistan. Based on some regional data, we can conclude that this figure is approximately at the level typical for the countries of Western Europe and North America. As for gender specifics, the prevalence of constipation in women is on average 2 times higher than in men, which was demonstrated in a large meta-analysis [2]. In addition, in individuals over sixty years of age, constipation occurs in 36%, and some reports have shown it to be as high as 50% [3]. This is due to anatomical features, sedentary lifestyle, dietary changes, comorbidity, and the intake of various medications that directly or indirectly affect intestinal motility. At the same time, it is worth noting that currently the number of young patients with CP, including children, has increased significantly and has a further upward trend [1, 4]. It should be noted that in individuals over 60 years of age, the incidence of constipation is

36% higher and reaches 50% [3]. This is due to sedentary lifestyle, anatomical features, changes in the nature of nutrition, comorbidity, taking various drugs that affect intestinal motility. In addition, it is worth noting that currently the number of young patients with chronic constipation, including children, has increased significantly and has a further upward trend. In particular, functional constipation is not uncommon in childhood; its prevalence is estimated to be 3% worldwide [1, 4].

Constipation is a decrease in the frequency of defecation (less than three times a week), changes in the consistency of feces (hard, lumpy feces), the presence of a feeling of incomplete emptying of the rectum, and the need for excessive pushing or manual assistance during defecation [5].

Currently, in modern domestic and foreign literature it is accepted to subdivide chronic constipation into primary and secondary [6]. Primary chronic constipation includes constipation in the form of alimentary (low intake of water and fiber) and behavioral factors (low physical activity), as well as primary disorders of colonic motility and coordination of the muscular apparatus providing defecation. Secondary chronic constipation is due to the presence of other diseases, including tumor nature or medications with the potential to induce constipation [7, 8].

Functional defecation disorders in the structure of this nosology are irritable bowel syndrome with predominant constipation and functional constipation. In addition, anorectal disorders that are accompanied by constipation, such as functional defecation disorders and dyssynergic defecation, are distinguished [5].

These nosological units belong to functional disorders and, according to the Rome IV revision criteria, are associated with disorders of motility, visceral hypersensitivity, altered mucosal function and immunity, gut microbiota, and/or central/intestinal nervous system function [9].

In the structure of primary constipation, functional constipation and irritable bowel syndrome with a predominance of constipation have the highest frequency [10, 11]. Irritable bowel syndrome is a functional intestinal disorder in which there is recurrent pain associated with abnormal intestinal peristalsis [9, 12].

Functional constipation is a common clinical problem, representing approximately 8% of cases in the pattern of patients seeking primary care [13]. The pathophysiology of functional constipation is considered to be multifactorial (Fig. 1), with impaired interaction between the CNS (brain) and the peripheral nervous system link providing the activity of the GI organs (brain-GI axis), a new definition of functional GI diseases proposed by the expert council of the updated Rome Consensus [9].

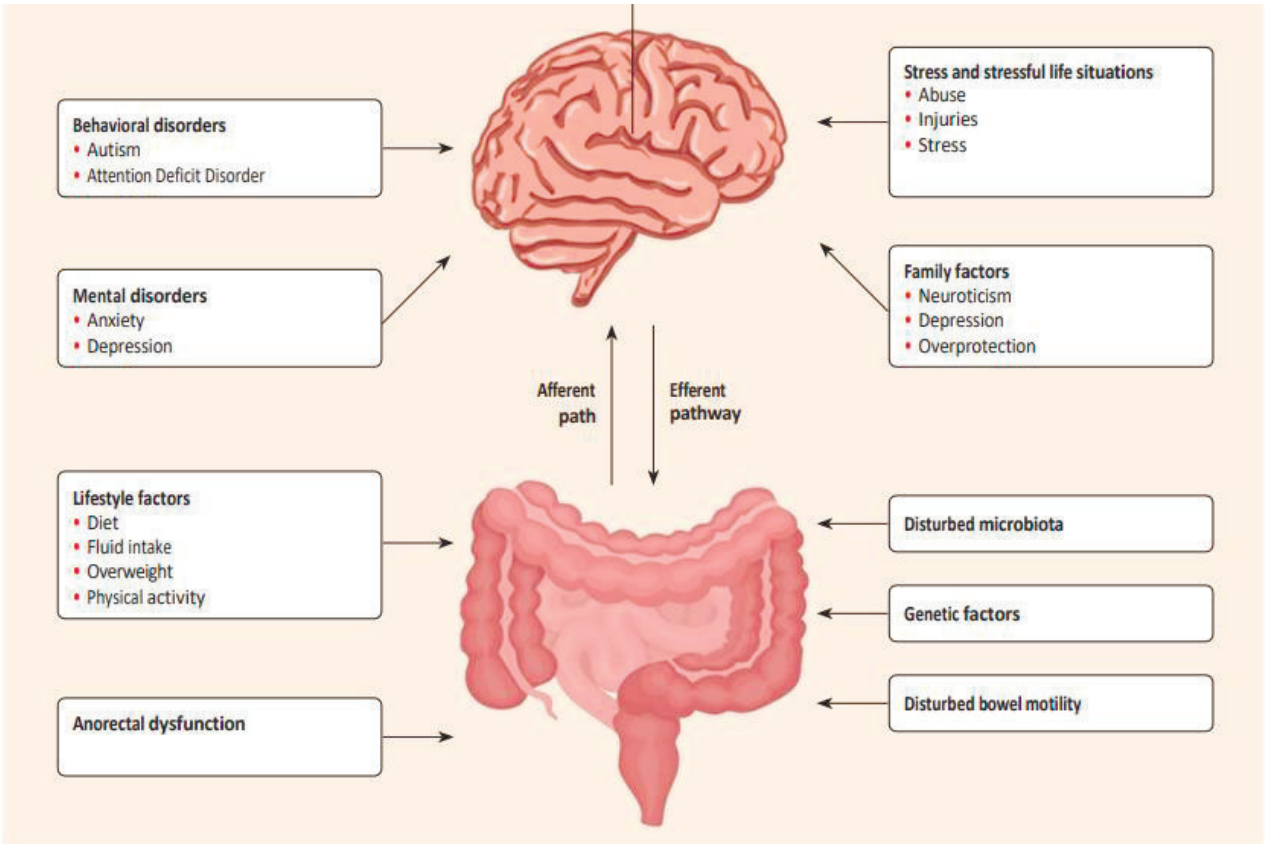


Figure 1. **Pathophysiologic factors of functional constipation**

In the context of functional disorders accompanied by constipation, anorectal dysfunction is considered, which leads to difficulty in evacuating stool from the rectum. These defecation disorders are caused by decreased rectal motility and/or increased resistance to evacuation, as well as abnormalities of rectal sensitivity [14]. Functional defecation disorders also include dyssynergic defecation, which results from paradoxical contraction or incomplete relaxation of the pelvic floor and external anal sphincters [15, 16].

To date, the initial approach in identifying functional disease is history taking and physical examination. Diagnostic methods are aimed at searching for and the possibility of excluding diseases of organic nature, in particular, identifying the presence of specific alarming symptoms - "red flags" [1, 17]. For this purpose, it is advisable to conduct a thorough laboratory and instrumental examination: clinical and biochemical blood tests, urine, stool analysis for hidden blood, rectal palpation, rectoromanoscopy, colonoscopy [11, 18].

In the absence of laboratory and instrumental data indicating the presence of organic pathology, the conclusion of a functional disorder is usually based on the evaluation of symptoms and anamnestic data. This concept may have some inaccuracies due to a possible decrease in the objectification of symptoms by the patient, as well as the lack of detail of the processes that underlie the occurrence of functional disorders.

It is known that the most important outcome of diagnostic measures is to predict response to treatment and to help stratify patients for specific therapies. In addition, the relevance of timely diagnosis and subsequent choice of treatment tactics is primarily due to the decrease in the quality of life of patients correlating with clinical symptoms. In addition, the economic component plays a major role, which includes a wide range of diagnostic and therapeutic measures, as well as the independent use of pharmaceuticals, which do not always have a proper effect. As a rule, in real clinical practice, the plan of management of patients with constipation is based on the exclusion of organic pathology, and then the selection of therapeutic tactics is based on speculative ideas without assessing the function of the anorectal zone and taking into account the probability of pelvic floor muscle dyssynergia.

However, since the etiology and pathophysiology of evacuation disorders are usually multifactorial, it is not sufficient to rely on symptoms alone when selecting therapy. Currently, there are diagnostic methods that allow detailing the types of disorders that may underlie the pathogenesis of functional constipation. These are anorectal manometry, rectal sensory test, balloon expulsion test, and defecography. Thus, the purpose of this review is to familiarize general practitioners, internists, gastroenterologists with the methods of diagnosing functional disorders of the gastrointestinal tract in patients with constipation and to draw attention to the importance of this examination, as well as to highlight the opportunities for the choice of treatment tactics that these methods provide.

General approaches to diagnosis.

After excluding the organic etiology of the disease, it is advisable to proceed to the detailing of symptoms of functional disorders. For this purpose, according to national and European recommendations, it is necessary to identify the signs of the disease, according to the Rome criteria IV revision (2016) (Fig. 2) [5, 9]

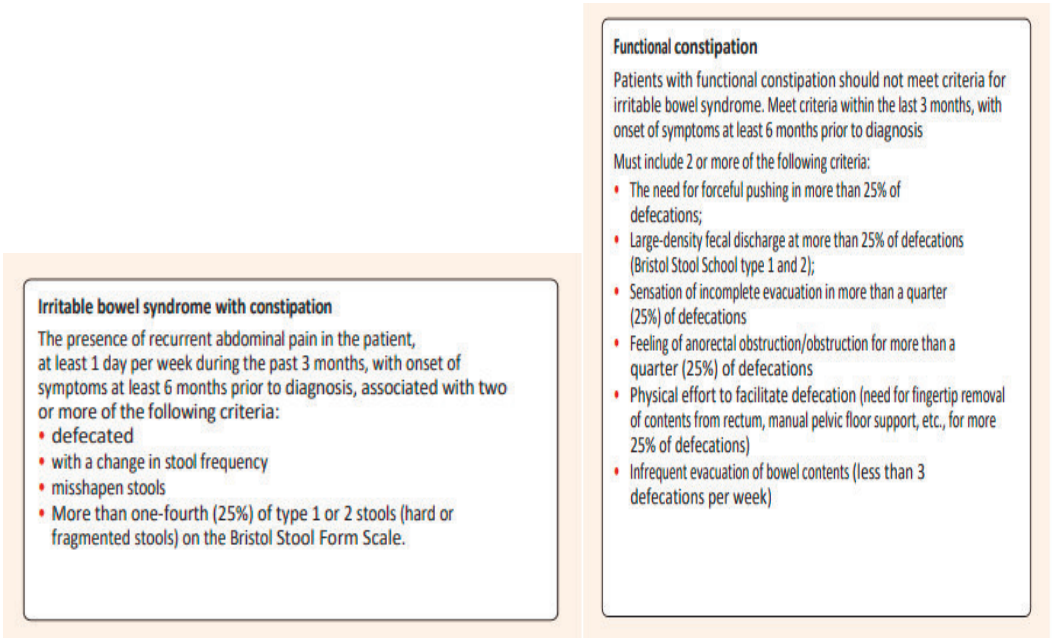


Figure 2. **Diagnostic criteria for constipation (Rome IV criteria, 2016)**

Clinical evaluation should examine a number of criteria, including stool frequency and consistency, stool size. In this case, it is necessary to rely on graphical representations of stool shape based on the Bristol Stool Shape Scale [19]. In addition, questionnaires and diaries written by the patient about bowel function can serve as additional methods to assess bowel function. Questionnaires reflect symptoms, while a bi-weekly diary of bowel function provides a more accurate assessment of daily changes and the relationship between stool form and other symptoms [20]. This has implications for symptom objectification because the patient may have a different perception of constipation than the established criteria. In clinical practice, some patients report constipation because they, perhaps unlike their spouse, do not defecate daily. Other patients have had symptoms for longer than originally thought (e.g., since childhood) [20].

It is important to ask patients about diet (whether intake of fiber, calories, and short-chain carbohydrates is adequate, lifestyle (e.g., activity level), toilet use habits, obstetric history, and presence of surgery. It should be remembered that unintentional refusal to eat is not uncommon [6]. In addition, the combination with other functional gastrointestinal pathology, especially in young patients without symptoms of anxiety, confirms a functional cause of symptoms [21].

Functional methods of diagnosing anorectal disorders.

To understand the mechanism of constipation, especially in patients resistant to first-line therapy such as lifestyle modification and optimization of stool consistency, it is useful to assess the motor and sensory function of the anorectal area [22]. Determination of dysfunction can directly influence the clinical picture of the disease and the choice of further treatment tactics. According to the recommendations of the European Society of Neurogastroenterology and Motility (2019), the balloon expulsion test, rectal sensory test, anorectal manometry, and defecography are used for this purpose, as indicated, as the most objective studies to assess anorectal sensorimotor function [23, 24]. According to a number of studies, about 25% of patients with irritable bowel syndrome with constipation reported ineffective therapy with laxatives, possibly due to the presence of dyssynergic defecation [14]. This determines the need for additional studies in the presence of functional disorders of the gastrointestinal tract associated with constipation.

Anorectal manometry is a diagnostic method to assess anorectal function. It is performed to measure anorectal pressure, assess anal sphincter function, rectal sensitivity, and determine rectal and rectosphincter reflexes both at rest and during simulated defecation [25]. Manometry can detect colonic motility disorders such as decreased motility and decreased phasic contractile responses to food intake and/or to the administration of certain laxative drugs [26]. This procedure uses a pressure-sensitive catheter and a balloon at the tip of the tube to assess the neuromuscular and sensory status of the anus and rectum. During the technique, there is a normal increase in rectal pressure along with relaxation of the internal and external anal sphincters [27].

Manometry equipment records pressure data from individual points in the anal canal ("conventional anal manometry") or simultaneously records and displays detailed information from the entire anal canal and distal rectum (high-resolution manometry) [27]. High-resolution manometry has higher sensitivity and specificity in assessing rectal motor dysfunction in chronic constipation compared to conventional anorectal manometry. This is achieved due to the available closely spaced pressure transducers, which provide better spatial resolution and allow for better pressure estimation as well as recording of colonic tone [28, 29].

The technique based on high-resolution anorectal manometry is implemented and actively used by the Department of Propaedeutics of Internal Medicine and Gastroenterology of A.I. Evdokimov Moscow State Medical University on the basis of the Central Clinical Hospital "RZD-Medicine". The use of simpler and less expensive methods, such as anorectal sphincterometry and profilometry, seems to be no less relevant [30]. Anorectal sphincterometry is a type of anorectal manometry, which allows a screening assessment of the functional state of the pelvic floor muscles, including the analysis of indicators responsible for the state of both holding and (indirectly, without determining the types of functional defecation disorders) evacuation of intestinal contents. The technique of anorectal manometry with puller pulling of a thin water-perfusion catheter with radial arrangement of channels (anorectal profilometry) makes it possible to evaluate the indices and pressure distribution along each of the channels throughout its movement. Thus, anorectal profilometry can be used for quick and objective diagnosis of spasm of smooth muscle structures of the internal sphincter, which determines the state of anal sphincter tone by 80% [30]. Moreover, according to some data, anorectal sphincterometry is a standard equipment of a coloproctologist's office1 and is more widespread, as well as profilometry, which is informative and allows choosing a pathogenetically justified approach to treatment [30].

Rectal filling awareness is crucial for normal bowel function. The balloon extrusion test is used for impaired diagnosis of motor as well as sensory anorectal function. In particular, this technique is of diagnostic value in the initial approach to patients with suspected dyssynergic defecation [30].

The balloon squeeze test is considered a rapid, reproducible and inexpensive test for the diagnosis of functional disorders accompanied by constipation. The technique involves measuring the amount of time it takes for the patient to squeeze a rectal balloon filled with 25 ml or 50 ml of water or air from the rectum. Depending on the technique used, a violation is defined if the balloon is not ejected between 1-5 min [31]. In a large study involving 286 patients, it was shown that this test has a high correlation with anorectal manometry and electromyography, and that the normal upper limit should be 2 min [32]. Because the balloon extrusion test is widely available, its cost is very low, and it is easy to perform, this test can be used in clinical practice to evaluate anorectal function in combination with other tests [31].

Rectal sensory test is used to determine the sensitivity thresholds. This is a method in which rectal sensitivity to distension is assessed using a rectal balloon placed at least 3-5 cm above the upper border of the anal canal. Balloon volume is recorded during each of the three sensitivity thresholds reported by the patient: continuously palpable volume, volume at which the urge to defecate occurs, and maximum tolerated distension volume. Based on the data obtained, rectal sensitivity is determined [24]. Numerous studies have shown that some patients with constipation have decreased sensitivity (rectal hyposensitivity), which can be detected mainly by this diagnostic method [33].

Barium defecography and magnetic resonance defecography are non-invasive diagnostic methods to illustrate the dynamics of physiologic processes in anorectal disorders. This is of added value for the evaluation of functional disorders accompanied by constipation [25]. These are radiologic studies of the rectum, which help to obtain images and assess the function of the rectum and pelvic muscles during defecation attempts [27]. It should be noted that the techniques have very limited application, due to lack of standardization, especially for magnetic resonance defecography. In addition, the possibility of psychological discomfort of the patient may interfere with the normal performance of the procedure, leading to overdiagnosis of impaired evacuation [25].

However, there are some reports that the results of high-resolution anorectal manometry and magnetic resonance imaging significantly correlate with each other, which confirms the validity criterion of these tests [34]. In addition, in some cases, barium defecography or magnetic resonance defecography can be used to assess evacuation parameters instead of the balloon extrusion test [35].

The method of anal electromyography is based on the detection of electromyographic activity, which is recorded by electrodes placed on the anal sphincter or attached to the skin of the perianal area [32]. According to the American Gastroenterological Association (AGA), the methods of intraanal electromyographic activity recording are of primary importance for assessing the total contractile capacity of the external sphincter and pelvic floor. The method of anal electromyography is mainly used to detect pelvic floor muscle dyssynergia [32].

In the diagnosis of functional constipation, an important step is to determine the abnormal rate of transit through the colon [36, 37]. Irrigoscopy is performed before the study, because the undiagnosed lengthening and/or dilation, violation of the position and fixation of the colon may lead to misinterpretation of the obtained data [37]. In addition, the American Gastroenterological Association recommends an initial assessment of anorectal function before conducting a colonic transit study [6].

Determination of the type of disorders by functional diagnostics.

After the initial clinical assessment, it is possible to roughly classify patients with slow and normal colonic transit, the presence or absence of anorectal dysfunction, and a combination of these [6].

The combined results of anorectal manometry, balloon extrusion test, and rectal sensory test allow classification of anorectal disorders into several types according to the London Classification [14]. These types of disorders include disorders of the rectoanal inhibitory reflex, anal tone, contractility, anorectal coordination, and sensation [14]. The classification of anorectal disorders has been adopted by the International Working Group on Anorectal Physiology regarding the characteristics, terminology used, and interpretation of anorectal function testing based on objective physiological measurements. It should be noted that testing may reveal either one or a combination of anorectal disorders, which should be taken into account when choosing further treatment tactics [14]. In addition, the classification provides a general approach to describing the results of anorectal function testing and can be considered as an addition to the Rome criteria of the IV revision (Fig. 3) [14, 43, 44].

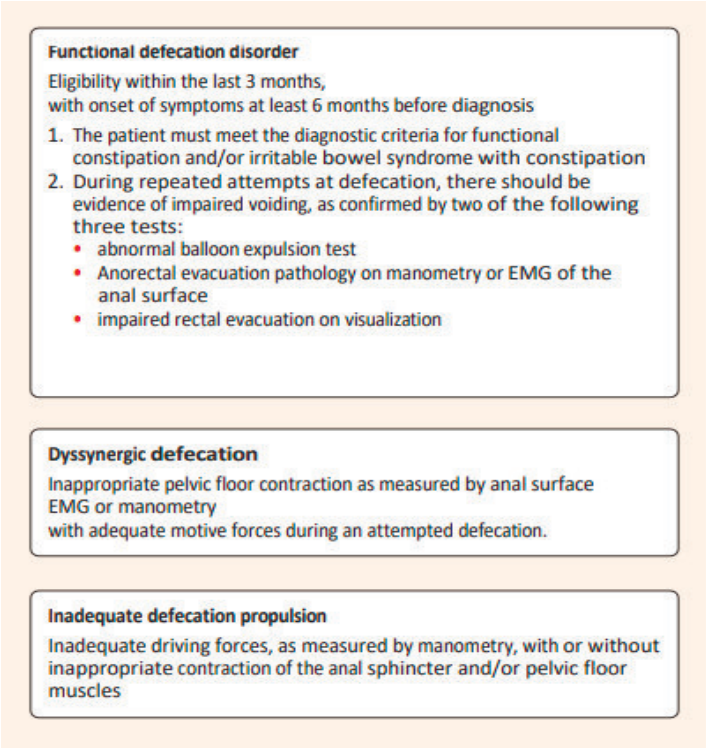


Figure 3. **Functional disorders of defecation, including dyssynergic defecation (Rome IV criteria, 2016).**

In addition to diagnostic results, the Rome criteria also take into account combinations of symptoms and physiological data, which helps to make a more detailed conclusion about the type of functional defecation disorder [44]. However, as can be seen from Fig. 3, based on the Rome criteria, the diagnosis of "dyssynergic defecation" must be confirmed by abnormal results in two out of four tests (such as manometry, balloon extrusion test, surface electromyography or barium defecography, or MRI) [33, 44]. It should be noted that patients with irritable bowel syndrome with a predominance of constipation do not meet the diagnostic criteria for defecation disorders according to the diagnostic Rome IV criteria. However, the relationship between irritable bowel syndrome and defecation disorders has been demonstrated in several studies [45].

Conclusion.

Thus, functional methods for assessing colon motility are important for a detailed understanding of the pathogenesis of constipation, which is of great importance in determining the tactics of further treatment of patients. Such functional methods as anorectal manometry, rectal sensory test and balloon expulsion test are the most studied and mandatory studies for an objective assessment of the sensorimotor function of the anorectal zone. In Uzbekistan, these methods are used extremely rarely, which requires widespread familiarization of practicing physicians with the advantages of these methods. The use of the presented methods will significantly improve the quality of diagnostics and choose an effective treatment strategy taking into account the impact on all pathogenetic links of the disease.

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