https://doi.org/10.33878/2073-7556-2024-23-2-35-45

Idiopathic megacolon: relationship between clinical features and diagnostic tests results

Denis V. Aleshin[1], Dmitry G. Shakhmatov[1,2], Evgeniy S. Surovegin[1], Elena P. Goncharova[1], Oksana Yu. Fomenko[1], Oleg I. Sushkov[1]

[1]Ryzhikh National Medical Research Center of Coloproctology (Salyama Adilya st., 2, Moscow, 123423, Russia)
[2]Russian Medical Academy of Postgraduate Education (Barrikadnaya st., 2/1, p.1, Moscow, 125993, Russia)

ABSTRACT *AIM: to assess the relationship between clinical features and diagnostic tests results in idiopathic megacolon/megarectum patients.*

PATIENTS AND METHODS: the retrospective analysis of clinical manifestations and diagnostic tests included 157 patients with idiopathic megacolon/megarectum in 2002-2023. The diagnosis of megacolon/megarectum was verified with a barium enema, Hirschsprung's disease was excluded byanorectal manometry and (if needed) rectal Swenson's biopsy.

RESULTS: the rate of integral parameter "abdominal discomfort" and Wexner constipation scale rate do not significantly correlate with barium enema, gut transit test, defecography and rectal compliance test results, besides of sigmoid colon width ($p = 0.03$). The rate of integral parameters "defecation difficulties" correlates with rectum width ($p < 0.001$) and do not correlate with gut transit time, results of defecography and rectal compliance test ($p > 0.05$). Distal contrast retention during gut transit test is associated with rectum width only ($p < 0.01$). The parameters of defecography do not correlate neither clinical features nor other diagnostic tests results ($p > 0.05$).

CONCLUSION: there was not significant relationship between rate of abdominal discomfort, Wexner constipation scale rate and diagnostic tests results. The rate of integral parameters "defecation difficulties" significantly correlates with rectum width (based on barium enema) only. Rectum width seems to be most important parameter to assess the rectum function and in a minor degree — rectal compliance test. The defecography do not correlate either with the severity of clinical symptoms or with the results of other diagnostic methods, which casts doubt on the appropriateness of using this diagnostic test in patients with megacolon.

KEYWORDS: *idiopathic megacolon, idiopathic megarectum, quality of life, barium enema, defecography, rectal compliance test*

CONFLICT OF INTEREST: *the authors declare no conflict of interest*

FOR CITATION: Aleshin D.V., Shakhmatov D.G., Surovegin E.S., Goncharova E.P., Fomenko O.Yu., Sushkov O.I. Idiopathic megacolon: relationship between clinical features and diagnostic tests results. *Koloproktologia*. 2024;23(2):35–45. (in Russ.). https://doi.org/10.33878/2073-7556-2024-23-2-35-45

ADDRESS FOR CORRESPONDENCE: *Aleshin D.V., Ryzhikh National Medical Research Center of Coloproctology, Salyama Adilya st., 2, Moscow, 123423, Russia; men.(499)199-07-61; e-mail: aleshin_dv@gnck.ru*

Received — 22.01.2024 *Revised — 21.03.2024* *Accepted for publication — 24.04.2024*

INTRODUCTION

Idiopathic megacolon is a chronic enlargement of the entire large intestine or any part of it, developing for unknown reasons. Megacolon does not have any pathognomonic symptoms. Usually, idiopathic megacolon manifests itself with chronic constipation and symptoms of abdominal discomfort, primarily bloating. However, it often occurs without any clinical manifestations and is detected already with complications, most often a colon volvulus. The diagnostic program in patients with idiopathic megacolon pursues 2 main goals: the exclusion of all known causes of megacolon, primarily Hirschsprung's disease, and the assessment of the severity of impaired motor evacuation function of the large intestine. In the previous study, when analyzing the relationship between the quality of life of patients with idiopathic megacolon/megarectum with clinical manifestations and diagnostic tests results, it was found that only the age of patients and the severity of symptoms of

abdominal discomfort and defecation difficulties are independent factors that significantly affect the assessment of quality of life [1].

AIM

To reveal the relationship between the clinical manifestations of idiopathic megacolon/megarectum and the results of objective diagnostic methods.

PATIENTS AND METHODS

A retrospective single center study of clinical symptoms and checkup results included 157 patients from 2002 to 2023, aged 18–78 years. The median was 24 (18; 41) years. There were 89 males (56.7%) and 68 females (43.3%).

Patients were included in the study in the presence of megacolon/megarectum according to barium enema (irrigoscopy) in accordance with the criteria described in the Russian clinical guidelines for idiopathic megacolon [2].

Hirschsprung's disease in all patients was excluded by a combination of radiological symptoms (n = 157), anorectal manometry (n = 157) and, if necessary, morphology of a full-thicknesspart of the rectal wall obtained by Swanson biopsy (n = 24). The criterion for non-inclusion was the presence of a stoma after previous colorectal resections.

The analysis took into account the frequency of symptoms and their severity on a point scale. The methodology for assessing clinical symptoms was described in detail earlier [1]. The relationship of clinical signs with the results of barium enema (n = 157), X-ray defecography with barium (n = 79), gastrointestinal transit time for 5 days (n = 95), reservoir function of the rectum (n = 129) was done. During barium enema, the maximal width of the rectum, sigmoid and transverse colon in cm, the length of the sigmoid and transverse colon in cm, when possible, and the multiplying the length of the sigmoid colon by its maximal width were measured. The analyzed parameters of defecography were defecation time (TDEF) in seconds and residual volume (VRSD) in ml. The total transit time (TTT) was estimated on a point scale, where TTT up to 24 hours, 24–48 hours, 49–72 hours, 73–96 hours and over 96 hours corresponded to 1, 2, 3, 4, and 5 points. In the reservoir rectal function test, the first sensitivity threshold (1st ST) in ml, the maximal tolerated volume (MTV) in ml, the index of the maximal tolerated volume (I_{MTV}), as the ratio of the maximal tolerated volume to the amount of residual rectal pressure created by it, and the adaptation coefficient ($\Delta V/\Delta P$) — the ratio of an increase in volume to an increase in residual pressure from the sensitivity threshold to the maximal tolerable volume. At the same time, in 62 cases, only air volumes corresponding to sensitivity thresholds were recorded, without taking into account the residual rectal pressure created by them. Therefore, it was impossible to calculate the index of the maximal tolerable volume and the coefficient of adaptation. In 9 more cases, it was not possible to calculate the adaptation coefficient, since patients were unable to differentiate the first threshold of sensitivity of the rectum to filling. It should be noted that due to the retrospective nature of the analysis, defects in filling out questionnaires by patients, as well as the unequal scope of checkup and the technical limitations of the diagnostic tests themselves, the number of cases for each of the compared signs was different. Therefore, the tables indicate the number of cases in the corresponding rows.

STATISTICAL ANALYSIS

Statistical analysis was performed using the STATISTICA 13.3 (TIBCO, USA) program. Given the non-normal distribution of most features, Spearman's criterion was used for correlation analysis, and the dependence of quantitative and binary features was studied using the Mann-Whitney U-test. The differences were recognized as statistically significant at $p < 0.05$.

Table 1. *The relationship of clinical symptoms and diagnostic test results with gender (Mann-Whitney test)*

Sign		*n*	Males (Me (Q1;Q3))	Females (Me (Q1;Q3))	*p*
Independent stool (points)		**120**	**4 (2; 5)**	**1 (1; 3)**	**< 0.001**
Defecation rate (points)		121	3 (2; 5)	3 (2; 5)	0.426
Defecation urge (points)		**110**	**2 (2; 4)**	**2 (1; 2)**	**0.004**
'Abdominal discomfort' (points)		**100**	**9 (6; 14)**	**12 (9; 17)**	**< 0.001**
'Defecation difficulties' (points)		98	8 (5; 11)	8 (5; 11)	0.602
Constipation intensity (Wexner scale)		98	12 (8; 15)	13 (10; 17)	0.111
Irrigoscopy	Sigmoid colon length (cm)	85	70.0 (60.0; 80.0)	71.0 (60.0; 85.0)	0.236
	Transverse colon length (cm)	14	55.0 (50.0; 65.0)	60.0 (55.0; 75.0)	0.606
	Rectal width (cm)	117	10.1 (9.0; 12.0)	10.0 (9.0; 11.0)	0.191
	Sigmoid colon width (cm)	108	11.0 (8.0; 13.0)	10.0 (8.0; 12.0)	0.117
	Sigmoid colon width × length (cm^2)	64	780.0 (522.5; 990.0)	765.0 (510.0; 910.0)	0.517
	Transverse colon width (cm)	42	6.3 (5.3; 9.0)	8.0 (6.2; 10.0)	0.117
Transit time by GIT (points)		95	5 (4; 5)	5 (4; 5)	0.802
Defecography	T_{def} (sec.)	71	60.0 (30.0; 70.0)	40.0 (30.0; 70.0)	0.474
	$V_{rsd.}$ (ml)	79	50.0 (20.0; 90.0)	37.5 (20.0; 50.0)	0.474
Rectal reservoir function	1^{st} ST (ml)	129	102.0 (80.0; 110.0)	102.0 (90.0; 105.0)	0.721
	MTV (ml)	82	660.0 (500.0; 890.0)	600.0 (400.0; 850.0)	0.787
	1_{MTV} (ml/mmHg)	64	32.5 (20.2; 52.4)	27.8 (19.6; 50.0)	0.874
	ΔV/ΔP (ml/mmHg)	51	39.1 (20.0; 88.3)	27.9 (14.4; 76.9)	0.488

RESULTS

The most common complaints of patients were bloating (115/120, 95.8%), constipation (133/151, 88.1%), abdominal pain (92/105,87.6%) and anal leakage (62/152, 40.8%). When assessing the relationship of clinical symptoms with gender, it was found that in women, symptoms of abdominal discomfort were significantly more pronounced than in men. For men, however, there was a great preservation of an independent stool and the urge to defecate. At the same time, there were no significant differences between the sexes in either the value of the 'defecation difficulties' indicator or the intensity of constipation on the Wexner scale (Table 1). We also did not find significant differences between men and women in the size of the large intestine and the severity of transit disorders, indicators of the rectal evacuation function (Table 1).

We also did not reveal a significant relationship between the age of patients and clinical symptoms, except for an inverse correlation with the preservation of urge to defecate. As for the results of diagnostic tests, the length and width of the sigmoid colon and the width of the transverse colon were directly correlated with age, and the width of the lumen and the residual volume of the rectum were inversely correlated. At the same time, the multiplying the length of the sigmoid colon by its width did not depend on age. Also, the severity of gastrointestinal transit difficulties increased statistically significantly with age (Table 2).

Further, the relationship between clinical symptoms and the results of diagnostic procedures was analyzed. According to the correlation analysis, the assessment of the intensity of constipation according to the modified Wexner scale did not depend on the size of the large intestine, or on the degree of transit slowdown, or on the severity of evacuation difficulties according to defecography and studies of the reservoir rectal function (Table 3). Similarly, we did not find a statistically significant relationship between the value of the 'abdominal discomfort' indicator with any of the parameters of the instrumental research methods (Table 3). The only exception was the width of the sigmoid colon, with which both indicators were statistically significantly correlated. But at the same time, the dependence was reversed, that is, the greater width of the intestine corresponded

Table 2. *The relationship of clinical symptoms and diagnostic test results with age (Spearman correlation)*

Sign		*n*	R	*p*
Independent stool (points)		120	–0.16	0.08
Defecation rate (points)		121	0.12	0.19
Defecation urge (points)		**110**	**–0.20**	**0.04**
'Abdominal discomfort' (points)		100	0.04	0.70
'Defecation difficulties' (points)		98	–0.19	0.06
Constipation intensity (Wexner scale)		98	–0.12	0.22
Irrigoscopy	**Sigmoid colon length (cm)**	**85**	**0.31**	**0.01**
	Transverse colon length (cm)	14	0.18	0.53
	Rectal width (cm)	**117**	**–0.33**	**< 0.01**
	Sigmoid colon width (cm)	**108**	**–0.33**	**0.02**
	Sigmoid colon width × length (cm^2)	64	0.23	0.07
	Transverse colon width (cm)	**42**	**0.40**	**0.01**
Transit time by GIT (points)		**95**	**0.31**	**< 0.01**
Defecography	T_{DEF} (sec.)	71	–0.10	0.39
	V_{RSD} (ml)	**79**	**–0.10**	**0.02**
Rectal reservoir function	1st ST (ml)	129	0.07	0.41
	MTV (ml)	82	–0.13	0.26
	1_{MTV}(ml/mmHg)	64	–0.09	0.45
	ΔV/ΔP (ml/mmHg)	45	–0.10	0.50

Table 3. *The relationship of Wexner constipation scale rate and rate of integral parameter "abdominal discomfort" with the results of diagnostic tests (Spearman correlation)*

Study/Sign / Indicator		The intensity of constipation (Wexner scale)			'Abdominal discomfort'		
		n	R	*p*	*n*	R	*p*
Barium enema	Sigmoid colon length (cm)	51	–0.01	0.94	55	–0.06	0.67
	Transverse colon length (cm)	10	–0.07	0.85	11	0.11	0.75
	Rectal width (cm)	78	0.22	0.06	79	–0.01	0.99
	Sigmoid colon width (cm)	**71**	**–0.25**	**0.03**	**74**	**–0.25**	**0.03**
	Sigmoid colon width × length (cm^2)	37	–0.29	0.08	41	–0.18	0.26
	Transverse colon width (cm)	34	0.19	0.28	34	0.314	0.07
Transit time by GIT (points)		60	0.11	0.40	61	0.01	0.93
Defecography	$T_{ДЕФ}$(c) T_{DEF} (sec.)	55	–0.11	0.43	56	–0.09	0.50
	V_{RSD} (ml)	60	0.10	0.43	62	–0.05	0.70
Rectal reservoir function	1st ST (ml)	86	0.07	0.54	88	0.15	0.16
	MTV (ml)	51	–0.09	0.52	52	0.04	0.77
	1_{MTV}(ml/mmHg)	36	–0.16	0.33	36	0.01	0.91
	ΔV/ΔP (ml/mmHg)	23	–0.28	0.54	22	0.14	0.54

to a lower intensity of constipation and a lower severity of abdominal discomfort.

The value of the 'defecation difficulties' indicator was statistically significantly correlated with the rectal width according to barium enema, but did not present a relationship either with the results of defecography or with the parameters of the rectal reservoir function (Table 4).

It should be noted that the results of defecography — the amount of residual volume and the time of emptying — did not show any relationship with either clinical signs or the results of other diagnostic tests (Table 5).

In this sense, the most clinically significant parameter was the rectal width according to barium enema data. It was significantly correlated with the defecation rate and the value of 'defecation difficulties' indicator, as well as with the maximal tolerated volume, the index of the maximal tolerated volume and the coefficient of adaptation

Table 4. *The relationship of rate of integral parameter "defecation disorder" with the results of diagnostic tests (Spearman correlation)*

Study/Sign \ Indicator		'Defecation difficulties'		
		n	R	*p*
Irrigoscopy	Sigmoid colon length (cm)	53	0.02	0.91
	Transverse colon length (cm)	11	–0.12	0.72
	Rectal width (cm)	**78**	**0.32**	**0.04**
	Sigmoid colon width (cm)	**71**	**–0.35**	**0.03**
	Sigmoid colon width × length (cm²)	**38**	**–0.38**	**0.02**
	Transverse colon width (cm)	34	0.34	0.06
Transit time by GIT (points)		59	0.12	0.37
Defecography	T_{DEF} (sec.)	54	0.04	0.76
	V_{RSD} (ml)	59	0.24	0.07
Rectal reservoir function	1st ST (ml)	86	0.09	0.42
	MTV (ml)	51	0.15	0.29
	1_{MTV}(ml/mmHg)	36	0.03	0.85
	ΔV/ΔP (мл/мм рт.ст.) ΔV/ΔP (ml/mmHg)	23	–0.11	0.62

Table 5. *The relationship of defecation time (ТДЕФ) and residual volume (VOCT) according to defecography with clinical and other diagnostic signs (Spearman correlation)*

Sign \ Defecography Parameter		T_{DEF}			V_{RSD}		
		n	R	*p*	*n*	R	*p*
Independent stool (points)		67	0.09	0.47	74	0.15	0.21
'Abdominal discomfort' (points)		56	–0.09	0.50	62	–0.05	0.04
Defecation rate (points)		64	0.03	0.80	70	–0.03	0.80
Defecation urge (points)		61	0.17	0.18	68	0.23	0.05
'Defecation difficulties' (points)		54	0.04	0.76	59	0.24	0.07
Anamnesis duration (points)		66	0.06	0.63	74	0.01	0.92
Constipation intensity (Wexner scale)		55	–0.11	0.43	60	0.10	0.43
Irrigoscopy	Sigmoid colon length (cm)	41	0.13	0.40	46	–0.11	0.46
	Transverse colon length (cm)	6	–0.38	0.45	7	–0.14	0.76
	Rectal width (cm)	62	0.14	0.27	69	0.10	0.43
	Sigmoid colon width (cm)	51	0.05	0.97	56	0.05	0.73
	Sigmoid colon width × length (cm²)	30	0.07	0.70	34	–0.07	0.67
	Transverse colon width (cm)	19	0.19	0.42	21	0.21	0.35
Transit time by GIT (points)		51	–0.17	0.27	57	–0.08	0.56
Rectal reservoir function	1st ST (ml)	66	0.05	0.67	73	0.11	0.37
	MTV (ml)	45	0.10	0.50	50	0.13	0.38
	1_{MTV}(ml/mmHg)	31	–0.02	0.93	34	0.137	0.44
	ΔV/ΔP (ml/mmHg)	19	–0.19	0.43	21	–0.28	0.22

according to the study of the rectal reservoir function (Table 6).

In turn, with respect to the maximal tolerated volume index (IMTV), a significant relationship was noted between its value and the frequency of complaints about the lack of a voluntary stool (Mann-Whitney U-test, $n = 58$, $p = 004$). But at the same time, there was no significant correlation with the 'defecation difficulties' indicator and the defecation rate, as well as the degree of preservation of the voluntary stool itself in points (Table 7).

It should also be noted that of all the signs characterizing the state of the motor evacuation function of the rectum, a significant correlation with distal delay of contrast in the total transit time test was revealed only for the rectal width according to barium enema (Fig. 1, Table 8). Neither the defecography nor the data of the rectal reservoir function test showed significant relationship between the rectum and this feature of transit difficulties (Table 8).

Table 6. *The relationship of rectal width according to barium enema with clinical signs and diagnostic test results (Spearman T correlation)*

Sign		*n*	R	*p*
Independent stool (points)		95	–0.09	0.36
Defecation rate (points)		**92**	**–0.24**	**0.02**
Defecation urge (points)		88	–0.06	0.59
'Abdominal discomfort' (points)		79	0.01	0,99 0.99
'Defecation difficulties' (points)		**78**	**0.32**	**< 0.01**
Time of the disease history (points)		107	0.01	0.89
Constipation intensity (Wexner scale)		78	0.22	0.06
Irrigoscopy	Sigmoid colon length (cm)	72	–0.09	0.46
	Transverse colon length (cm)	8	0.44	0.28
	Sigmoid colon width (cm)	84	0.05	0.64
	Sigmoid colon width × length (cm^2)	53	0.02	0.88
	Transverse colon width (cm)	27	0.08	0.68
Transit time by GIT (points)		70	–0.07	0.58
Rectal reservoir function	1^{st} ST (ml)	102	–0.08	0.37
	MTV (ml)	**65**	**0.25**	**0.04**
	1_{MTV} (ml/mmHg)	**50**	**0.37**	**0.01**
	ΔV/ΔP (ml/mmHg)	**34**	**0.41**	**0.02**

Table 7. *The relationship of $I_{МПО}$ according to rectal compliance test with clinical and other diagnostic signs (Spearman correlation)*

Sign		*n*	R	*p*
Independent stool (points)		51	0.04	0.76
Defecation rate (points)		47	0.01	0.98
Defecation urge (points)		46	0.16	0.29
'Abdominal discomfort' (points)		36	0.02	0.91
'Defecation difficulties' (points)		36	0.03	0.85
Anamnesis duration (points)		56	–0.19	0.15
Constipation intensity (Wexner scale)		36	–0.17	0.33
Irrigoscopy	Sigmoid colon length (cm)	37	0.02	0.93
	Transverse colon length (cm)	7	–0.56	0.19
	Rectal width (cm)	**50**	**0.37**	**0.01**
	Sigmoid colon width (cm)	34	0.08	0.66
	Sigmoid colon width × length (cm^2)	25	0.01	0.97
	Transverse colon width (cm)	8	–0.20	0.63
Transit time by GIT (points)		46	–0.06	0.51

As for the length, width of the sigmoid colon and their multiplying, we did not find a significant relationship between the size of the intestine and the value of the 'abdominal discomfort' indicator and the constipation intensity on the Wexner scale, except for the inverse correlation of both indicators with the sigmoid colon width. The sigmoid colon width in those patients who complained of constipation was also significantly smaller. At the same time, we did not identify the relationship between the size of the sigmoid colon and the severity of bloating, as well as with the transit time through the gastrointestinal tract. At the same time, the sigmoid colon width was significantly correlation with the value of the 'defecation difficulties' indicator, as well as with the defecation rate and the degree of preservation of the urge to defecate (Tables 9,10).

DISCUSSION

The etiology of idiopathic megacolon/megarectum is currently unknown, which is why it is designated as 'idiopathic'. Most likely, this is an innate feature of the development of the large intestine. The clinical significance of idiopathic megacolon/

Table 8. *The relationship of signs of impaired evacuation function of the rectum with the presence or absence of distal contrast retention during gut transit test (Mann-Whitney test)*

Study/Sign		*n*	Distal retention		*p*
			Yes (Me (Q1;Q3))	No (Me (Q1;Q3))	
Irrigoscopy	**Rectal width**	**58**	**10.7 (10.0; 12.7)**	**9.0 (7.5; 10.5)**	**< 0.01**
Defecography	T_{DEF} (sec.)	44	60.0 (47.5; 70.0)	39.0 (22.5; 70.0)	0.14
	V_{RSD} (ml)	49	50.0 (37.5; 75.0)	35.0 (20.0; 85.0)	0.22
Rectal reservoir function	1st ST (ml)	66	101.0 (80.0; 108.0)	102.0 (40.0; 109.0)	0.56
	MTV (ml)	50	780.0 (510.0; 960.0)	560.0 (210.0; 740.0)	0.05
	1_{MTV} (ml/mmHg)	40	30.1 (21.4; 57.9)	30.6 (16.2; 47.7)	0.30
	ΔV/ΔP (ml/mmHg)	24	29.2 (20.9; 71.1)	42.3 (10.9; 175.8)	0.53

Table 9. *The relationship of the size of the sigmoid colon with clinical and other diagnostic signs (Spearman correlation)*

Sigmoid colon size / Sign	Length			Width			Length x Width		
	n	R	*p*	*n*	R	*p*	*n*	R	*p*
Independent stool (points)	64	–0.01	0.92	84	0.17	0.12	46	0.11	0.47
'Abdominal discomfort' (points)	55	–0.06	0.67	74	**–0.25**	**0.03**	41	–0.18	0.26
Defecation rate (points)	62	0.11	0.39	87	**0.35**	**0.01**	47	**0.42**	**0.01**
Defecation urge (points)	58	0.01	0.97	76	**0.30**	**0.01**	41	0.14	0.38
'Defecation difficulties' (points)	53	0.02	0.91	71	**–0.35**	**0.01**	38	**–0.38**	**0.02**
Anamnesis duration (points)	77	0.21	0.07	100	0.09	0.40	60	0.10	0.44
Constipation intensity (Wexner scale)	51	–0.01	0.94	71	**–0.25**	**0.03**	37	–0.29	0.08
Transit time by GIT (points)	50	0.10	0.49	65	0.21	0.10	40	0.30	0.06

megarectum is determined by the risk of life-threatening complications, as well as a complex of symptoms that can significantly affect the quality of life of patients. As for complications, first of all, these are volvulus of the sigmoid colon, less often — the development of fecal stones and fecal blockages, leading to mechanical intestinal obstruction. According to domestic and foreign recommendations, even 1 episode of volvulus in the anamnesis is an indication for elective surgical treatment — large intestine resection [2–4]. Our previous work was devoted in more detail to the problem of predicting sigmoid colon volvulus in patients with idiopathic megacolon/megarectum and indications for elective surgery [5]. In the absence of complications, idiopathic megacolon does not pose a danger to the health of patients and, accordingly, does not require mandatory surgical correction by itself. Conservative therapy, which is symptomatic in nature and is aimed mainly at correcting constipation and symptoms of abdominal discomfort, in most cases proves to be quite effective. Nevertheless, there are still a number of patients whose condition cannot be improved, and who are persistently looking for a 'radical' way to solve the problem. In the uncomplicated course of megacolon/megarectum, the goal of both conservative and surgical treatment of megacolon is to improve the quality of life of patients. In the case of elective surgical treatment of a complicated megacolon, in addition to preventing the complications themselves, we also strive to achieve an acceptable functional outcome of the surgery, that is, ultimately, a satisfactory quality of life. In the previous work, when analyzing the relationship between the quality of life of patients with

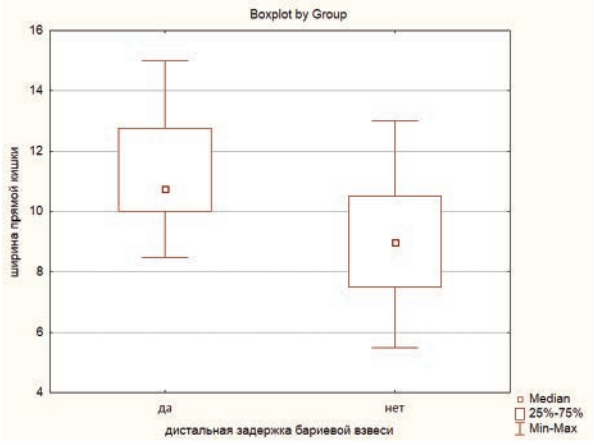

Figure 1. *Rectum width and distal contrast retention during colonic transit test relationship*

Table 10. *The relationship between the size of the sigmoid colon and complaints of constipation (Mann-Whitney test) and bloating (Spearman correlation)*

Study/Sign	Symptom	Constipation				Bloating (points)		
		n	Yes (Me)	No (Me)	*p*	*n*	R	*p*
Irrigoscopy	Sigmoid colon length (cm)	80	70.0	70.0	0.55	55	0.11	0.43
	Sigmoid colon width (cm)	**104**	**10.0**	**13.0**	**0.04**	74	0.11	0.35
	Sigmoid colon width × length (cm^2)	61	765.0	923.0	0.21	42	0.12	0.44

idiopathic megacolon/megarectum with clinical manifestations and diagnostic test results, it was found that only the age of patients and the severity of symptoms of abdominal discomfort and defecation difficulties are independent factors that statistically significantly affect the assessment of quality of life [1].

Thus, in order to predict the effectiveness of conservative therapy, to more accurately determine the indications for surgery, as well as the volume and method of large intestine resection, both in the case of uncomplicated megacolon treatment and for the prevention of complications, it is necessary to understand how pronounced the clinical symptoms are due to the anatomical features and functional state of the large intestine.

Usually, a number of examinations are carried out for this purpose, which are aimed at assessing the propulsive activity of the colon and the motor evacuation function of the rectum. In general, the complex of diagnostic measures is similar to that of patients with chronic constipation not associated with megacolon. The most studied and reproducible way to study the propulsive activity of the colon is to study the rate of transit through the gastrointestinal tract by X-ray or radionuclide methods [6,7]. As for the functional state of the rectum, the main methods here are the assessment of the size of the intestine using contrast enema, defecography and anorectal manometry, including the study of the reservoir function of the rectum [6,7].

The inconsistency of the test results and the need for extremely careful interpretation in patients with chronic constipation and functional defecation difficulties were demonstrated in studies at the end of the last century [8,9]. However, in the literature available to us, we have not found sources that would evaluate the effectiveness of these tests in patients with idiopathic megacolon/megarectum.

The presence of obvious anatomical abnormalities of the large intestine in patients with megacolon/megarectum suggests a causal relationship between symptoms and anatomical features and, accordingly, the possibility of relieving symptoms by surgical correction of these anomalies. The aim of the analysis was to assess the relationship of clinical symptoms and anamnestic data with the size of the intestine and the functional state of both enlarged and visually normal parts of the large intestine, assessed using diagnostic tests commonly used for this in patients with chronic constipation. We did not find a significant correlation of the clinical picture of megacolon on the gender of patients, except for a greater severity of abdominal discomfort in women. At the same time, there were no differences in the size of the intestine, the prevalence of megacolons, and the severity of transit difficulties between men and women. Megarectum was significantly more common in younger patients. Otherwise, we did not find a significant relationship between the size of the large intestine and the age of the patients. With age, the severity of transit difficulties also increased significantly, which coincided with a more noticeable loss of the urge to defecate. But at the same time, the effect of age on the severity of other clinical signs was not revealed. As the main parameters for assessing the severity of clinical symptoms, we used the integral indicators of 'abdominal discomfort', 'defecation difficulties' and constipation intensity according to the modified Wexner scale. Using correlation analysis, we were unable to find a statistically

significant relationship between the intensity of constipation on the Wexner scale and the severity of abdominal discomfort, either with the size of the large intestine according to barium enema, or with the severity of transit difficulties, or with the results of defecography and of the rectal reservoir function test.

The only exception was the sigmoid colon width, with which both indicators were significantly correlated. But at the same time, the correlation was reversed, that is, the greater width of the intestine corresponded to a lower intensity of constipation and a lower severity of abdominal discomfort.

The severity of symptoms of defecation difficulties increased significantly with an increase in the rectal size, but did not correlate with the total transit time through the gastrointestinal tract, or with the results of defecography, or with the parameters of the rectal reservoir function test. In addition to the value of the 'defecation difficulties' indicator, the rectal width according to irrigoscopy was statistically significantly correlated with the defecation rate, as well as with the index of the maximal tolerated volume and the coefficient of adaptation according to the rectal reservoir function test.

In addition, the rectal width is the only parameter of an 'objective' assessment of the rectal condition, which significantly correlated with the rate of distal delay of contrast medium in the study of transit through the gastrointestinal tract. But the results of defecography — the amount of residual volume and the time of emptying — on the contrary, did not show any relationship with either clinical signs or the results of other diagnostic tests.

Of course, the interpretation of the interrelationships of the clinical picture of megacolon and the results of diagnostic procedures is greatly complicated by a situation that could be called the 'double unknown' effect: on the one hand, we do not know how well the diagnostic methods used assess the severity of motor evacuation difficulties of the large intestine. And on the other hand, to what extent the clinical symptoms are caused by these difficulties. In general, the test of the transit of barium suspension through the gastrointestinal tract provides a fairly reliable assessment of the propulsive activity of the small intestine and the severity of difficulties of passage through the colon. But it does not allow us to assess whether the slowdown in transit is due to a violation of the function of only the expanded sections or the entire colon. Thus, the lack of correlation between clinical symptoms (indicators of the intensity of constipation on the Wexner scale and abdominal discomfort) and the colon size, together with the study of TTT (total transit time) by passage, does not allow making an informed choice between resection of only expanded sections and colectomy in the case of surgical treatment. According to indirect signs, the most clinically significant parameter in assessing the rectal function can be considered its width according to irrigoscopy data. In any case, it is most closely related to both clinical symptoms and the results of other tests. Among the parameters evaluated in the study of the rectal reservoir function, the index of maximal tolerated volume (IMTV) seems to be the most useful. It was significantly associated with the rectal width, as well as the presence or absence of a voluntary stool, although it did not correlate with the 'defecation difficulties' indicator.

Its reliability, apparently, is less than that of the 'rectal width' indicator during barium enema. But the advantage of the study lies in the absence of radiation exposure, so it can be used to assess the condition in dynamics. But the use of defecography in the checkup of patients with megacolon/megarectum is hardly justified, since the reliability of its assessment of the motor evacuation function of the rectum remains in great doubt.

The correlation between the sigmoid colon size and the severity of symptoms of defecation difficulties turned out to be somewhat unexpected. The dependence was significant and had the

opposite character, that is, the larger size of the sigmoid colon corresponded to a lower value of the 'defecation difficulties' parameter, a higher self-defecation rate and the preservation of the urge to defecate. It could be assumed that this dependence is a reflection of the state of decompensation, which is observed in a number of patients with idiopathic megacolon and Hirschsprung's disease and is usually manifested by a change of constipation to diarrhea, accompanied by increased bloating and weight loss. This is partly confirmed by the inverse relationship of the sigmoid colon width with the rate of complaints of constipation and the intensity of constipation on the Wexner scale. However, the sigmoid colon size did not correlate with either the presence or absence of constipation or the severity of bloating. Moreover, as mentioned above, the sigmoid colon width was inversely correlated with the severity of abdominal discomfort. Therefore, it is more likely that such an inverse relationship is due to the presence in some patients of a megarectum with a normal size of the sigmoid colon or a megasigma and an unexpanded rectum. Thus, evacuation difficulties caused by megarectum could be the cause of difficulties in defecation in patients with a smaller sigmoid colon. And, on the contrary, the normal function of the rectum in megasigma is to cause a lower severity of defecation difficulties and the preservation of the urge to defecate. This assumption needs to be confirmed. Therefore, a more detailed analysis of the dependence of life quality and clinical symptoms on the type of megacolon will be presented in subsequent publications.

CONCLUSION

The severity of abdominal discomfort and the intensity of constipation on the Wexner scale in patients with idiopathic megacolon/megarectum are not significantly correlated with the results of diagnostic tests, and the 'defecation difficulties' indicator significantly depends only on the rectal width. It is the width of the rectum according to barium enema data that seems to be the most important sign for assessing the severity of a violation of its motor evacuation function, and to a lesser extent, the parameters of the reservoir function study. The results of defecography do not correlate either with the severity of clinical symptoms or with the results of other diagnostic tests, which casts doubt on the expediency of using this diagnostic test in patients with megacolon.

AUTHORS CONTRUBUTION

Concept and design of the study: *Denis V. Aleshin*
Processing of the material: *Denis V. Aleshin*
Writing of the text and statistical data processing: *Denis V. Aleshin*
Editing: *Oleg I. Sushkov, Dmitriy G. Shakhmatov, Evgeniy S. Surovegin, Oksana Yu. Fomenko, Elena P. Goncharova*

INFORMATION ABOUT THE AUTHORS (ORCID)

Denis V. Aleshin — 0000-0001-8863-2229
Dmitriy G. Shakhmatov — 0000-0001-9780-7916
Evgeniy S. Surovegin — 0000-0001-5743-1344
Elena P. Goncharova — 0000-0001-6785-5191
Oksana Yu. Fomenko — 0000-0001-9603-6988
Oleg I. Sushkov — 0000-0001-9780-7916

REFERENCES

1. Aleshin D.V., Achkasov S.I., Shakhmatov D.G., et al. Clinical features and quality of life of patients with idiopathic megacolon. *Koloproktologia*. 2023;22(2):40–48. (in Russ.). doi: 10.33878/2073-7556-2023-22-2-40-48
2. Clinical Recommendations/ Idiopathic megacolon. https://cr.minzdrav.gov.ru/recomend/182_2 (in Russ.).
3. Vogel JD, Feingold DL, Stewart DB, et al. Clinical Practice Guidelines for Colon Volvulus and Acute Colonic Pseudo-Obstruction. *DisColonRectum*. 2016;59(7):589–600. doi: 10.1097/DCR.0000000000000602
4. Brian WCA Tian, Vigutto G, Tan E, et al. WSES consensus guidelines on sigmoid volvulus management. *World J Emerg Surg*. 2023;15;18(1):34. doi: 10.1186/s13017-023-00502-x
5. Aleshin D.V., Achkasov S.I., Shakhmatov D.G., et al. Risk factors of sigmoid volvulus in patients with idiopathic megacolon. *Koloproctologia*. 2024;23(1):32–41.

(in Russ.). doi: 10.33878/2073-7556-2024-23-1-32-41
6. Ivashkin V.T., Shelygin Y.A., Maev I.V., et al. Clinical Recommendations of the Russian Gastroenterological Association and Association of Coloproctologists of Russia on Diagnosis and Treatment of Constipation in Adults. *Russian Journal of Gastroenterology, Hepatology, Coloproctology*. 2020;30(6):69–85. (In Russ.). doi: 10.22416/1382-4376-2020-30-6-69-85
7. Bharucha AE, Pemberton JH, Locke GR 3rd., American Gastroenterological Association technical review on constipation. *Gastroenterology*. 2013;144(1):218–238.
8. Caruana WA, Freimanis BJ, Bauman MG, et al. Contributions of evacuation proctography and anorectal manometry to evaluation of adults with constipation and defecatory difficulty. *Digestive Diseases and Sciences*.1990;35(4):481–487. doi: 10.1007/bf01536923
9. Diamant NE, Kamm MA, Wald A, et al. AGA technical review on anorectal testing techniques. *Gastroenterology*. 1999;116:735–760. doi: 10.1016/S0016-5085(99)70195-2