Research Article
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The Point-Rating Scale for Determining Treatment Tactics in Patients with Adhesive Small Bowel Obstruction

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RELEVANCE The most practiced method of treating patients with acute intestinal obstruction - urgent surgical intervention - does not guarantee remission, contributing to the progression of morphological changes in the abdominal cavity. From this perspective, a shift in emphasis towards the planned surgical treatment of patients with adhesive disease with the use of the existing anti-adhesive methods after conservative resolution of the intestinal passage disorders looks like a promising direction.

AIM OF THE STUDY Improving the results of patients with acute adhesive intestinal obstruction treatment by developing a point-rating scale that allows to highlight groups of patients who are prone to conservative resolution of intestinal passage disorders episode, and, thereby, reduces the proportion of urgent interventions.

MATERIAL AND METHODS The analysis of the 125 patients treatment results (retrospective group) admitted with symptoms of acute adhesive intestinal obstruction was carried out. On this basis, the point-rating scale was developed including a number of factors that have certain value in terms of predicting the probability of conservative therapy success. Subsequently the developed scale was applied in 170 patients (prospective group) as part of treatment tactics implementation aimed at maximally conservative resolution of adhesive intestinal obstruction without negative effect on the immediate results of patients operated in later periods.

RESULTS The developed point-rating scale made it possible to reduce the frequency of urgent interventions among patients with signs of acute adhesive intestinal obstruction (from 79.2% to 57.6%) due to longer conservative measures — 18.1±17.2 and 11,2±8.7 hours in prospective and retrospective groups, respectively). There was no negative impact on the frequency of resection interventions (12.2 and 16.1% in the prospective and retrospective groups) as well as postoperative complications and overall mortality.

CONCLUSIONS The developed point-assessment scale made it possible to stratify patients in accordance with the probability of conservative therapy success and to justify its continuation for more than 12 hours in low-risk patients. The obtained results allow us to recommend the proposed scale for use in clinical practice.

Keywords: abdominal adhesions, acute adhesive intestinal obstruction, point scale
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AAIO— acute adhesive intestinal obstruction
USP — ultrasound procedure

RELEVANCE

The history of the study of the pathomorphosis of postoperative intra-abdominal adhesions and associated clinical conditions dates back to the very inception of abdominal surgery. Despite such a significant elapsed time, the scientific search in this direction is far from complete, as evidenced by the high frequency of adhesive disease, the lack of a unified approach to its treatment and effective schemes for the prevention of recurrence of the disease. The most serious form of this disease, of course, is acute adhesive intestinal obstruction (AAIO), the main treatment for which remains urgent surgical intervention [1, 2].

However, taking into account the key pathogenetic component of the development of abdominal adhesions, which is surgical trauma, urgent surgical intervention in such patients seems to be an extreme measure due to the lack of guarantees of a stable cure. At the same time, an unjustified delay in surgical intervention in a patient with acute intestinal obstruction contributes to an increase in the incidence of postoperative complications and a deterioration in the immediate results of treatment [3].

In view of this, the question of the volume and timing of conservative treatment of subcompensated forms of AAIO becomes especially urgent. According to the Russian National Clinical Guidelines [4], a time of 12 hours from the moment of admission is indicated as the term of non-operative treatment for AAIO, provided the duration of the disease does not exceed 36 hours. The views of foreign researchers on the safe terms of conservative treatment of AAIO vary from 24 to 72 hours, without specifying clear criteria for the termination of non-operative measures and indications for urgent surgical intervention. [5]. In other words, no unified views on the duration of conservative treatment and indications for its conversion into preoperative preparation have not been developed so far.

Purpose of the work: to improve the results of treatment of patients with AAIO by developing a point-assessment scale that allows to distinguish groups of patients prone to conservative resolution of an episode of intestinal passage disorders, and, thereby, reducing the proportion of urgent interventions.

MATERIAL AND METHODS

In the course of dynamic observation of patients with AAIO, a number of clinical, laboratory and instrumental parameters are usually assessed in order to determine the effectiveness of conservative treatment and to justify further tactics in favor of continuing non-operative measures or performing urgent surgical intervention. To construct a point-assessment scale focused on identifying patients promising in terms of non-operative resolution of AAIO, the results of treatment of 125 patients who were in the surgical departments of the Elizabethan Hospital in St. Petersburg in the period from 2016 to 2017 were analyzed.

To assess the effectiveness of the developed scale, a prospective group of 170 patients was also selected who were treated in the period from 2018 to 2019 using the proposed treatment algorithm. The inclusion criteria for the study were patients with AAIO with no signs of strangulation or peritonitis, that is, patients whose treatment began with conservative measures with further determination of tactics based on the results of follow-up.

When conducting a comparative analysis, there were no significant differences in age and gender indicators between the study groups, women of elderly and senile age predominated: 62 (36.5%) and 51 (40.8%) patients in the prospective and retrospective groups, respectively. Considering the age of the majority of patients, the comorbid background was often aggravated by chronic diseases of the

cardiovascular and respiratory systems. In particular, up to 51.7% of the prospective and 40% of patients in the retrospective group had circulatory system disorders of varying degrees of compensation; similar figures were given for various respiratory disorders: 9.4% and 10.4%, respectively, for oncological diseases - 7.1% and 8.8%, respectively.

The duration of hospitalization from the onset of the disease as one of the main parameters for determining the treatment tactics within the compared groups varied within a fairly wide range from 2 to 89 hours, averaging 27.2 ± 22.6 hours and 27.4 ± 23.5 hours for prospective and retrospective groups respectively. The number of surgeries underwent as an indicative criterion of the severity of the adhesions in the abdominal cavity also varied from 0 to 8 operations, with mean values of 1.9 ± 1.1 in the prospective group and 2.0 ± 1.3 in the retrospective group.

Comparative characteristics of clinical symptoms, laboratory and instrumental indicators, affecting the treatment tactics by one way or another one, are given in Table 1.

Table 1

Comparative characteristics of clinical with symptoms, laboratory and instrumental indicators of the studied groups

Feature	Study groups (n = 295)			
	Prospective (*n*=170)		Retrospective (*n*=125)	
	n	%	*n*	%
Stomach ache				
permanent	69	40,5	36	28,8
spasmodic	101	59,5	89	71,2
Vomiting on admission	77	45,3	70	56
Bloating	109	64,1	90	72
Lack of gas discharge	132	77,6	93	74,4
Weakened peristalsis	94	55,3	77	61,6
Splash noise	23	13,5	13	10,4
Leukocyte level, 10^9 / l	10,7±4,2		10,7±4,3	
Shift of the leukocyte count to the left	75	44,1	59	47,2
Intestinal levels in an overview X-ray				
single	53	31,2	35	28,0
multiple	7	4,1	10	8,0
horizontal	110	64,7	80	64,0
Free liquid as measured by ultrasound	49	28,8	29	23,2
Average intra-abdominal pressure, mm Hg	17,1±11,2		19,0±12,3	

These data indicate the absence of significant differences in most of the compared signs, which allows us to conclude that the retro- and prospective groups are comparable in terms of the general somatic background and the degree of compensation for acute intestinal obstruction at the time of admission (p> 0.05).

To construct a point scale, we analyzed the correlation between a number of parameters and the likelihood of urgent surgical intervention for AAIO. In other words, an assessment was made of the significance of each of the clinical, laboratory and instrumental signs in terms of predicting the success of conservative treatment. Information about the presence and strength of the revealed correlation, stratified according to the *Chaddock* classification, is presented in Table. 2.

Table 2

The presence and strength of correlation between a number of parameters and the likelihood of urgent surgical intervention

Clinical parameter	Correlation, *r*	Correlation strength
The time of the last operation, the presence of a splash noise, the nature of peristalsis, leukocytosis, leukocyte index of intoxication, hemoglobin, CRP, total CPK.	Absent (r<0,1)	No correlation found
The number of operations in the anamnesis	0,25	Weak
Small intestine diameter according to ultrasound data	0,2	
The presence of free fluid according to ultrasound data	0,22	
Nasogastric tube discharge within 12 hours of observation	0,27	
Intra-abdominal hypertension level	0,33	Moderate
Duration from the onset of the disease to admission to the hospital	0,35	
The presence of levels according to the X-ray study	0,34	
The nature of the pain syndrome	0,35	
Scoring points on a scale *APACHE* II	0,41	
Results of enterography with water-soluble contrast	0,5	Visible

Notes: CPK — creatine phosphokinase; CRP — C-reactive protein

To construct a scoring scale, criteria were selected that had weak, moderate and noticeable correlations with the likelihood of emergency interventions, after which they were assigned numerical values in accordance with the severity of this relationship (Table 3). In the presence of a noticeable correlation, the maximum value of the factor under consideration could be 4 points, while indicators characterized by weak and medium degrees of connection were assigned indicators of no more than 2 and 3 points, respectively.

Table 3

The point-rating scale for determining treatment tactics in patients with adhesive small bowel obstruction

Index	Value	Score
Duration of the disease from onset to admission to the hospital, h	< 24	0
	24–48	1
	48–72	2
	>72	3
The nature of the pain	Cramping	1
	Moderate aching	3
The number of previous operations	Absent	0
	1 surgery	1
	2 and more	2
The presence of fluid levels according to the X-ray study of the abdominal cavity	Single intestinal levels	1
	Multiple / horizontal intestinal levels	2
Small intestine diameter according to ultrasound, mm	<40 mm	0
	≥40 mm	2
Free fluid in the abdominal cavity (according to ultrasound), ml	absent	0
	<500 ml in volume	1
	≥500 ml in volume	2
Results of enterography with water-soluble contrast	positive	0
	dubious	2
	negative	4
Scale *APACHE* II, scores	0–7	0
	8–15	1
	16–23	2
	> 23	3
Nasogastric tube discharge within 12 hours	absent	0
	<500 ml	1
	≥500 ml	2
Intra-abdominal hypertension level	I–II degree	1
	III–IV degree	2

According to the developed scale, the probability of failure of the conservative resolution of AAIO is expressed in digital equivalent, taking values from 3 to 25. For the described group of patients, the mean values of the scale were 13.2 ± 4.1 points, varying from 4 to 22. Comparison of the results obtained with the probability of urgent surgical interventions showed the following pattern: if the scale value was less than 10 points (20 patients), the need for emergency intervention occurred in only 2 patients (10%).

On the contrary, when the indicator exceeded 14 points, conservative treatment was successful only in 3 patients out of 56 (5.4%). Among 49 patients with intermediate values of the scale (from 10 to 14), 44 (89.7%)patients underwent urgent surgical interventions. Based on the data obtained and the aspiration to, if possible, conservative management of patients with AAIO, grounded in the literature, the stratification of the probability of success of conservative treatment was carried out as follows: a scale value of more than 14 points corresponded to a low probability of success of conservative therapy, from 10 to 14 points - average, less 10 points – high probability.

Subsequently, the developed point scale was applied in a prospective group of 170 patients within the framework of the implementation of treatment tactics aimed at the most conservative resolution of the AAIO phenomena, provided that there was no negative impact on the immediate results of treatment in patients who were operated on at a later date.

All patients of the prospective group within 12 hours from the moment of admission underwent the same standardized complex of conservative measures aimed at correcting volemic and electrolyte disorders, stimulating peristaltic activity and decompression of the gastrointestinal tract. After the expiration of the specified period, the value was assessed on a point scale with the determination of further treatment tactics: with values not exceeding 14 points, conservative treatment was continued with a re-assessment of clinical dynamics after 6-12 hours. The statement of the fact of a low probability of success of further therapy (scale value 15 points or more) served as an indication for urgent surgical intervention.

RESULTS AND DISCUSSION

Fig. 1 shows the distribution of patients in the prospective group according to the values of the developed point-assessment scale, the average value of which was 13.8 ± 3.4 points.

According to the data obtained, out of 20 patients with low scale values (no more than 9), not a single patient was urgently operated on. Of 72 patients in whom the probability of success of conservative treatment was assessed as low (the value of the developed scale is 15 points or more), 68 patients underwent emergency surgery (97.1%). Among 78 patients with intermediate values of the scale, conservative therapy was unsuccessful in 38.4% (30 patients).

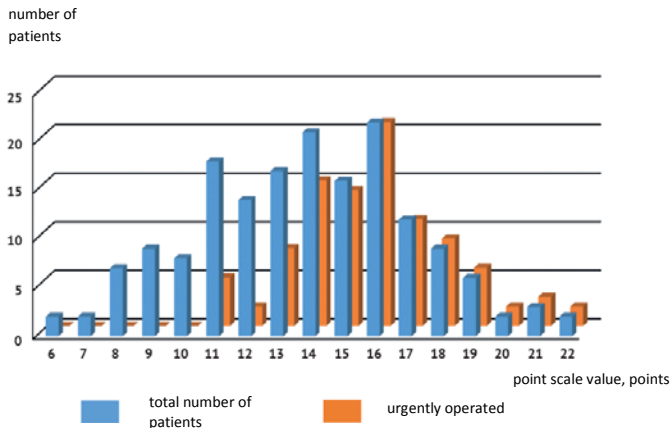

Fig. 1. Distribution of patients in the prospective group according to the values of the developed point-rating scale

Table 4 summarizes the comparative data on the characteristics of the performed surgical interventions and the course of the postoperative period among the patients of the study groups.

Table 4

Comparative characteristics of the performed surgical interventions and the course of the postoperative period in patients of the compared groups

Parameter	Operated patients (*n*=197)			
	Prospective group (*n*=98)		Retrospective group (*n*=99)	
	n	%	*n*	%
Duration of non-operative treatment, h	18,1±17,2		11,2±8,7	
Volume of surgery				
dissection of adhesions	31	31,6	13	13,1
dissection of adhesions and nasogastrointestinal intubation	48	49,1	61	61,7
with resection of the small intestine	12	12,2	16	16,1
with the elimination of ventral hernia	7	7,1	9	9,1
Duration of surgery, min	113,4±69,2		121,8±68,7	
Postoperative complications *				
I	10	10,2	10	10,2
II	4	4,2	3	3,1
III*a*	2	2,0	5	5,1
III*b*	3	3,1	6	6,1
IV*a*	0		5	5,1
IV*b*	0		3	3,1
Total bed-day among surviving patients	7,5±7,1		11,1±8,4	
Postoperative mortality	3	3,1	14	14,1

Note: * — surgical complications degree according to the *Clavien–Dindo* classification

Based on the data presented, a statistically significant decrease in urgent surgical interventions (from 79.2 to 57.6%) was proved due to the success of more prolonged conservative measures, which amounted to 18.1 ± 17.2 and 11.2 ± 8.7 bed days for prospective and retrospective groups, respectively. There were no significant differences in the duration and nature of the performed surgical interventions; it should be noted that an increase in the average duration of non-surgical treatment did not contribute to an increase in the frequency of bowel resection.

As for the structure of postoperative complications, a moderate decrease in the incidence of the latter was recorded due to a decrease in the incidence of the most severe forms (grade IV according to the *Clavien-Dindo* classification) in the prospective group.

The use of the developed point-assessment scale within the framework of the diagnostic and treatment algorithm allowed to reduce the postoperative mortality from 14.1 to 3.1% with a positive effect on the average bed-day among surviving patients, which amounted to 11.1 ± 8.4 days and 7.5 ± 7.1 days in prospective and retrospective groups, respectively.

CONCLUSIONS

1. The developed point-assessment scale, taking into account the anamnestic features of the disease, general somatic background and clinical dynamics, made it possible to stratify patients in accordance with the probability of success of conservative treatment and justify its continuation for more than 12 hours in low-risk patients.

2. The use of this distribution in clinical practice made it possible to reduce the frequency of emergency interventions among patients with acute adhesive intestinal obstruction due to longer conservative measures without negatively affecting the frequency of resection interventions, postoperative complications and mortality. The data obtained allow us to recommend the developed point-assessment scale for use in clinical practice.

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