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RISK OF DEVELOPMENT OF ADHESIVE INTESTINAL OBSTRUCTION AFTER URGENT ABDOMINAL SURGERY

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Summary

The most common causes of acute adhesive ileus (AIO) include adhesions, neoplasms, and hernias. Adhesions are the predominant cause of intestinal obstruction.

A total of 17,952 patients with various benign urgent surgical pathologies of the abdominal organs were included in the study. Of these, for the period from 2015 to 2019, cases of adhesive intestinal obstruction were analyzed (80 patients).

All patients were taken to the hospital for emergency indications by gravity or by ambulance. Among them there were 33 (41.25%) women and 47 (58.75%) men, the average age was 53.8 ± 2.7 . In a conservative manner, it was possible to eliminate intestinal obstruction in 61% of patients. While surgical intervention was resorted to in 31% of cases. When comparing all cases of development of ASIO, there was no significant difference between the laparoscopy group and traditional interventions ($\chi^2=3.178$; $df=1$; $p=0.075$). In turn, when assessing the level of significance of the obtained relative values (Student's t-test), a minimal difference was revealed with a significance level of $p<0.05$ ($t=2.08$), which indicates a potentially lower risk of developing postoperative ASIO after laparoscopic interventions.

Keywords: acute adhesive intestinal obstruction, risk of adhesive obstruction, viscerolysis, abdominal trauma, laparoscopic intervention

概括

急性粘连性肠梗阻 (AIO) 的最常见原因包括粘连、肿瘤和疝。粘连是肠梗阻的主要原因。

共有 17,952 名患有各种腹部器官良性紧急手术病理的患者被纳入研究。其中, 对 2015 年至 2019 年期间的粘连性肠梗阻病例 (80 例) 进行了分析。

所有患者均由重力或救护车送往医院急诊。其中女性33例（41.25%），男性47例（58.75%），平均年龄 53.8 ± 2.7 岁。以保守的方式，有可能消除61%的患者的肠梗阻。31%的病例采用了手术干预。在比较所有发生ASIO的病例时，腹腔镜组与传统干预组无显著差异（ $\chi^2=3.178$ ； $(df=1)$ ； $p=0.075$ ）。反过来，在评估获得的相对值的显著性水平（学生t检验）时，显著性水平 $p<0.05$ （ $t=2.08$ ）显示出最小差异，这表明发生术后ASIO的风险可能较低腹腔镜干预后。

【关键词】：急性粘连性肠梗阻 粘连性梗阻风险 内脏松解 腹部创伤 腹腔镜介入

Relevance

Adhesive ileus (AIO) is one of the most common diseases in emergency abdominal surgery. Recently, there has been a steady increase in this nosology. Over the past decades, cases of ASIO have doubled and do not tend to decrease [1]. In recent years in the UK, small bowel obstruction has become an indication for emergency laparotomy in 51% of cases. Scott et al. reported emergency surgery, which accounts for 80% of all hospital admissions, morbidity, mortality, and health care costs for general surgery in the United States.[5] These operations include partial colectomy, small bowel resection, cholecystectomy, peptic ulcer surgery, adgeolysis, appendectomy, and laparotomy. Adhesive intestinal obstruction of the small intestine was the most common diagnosis in the behavior of four of seven surgical interventions. [3, 4] Postoperative adhesive processes are the main cause of small intestine obstruction, accounting for 60% of cases. Among all cases of intestinal obstruction, acute small intestine is 64.3-80%, while having a severe course and a worse prognosis, this causes high mortality in this pathology, it ranges from 5.1% to 8.4%, occupying a leading place among all urgent diseases [6].

The most common causes of acute intestinal obstruction include adhesions, neoplasms, and hernias. Adhesions are the predominant cause of intestinal obstruction, other causes include inflammatory bowel disease, intussusception, intestinal volvulus, gallstones, and foreign bodies [2].

The aim of our study was to determine the frequency and degree of risk of developing acute adhesive intestinal obstruction, depending on the type of previously performed operations on the abdominal organs.

Materials and methods.

In total, the study included 17952 patients with various benign urgent surgical pathologies of the abdominal organs, who were operated on in the Nukus branch of the RRCEM and the Beruni Regional Medical Center of the Ministry of Health of the Republic of Kazakhstan. According to the design of the study, an assessment of the true incidence of development and calculation of the standardized risk of developing adhesions with clinically significant manifestations of intestinal obstruction (hospitalized patients with ASIO) was carried out. This group of patients was operated on for the period from 2015 to 2019, among which cases of the development of this complication (80 patients) were analyzed.

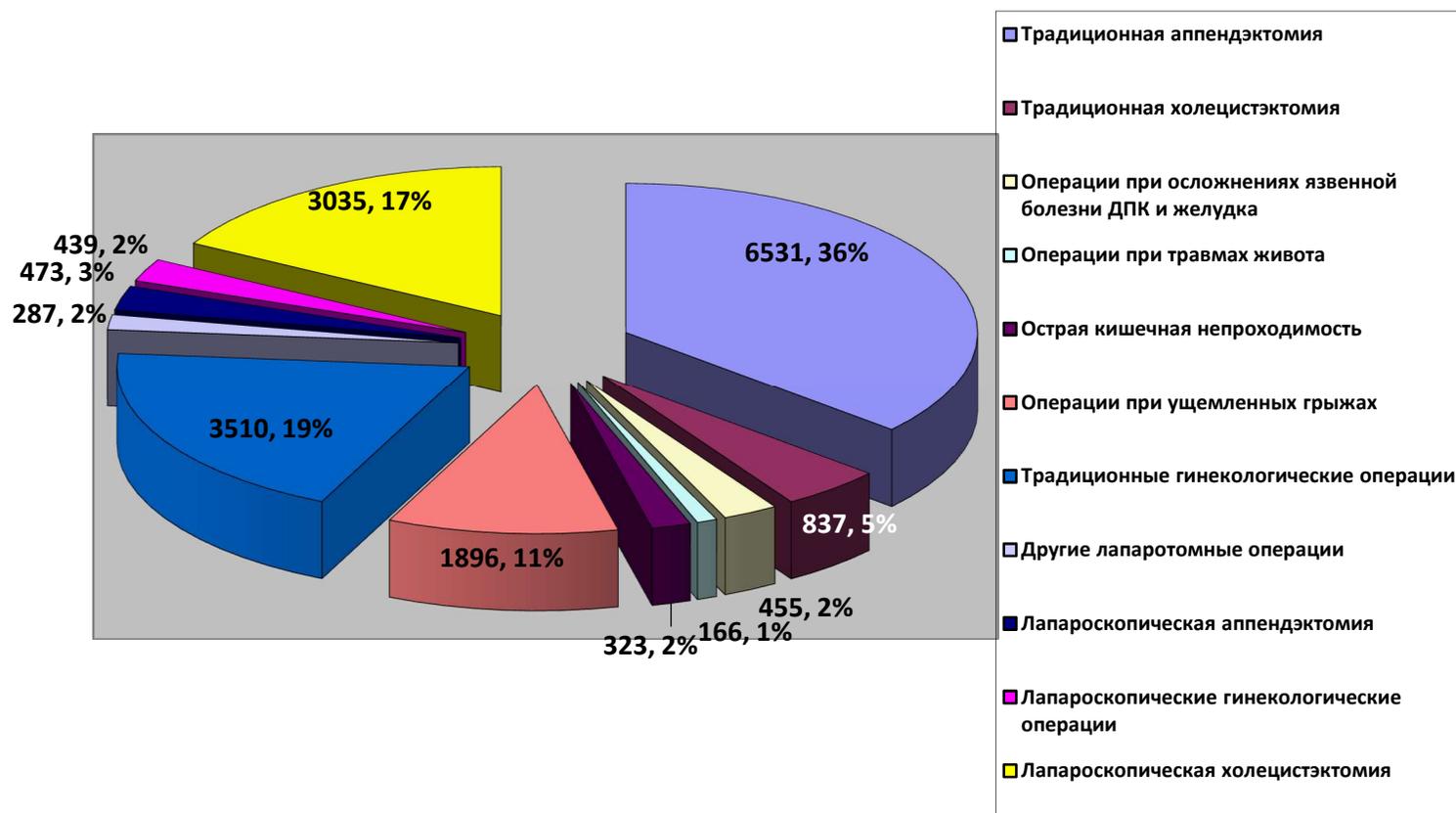
All patients were taken to the hospital for emergency indications by gravity or by ambulance. Among them there were 33 (41.25%) women and 47 (58.75%) men, the average age was 53.8 ± 2.7 years (from 18 to 81 years). After hospitalization, patients underwent standard diagnostic procedures performed in the event of acute intestinal obstruction. Plain radiography of the chest and abdominal organs. The presence of severe pneumatosis indicates intestinal colic with bowel dysfunction; the presence of arches or Cloiber bowls indicated intestinal obstruction.

Be sure to take into account the anamnesis and previously transferred surgical interventions in the anamnesis.

Ultrasound of the abdominal cavity is not always informative due to the presence of swollen intestinal loops, but still allows you to determine the presence or absence of peristalsis in the intestine, effusion in the abdominal cavity, concomitant surgical pathology (cholelithiasis, abdominal masses, gynecological surgical pathology).

When establishing a history of previous surgical interventions on the abdominal cavity, the absence of a tumor process, the exclusion of obstructive obstruction or intussusception, the patients began to stimulate the intestines. Also, a contrast agent was given per os and the passage of the contrast along the gastrointestinal tract was monitored. Decompression of the gastrointestinal tract was performed (nasogastric tube, cleansing, siphon enemas).

As shown in Figure 1, it was found that adhesive intestinal obstruction occurred after the following surgical interventions.



As can be seen from Table 1, ASIO most often developed after a previous operation for acute intestinal obstruction, the second place due to the development of adhesive obstruction is occupied by abdominal trauma. The proportion of other operations performed earlier was significantly lower.

As a result of the conservative measures taken (intestinal stimulation, cleansing enemas), it was possible to conservatively resolve adhesive intestinal obstruction in 49 patients. Surgical intervention had to be resorted to in 31 cases.

Table 1

The summary number and structure of operations performed (2015-2021) and the number of developed cases of ASIO

	Number	Number of reported cases of ASIO
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Operational interventions	Operated			Conservatively		Total			
	abs.	abs.	%	abs.	%	abs.	%	m	t
Traditional appendectomy	6531	5	0,08%	8	0,12%	13	0,20%	3,60	3,61
Traditional cholecystectomy	837	2	0,24%	2	0,24%	4	0,48%	2,00	2,00
Operations for complications of peptic ulcer of the duodenum and stomach	455	1	0,22%	3	0,66%	4	0,88%	1,99	2,01
Operations for abdominal injuries	166	1	0,60%	3	1,81%	4	2,41%	1,98	2,02
OKN	323	7	2,17%	9	2,79%	16	4,95%	3,90	4,10
Operations for strangulated hernias	1896	3	0,16%	4	0,21%	7	0,37%	2,64	2,65
Traditional gynecological operations	3510	8	0,23%	12	0,34%	20	0,57%	4,46	4,48
Other laparotomy operations	287	0	0,00%	1	0,35%	1	0,35%	1,00	1,00
Laparoscopic appendectomy	473	0	0,00%	1	0,21%	1	0,21%	1,00	1,00
Laparoscopic gynecological surgeries	439	1	0,23%	1	0,23%	2	0,46%	1,41	1,42
LHEK	3035	3	0,10%	5	0,16%	8	0,26%	2,82	2,83
Total	17952	31	0,17%	49	0,27%	80	0,45%	8,92	8,96

Note: t - reliability of the received value

Intraoperatively, it was established that the cause of obstruction in 10 cases was adhesive strangulation obstruction, of which in 4 cases, due to developed necrosis, resection of the intestinal loop was performed with the application of side-to-side entero-enteroanastomy. In 21 patients, the cause of obstruction was the adhesive process between the loops of the intestine with the formation of a "double-barrel". This obstacle is eliminated by the intersection of adhesions between the loops of the intestine and their straightening. All patients underwent total nasointestinal intubation with an Abbott-Muller probe after adgeolysis.

In the postoperative period, we observed the following complications

In acute intestinal obstruction, the operation is performed under difficult conditions, such as peritonitis, necrosis of the intestine, its resection, the need to perform viscerolysis, the urgency of the intervention, which determine the severity of the postoperative period and the wound process. Complications that have arisen in operated patients are presented in Table 2

Table 2

Results of complications in acute adhesive intestinal obstruction

Complications of the postoperative period	N=80	
	abs.	%
Abdominal infiltrate	2	6,4
Intraoperative opening of the intestinal lumen	2	6,4
intestinal fistula	1	3,2
Ligature fistula	2	6,4
Suppuration of the postoperative wound	2	6,4
Postoperative mortality	-	-
Total	9	29%

Results and discussion.

Analysis of the obtained results showed that there were no gender differences. In a conservative manner, it was possible to eliminate intestinal obstruction in 61% of patients. Improvement in the general condition of patients, relief of the clinical symptoms of the disease, restoration of the passage of barium sulfate through the intestines made it possible to refrain from surgery in such cases. While surgical intervention was resorted to in 31% of cases. Also, there was no significant difference in the occurrence of adhesive obstruction depending on the method of surgical access: traditional or laparoscopic. (Fig. 2)

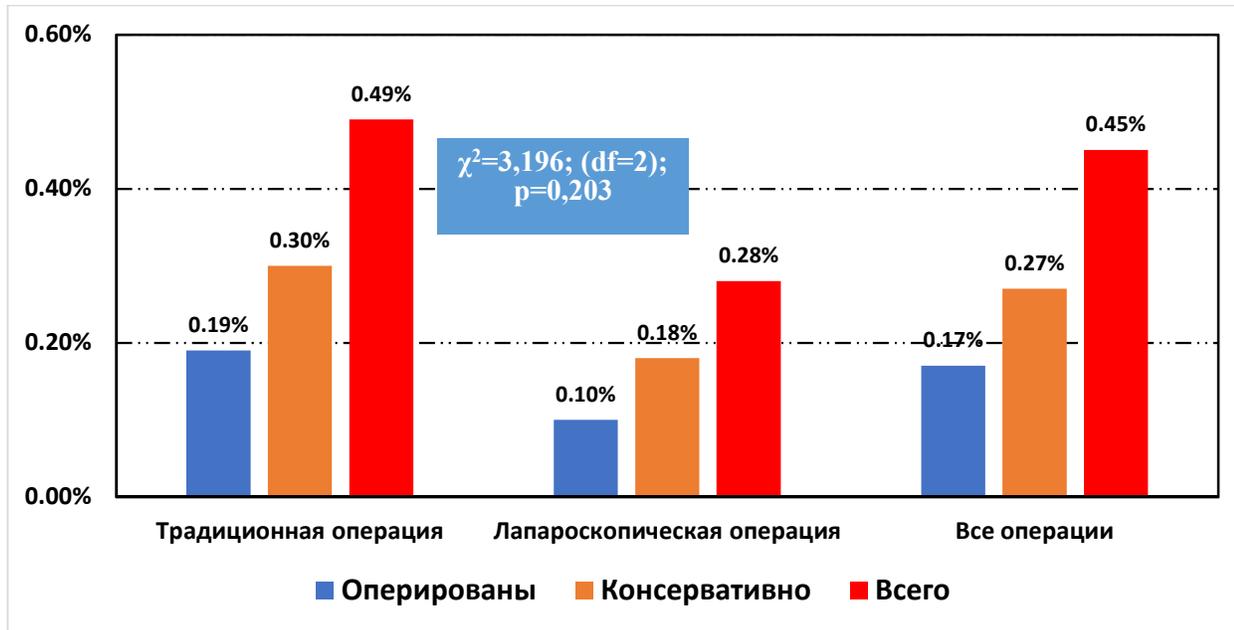


Fig.2 The frequency of development of ASIO depending on the type of operation

When comparing all cases of development of ASIO, there was no significant difference between the laparoscopy group and traditional interventions ($\chi^2=3.178$; $(df=1)$; $p=0.075$). In turn, when assessing the level of significance of the obtained relative values (Student's t-test), a minimal difference was revealed with a significance level of $p<0.05$ ($t=2.08$), which indicates a potentially lower risk of developing postoperative ASIO after laparoscopic interventions (Table 3). However, taking into account the fact that the analysis was carried out in the group of emergency surgical interventions, it should be pointed out once again that many traditional operations are performed in patients who do not have the opportunity for laparoscopic intervention or it is contraindicated (diffuse peritonitis, history of operations, etc.). Accordingly, it is for this reason that the risk of developing postoperative ASIO after traditional operations will be higher.

Table 3

Assessment of the risk of developing ASIO per 1000 operations

Operational interventions	Number	Probability of developing ASIO per 1000 operations	The probability of surgical treatment in the development of AKI per 1000 operations	Probability of conservative resolution of ASIO per 1000 operations

		Indica- tor	m	t	Indica- tor	m	t	Indica- tor	m	t
OKN	323	49,5	12,1	4,10	21,7	8,1	2,67	27,9	9,2	3,04
Operations for abdominal injuries	166	24,1	11,9	2,02	6,0	6,0	1,00	18,1	10,3	1,75
Operations for complications of peptic ulcer of the duodenum and stomach	455	8,8	4,4	2,01	2,2	2,2	1,00	6,6	3,8	1,74
Traditional gynecological operations	3510	5,7	1,3	4,48	2,3	0,8	2,83	3,4	1,0	3,47
Traditional cholecystectomy	837	4,8	2,4	2,00	2,4	1,7	1,42	2,4	1,7	1,42
Laparoscopic gynecological surgeries	439	4,6	3,2	1,42	2,3	2,3	1,00	2,3	2,3	1,00
Operations for strangulated hernias	1896	3,7	1,4	2,65	1,6	0,9	1,73	2,1	1,1	2,00
Other laparotomy operations	287	3,5	3,5	1,00	0,0	0,0	#ДЕЛ/0!	3,5	3,5	1,00
LHEK	3035	2,6	0,9	2,83	1,0	0,6	1,73	1,6	0,7	2,24
Laparoscopic appendectomy	473	2,1	2,1	1,00	0,0	0,0	#ДЕЛ/0!	2,1	2,1	1,00
Traditional appendectomy	6531	2,0	0,6	3,61	0,8	0,3	2,24	1,2	0,4	2,83
Total	17952	4,5	0,5	8,96	1,7	0,3	5,57	2,7	0,4	7,01

Conclusions .

During 5 years of follow-up after various emergency interventions on the abdominal organs, the highest risk of developing ASIO was noted after operations for abdominal injuries - 2.41% (in 4 out of 166 patients), for complications of peptic ulcer of the duodenum and stomach - 0.88% (in 4 out of 455 patients) and after traditional gynecological interventions - 0.57% (in 20 out of 3510 patients), while after other interventions the frequency of this complication did not exceed 0.5% (traditional (0.48%) and laparoscopic cholecystectomy (0.26%), laparoscopic gynecological operations (0.46%), traditional (0.20%) and laparoscopic (0.21%) appendectomy, operations for strangulated hernias (0.37%), etc. (0.35 %)), in turn, the frequency of recurrence of adhesive obstruction after previous similar interventions reached 4.95% (in 16 of 323 patients).

The overall incidence of ASIO was 0.45% (in 80 out of 17952 operated patients in 2015-2021), while in 0.27% of cases this complication was resolved by conservative measures, and in 0.17% of cases surgical treatment was required. It should be noted that the analysis of the significance of the frequency of development of ASIO after various interventions showed the absence of such ($p>0.05$) for laparoscopic gynecological operations ($t=1.41$) and laparoscopic appendectomies ($t=1.00$), while after another spectrum of abdominal operations, the indicators were significant ($t=2.00-4.48$; $p<0.05$).

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