

Mini laparotomic technology in the diagnosis and treatment of postoperative intra-abdominal complications

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Abstract. The aim of the study was to improve the results of surgical treatment of intra-abdominal postoperative complications at the expense of differentiated use of minilaparotomic and endovideosurgical technologies. Treatment of 617 patients who underwent repeated operative interventions on abdominal organs in connection with different early postoperative intra-abdominal complications were analyzed. Mini-invasive repeated medicodiagnostic operative interventions were performed in 268 (56,4%) cases for acute destructive pancreatitis and its complications, in 65 (13,7%) cases - regarding postoperative biliary complications, in 37 (7,8%) - postoperative appendectomy complications, 31 (6,1%) - postoperative stomach and bowel complications. For the purpose of making prognosis of early postoperative intraabdominal complications and diagnosis of intra-abdominal hypertensive syndrome, 95 patients underwent indirect measurement of intra-abdominal pressure. Intra-abdominal pressure monitoring with determination of the degree of intra-abdominal hypertension was the basic factor for choosing the tactics of further surgery. The developed algorithm of surgical tactics permitted to decrease the number of relaparotomies to 142 (23%).

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Introduction

Timely diagnosis of early postoperative intra-abdominal complications (PIC), and timing and indications for reinterventions are complex and urgent problems in modern surgery [1]. In spite of the improvement in diagnostic algorithms, tactical and operative techniques of surgical interventions on the abdominal organs with various surgical pathology, PIC remains the most common cause of relaparotomies in the early postoperative period [2]. Objective assessment of the severity of the condition and prognosis of patients with postoperative complications was carried out by means of integrated assessment scales of the severity of the condition, as well as specific scales tailored to peculiarities of peritonitis [3]. The use of endovideosurgical and mini laparotomic technologies in the early postoperative period, the study of fluid from the abdominal cavity using modern biochemical and bacteriological methods are of great importance for the prediction and early diagnosis of PIC [4]. Recurrent mini-invasive surgery (MIOS) in the early postoperative period helps to assess the etiology of the disease in the abdomen and in some cases carry out surgical treatment, adequate to traditional "open" surgical interventions with the elimination of a wide variety of complications [5,6]. When comparing the results of treatment of early PIC in patients with diagnostic

and therapeutic repeated MIOS, a decrease in mortality from 45.7 to 20% was established [7-10].

The aim of the study to analyze how the results of surgical treatment of intra-abdominal postoperative complications due to differential use of mini laparotomic and endovideosurgical technologies were improved.

Materials and methods

We have analyzed the surgical treatment of 617 patients who were made recurrent surgery on the abdominal organs due to various early postoperative intra-abdominal complications over the past ten years on the basis of two multidisciplinary surgical clinics GKB # 4 and GKB#2 in the city of Perm. There were 318 (51.5%) female and 299 (48.5%) male patients; an average age of patients was 52.2+10.4. Complex of clinical, laboratory and instrumental techniques, including ultrasound, x-ray, CT, MRI, and endoscopic examinations was used for the diagnosis of PIC. We regarded the recurrent minimally invasive surgery to be a stage of a complex treatment of surgical diseases and their complications. It may be either intermediate or final, that enables to avoid unreasonable relapatomy.

In our opinion, the main aim of a recurrent minimally invasive surgery was: an early diagnosis of complications of surgical diseases and postoperative

intra-abdominal complications in the absence of distinct clinical symptoms, the choice of an adequate surgical approach, type and amount of resurgery or endovideosurgical intervention, effective intra-abdominal surgical decompression and sanation, redrainaging and intracorporeal detoxification. Curative amount of mini-invasive resurgery was considered to be complete and adequate if it corresponded to the traditional open surgery in a revealed surgical pathology. The question concerning a programmed nature of postoperative relaparoscopy and laparoscopy which, in our opinion, should be performed on the 3d-4th day for the early detection of insolvency of various types of anastomoses and for the detection of endoscopic evidence of septic intra-abdominal complications remained to be controversial. We believe that relaparoscopy is a recurrent endovideosurgical intervention, carried out with a diagnostic or therapeutic purpose after a previous endovideosurgery or laparoscopy. Postoperative laparoscopy is an endovideosurgical intervention after undergoing "open" or mini-laparotomic operation. Mini laparotomic technologies were used as independent types of operations on the hepatopancreatoduodenal area, stomach, appendix, as well as one of the stages of treatment of acute pancreatitis and its parapancreatic complications. Minilaparotomy was combined with endovideosurgery most frequently.

Results and discussion

The main causes of recurrent MIOS concerning postoperative intra-abdominal complications in 617 patients were: the complexity of diagnosis of early postoperative complications - 218 (35.4%) cases, the progression of the primary surgical disease and its complications - 180 (29.2%), the decision on the choice of a reoperative method - 113 (18.4 %); errors of primary endoscopic diagnosis - 37 (6.1%), insufficient clinical experience of endoscopists and surgeons - 47 (7.6%), inadequate volume of primary endovideosurgery, mini - laparotomy or open surgery - 28 (4.6 %). Repeated mini-invasive therapeutic and diagnostic surgeries were performed in 268 (56.4%) patients with acute destructive pancreatitis and its complications, in 65 (13.7%) patients with complications after operations on the biliary tract, in 37 (78%) patients with complications after appendectomy, in 31 (6.1%) patients after operations on the stomach and colon. Time of their execution ranged from 1 to 12 days.

As a result, depending on the nature and severity of postoperative complications the following options of resurgery were carried out: minilaparotomy in 254 (41.2%) cases, reminilaparotomy in 21 (3.4%) cases, relaparoscopy

in 128 (20.7%) cases, post-operative laparoscopy in 72 (11.6%) cases and relaparotomi in 142 (23.0%) cases. Lap Disk (table) was used in 5 patients with recurrent surgeries.

Table 1. Structure of diseases in which the repeated surgeries were performed in order to identify and eliminate postoperative intra-abdominal complications (n = 617)

Nosological form	Males		Females		Totally	
	Abs.	%	Abs.	%	Abs.	%
Acute appendicitis	16	2,6	21	3,4	37	6,0
GSD. Acute calculous cholecystitis	7	1,1	58	9,4	65	10,5
Acute pancreatitis	142	23,0	126	20,4	268	43,4
Thrombosis of the mesenteric vessels	31	5	21	3,4	52	8,4
Diseases of the stomach and duodenum	11	1,8	6	1,0	17	2,8
Diseases of the colon	6	1	8	1,3	14	2,3
Hernias of different localization	14	2,3	17	2,8	31	6,1
Ascites of unknown etiology	21	3,4	17	2,8	38	6,2
Intestinal occlusion	18	2,9	17	2,8	29	5,7
Gynecological diseases	-	-	25	4,0	25	4,0
Totally	299	48,5	318	51,5	617	100

Drainage of retrocoliac retroperitoneal area in acute pancreatitis was performed during therapeutic and diagnostic laparoscopy in lumberdorsal areas between the middle and posterior axillary lines. Minilumbotomy 3-4 cm in length, followed by blunt separation of tissues to retroperitoneal fat by digitoclasia was carried out. Further revision of the retroperitoneal fat toward the head, tail and body of the pancreas was overseen under retroperitoneoscopy with additional invasion of instrumental ports for autopsy, drainage of cellular spaces and removal of sequesters, thus avoiding damage of the hollow and parenchymal organs, as well as of parietal and visceral peritoneum. Controlled visually adequate drainage of retroperitoneal cellular spaces leading to a decrease in the severity of endotoxemia, activity and prevalence of enzymatic peritonitis, was a method of early prevention and treatment of septic parapancreatic complications. Mini-laparotomy was performed after laparoscopic cholecystectomy in 10 patients with bile leakage: edge wound of CBD was sutured in 3 cases, bile leakage from Lyushka meatus was in 7 cases.

Remini-laparotomy was applied in drainage and redrainage of biliary tract after choledocholithotomy in 6 patients and in 5 patients in case of imposing of biliodigestive anastomoses due to jaundice and extensive scar structure of the terminal segment of hepaticocholedochus. Postoperative laparoscopy and relaparoscopy were conducted in patients after typical and laparoscopic appendectomy in 31 cases. Almost all recurrent endoscopic examinations were performed in the first 4 days. The indications for relaparoscopy, postoperative laparoscopy and mini-laparotomy in these patients were: persisting peritoneal symptoms in 14 cases, the appearance of an infiltrate in the right iliac area in 12 patients, the signs of acute intestinal obstruction in 4 patients, intra-abdominal bleedings in 3 patients. Relaparotomy in this group was conducted only in 4 (12%) patients.

The most common bases for relaparotomies in 142 patients were: abdominal trauma in 28 (19.7%) patients, severe destructive pancreatitis in 23 (16.2%) patients, destructive forms of cholecystitis in 21 (14.8%) patients, gastric and duodenal ulcer in 19 (13.4%) patients. Relaparoscopy was carried out under the practical standard and was completed by the removal of the cause of peritonitis, drainage and adequate sanitation of abdomen, decompression of jejunum. Laparotomy was imposed and from 4 to 10 programmable sanations of abdomen were carried out in 9 patients.

In order to predict early PIC and for the diagnosis of syndrome of intra-abdominal hypertension (SIAH) 95 patients underwent indirect measurement of intra-abdominal pressure in the bladder with manometry and tansometry[9]. Measurement of intra-abdominal pressure was performed at the following diseases and injuries of the abdominal cavity: acute destructive appendicitis with peritonitis-7 (7.4%), perforated ulcer of stomach and duodenum, 12 (12.6%), acute gangrenous ruptured cholecystitis - 18 (18.9%), infected pancreatic necrosis with purulent parapancreatitis - 15 (15, 8%), acute intestinal obstruction - 16 (16.8%), abdominal trauma - 7 (7.4%), strangulated hernia - 4 (4.2%), thrombosis of mesenteric vessels with necrosis of intestine - 4 (4, 2%), cancer of colon and intestine - 12 (12.6%). Number of ongoing studies ranged from 3 to 7 in each patient, and their multiplicity depended on the clinical course of the disease, the amount of surgery, age, concomitant pathology and features of postoperative period. All patients underwent abdominal pressure strain studies on the 1st and 2nd day after surgery. Based on monitoring data of average abdominal pressure SIAH of the Ist grade was diagnosed in 55 (58.3%) patients, of the IInd grade - in 34 (35,4%), of the IIIrd grade- in

6 (6.2%). Reoperation was avoided in 45 (82.1%) cases out of 55 patients with SIAH of the Ist grade as a result of intensive medical therapy. In 10 (17.9%) patients, despite the ongoing conservative treatment measures, SIAH I, persisted up to 1day, with no tendency to reduction of intra-abdominal pressure. After an additional examinations 8 (14.3%) patients underwent postoperative diagnostic laparoscopy, 5 (10.7%) of which were therapeutic and enabled to avoid relaparotomy. The transition to an "open" operation due to postoperative peritonitis was required in 2 (3.6%) cases. Relaparotomy without recurrent MIOS was performed in 2 (3.6%) patients due to perforated "stress" gastric ulcers. In patients with SIAH II grade recurrent MIOS were performed in 18 (52.9%) patients, in 12 (35.3%) cases minilaparotomy surgery corresponded to therapeutic volume of traditional relaparotomy. Relaparotomy was performed after postoperative laparoscopy in 6 (17.6%) patients. Relaparotomy due to postoperative intra-abdominal complications without prior diagnostic MIOS was performed in 10 (29.4%) cases. In group with SIAH III grade consisting of 6 (6.2%) patients, relaparotomy was performed in 4 (66.7%) cases.

Postoperative mortality in patients with PIC who developed SIAH II-III was 22.9%. Causes of deaths were: progression of basic disease with the development of abdominal sepsis - 5 (11.1%) cases, progressive peritonitis - 1 (2.1%), failure of intestinal anastomosis - 1 (2.1%), acute heart failure - 2 (4, 2%), acute cerebral circulation disorder - 1 (2.1%), pneumonia - 1 (2.1%).

Findings

The accumulated experience of recurrent MIOS after operations on the abdominal organs allowed us to propose an algorithm of the diagnosis and treatment of early postoperative intra-abdominal complications with the use of relaparoscopy, postoperative laparoscopy, mini-laparotomy and relaparotomy. The algorithm of surgical tactics was based on dynamic observation of patients in the early postoperative period, laboratory tests of blood and fluid from the abdominal cavity (ammonia and alkaline phosphatase), instrumental methods of diagnosis of abdominal diseases. Intra-abdominal pressure monitoring determined the developmental degree of SIAH was fundamental in choosing the variant of recurrent MIOS and tactics of the further surgical treatment. Patients with SIAH I needed a power dynamic monitoring with intensive medical therapy in the intensive care unit and intensive care within 12-24 hours. Expansion of therapeutic and diagnostic programs with the performance of recurrent MIOS for diagnosis and elimination of

established intra-abdominal postoperative complications was required when SIAH I lasted more than 24 hours, or it passed into the II grade of severity. SIAH of III-IV grade was the indication for relaparotomy to conduct an adequate surgical correction and decompression of the gastrointestinal tract.

Thus, a differentiated approach to the use of algorithm of recurrent minimally invasive interventions to select the optimum access and adequate volume of surgical operations reduced the number of relaparotomies to 23% at intra-abdominal complications, their traumatism, the percentage of septic complications and mortality, improved the quality of life of the operated patients.

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