

<https://doi.org/10.33878/2073-7556-2023-22-2-10-31>



# CLINICAL GUIDELINES

## Acute malignant colorectal obstruction (K56.6; C18, C19, C20), adults

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

**FOR CITATION:** Achkasov S.I. et al. CLINICAL GUIDELINES. Acute malignant colorectal obstruction (K56.6; C18, C19, C20), adults. *Koloproktologia*. 2023;22(2):10–31. (in Russ.). <https://doi.org/10.33878/2073-7556-2023-22-2-10-31>

Coding according to the International Statistical Classification of Diseases and Health-Related Problems:

**K56.6; C18, C19, C20**

Age Group: **Adults**

Year of approval: **2023**

### DEVELOPER OF CLINICAL RECOMMENDATIONS

- Russian Association of Coloproctology
- Association of Oncologists of Russia
- Russian Society of Surgeons

### LIST OF ABBREVIATIONS

AP — arterial pressure

**RF** — respiratory failure  
**GIT** — gastrointestinal tract  
**CT** — computed tomography  
**ABS** — acid-base state  
**GBT** — general blood test  
**ALIO** — acute large intestine obstruction  
**US** — ultrasound  
**CKD** — chronic kidney disease  
**CHF** — chronic heart failure  
**RMR** — respiratory movements rate  
**HR** — heart rate  
**Rg** — radiography  
**ScvO2** — saturation of venous blood of central vessels with oxygen  
**SpO2** — saturation of arterial blood with oxygen

## TERMS AND DEFINITIONS

**Endotoxemia**, or **endogenous intoxication syndrome**, is a complication of various diseases associated with a violation of homeostasis due to the accumulation of endogenous toxic substances in the body, including bacterial endotoxins with pronounced biological activity.

**Peritoneal carcinomatosis** is one of the forms of metastasis of cancer of the abdominal cavity and pelvis, characterized by tumor foci on the visceral and parietal peritoneum.

### 1. BRIEF INFORMATION ON THE DISEASE OR CONDITION (GROUP OF DISEASES OR CONDITIONS)

#### 1.1 Definition of a disease or condition (group of diseases or conditions)

Intestinal obstruction of tumor genesis is a syndrome characterized by a violation of the movement of contents through the digestive tract caused by a mechanical obstacle, which is a malignant or benign neoplasm of the intestine.

#### 1.2 Etiology and pathogenesis of a disease or condition (groups of diseases or conditions)

Acute large intestine obstruction of tumor etiology refers to mechanical obstruction and predominantly is located in the large intestine. Much less often, ALIO is caused by malignant neoplasms of the small intestine and benign intestinal tumors. Obturation can occur due to the overlap of the intestinal lumen, both by the primary tumor of the

intestine, and by compression from the outside by a tumor originating from neighboring organs and tissues.

The most characteristic is an erased, slowly progressing onset in the form of a transit disturbances due to incomplete overlap of the intestinal lumen. The acute onset may be due to complete obturation of the narrowed area by a tumor or dense fecal masses.

In the early stage of obstruction, peristalsis increases, while the intestine, with its contractions, seems to strive to pass through the tumor. At this stage, the bowel movements in the proximal loop shortened, but more frequent. Later, because of hypertonicity of the sympathetic nervous system, overstretching of the intestine, severe inhibition of tissue perfusion, a phase of significant inhibition of the motor function of the intestine occurs, and in the later stages of obstruction, its complete paralysis develops. The disorder of metabolism of intestinal wall tissues is aggravated by increasing endogenous intoxication, which, in turn, increases tissue hypoxia.

Water-electrolyte disorders are associated with the loss of a large amount of fluid, electrolytes and proteins. The fluid is lost with vomit, deposited in the proximal to the tumor part of the intestine, accumulates in the edematous intestinal wall, its mesentery, as well as in the free peritoneal cavity. Fluid loss per day can reach 4 liters or more. There is a shift of the electrolyte balance, first, the loss of potassium. Along with liquid and electrolytes, a significant amount of proteins (up to 300 g/day) is lost due to starvation, vomiting, sequestration into the intestinal lumen and abdominal cavity. Violation of the barrier function of the intestinal wall leads to the translocation of bacteria into the portal bloodstream, lymph and peritoneal exudate. These processes underlie the systemic inflammatory response and abdominal surgical sepsis. A significant pathogenetic role assigned to intra-abdominal hypertension — compartment syndrome, which leads to a poor blood supply in abdominal organs, a decrease in the viability of tissues, multiple organs failure. The main principles of treatment of compartment syndrome are early surgical decompression and rational infusion therapy.

### **1.3 Epidemiology of a disease or condition (groups of diseases or conditions)**

Colorectal cancer is one of the most common malignant neoplasms both in Russia and around the world [1,2]. Acute intestinal obstruction is a complication of colorectal cancer, which occurs in 15–20% of patients of all age groups, but more often in patients older than 50 years. In Russia, an increase in the number of patients with tumor acute intestinal obstruction is registered annually. According to data for 2019, 22,221 cases of ALIO detected in Russia. Hospital and postoperative mortality was 15.39% and 17.05%, respectively [3].

### **1.4 Features of coding a disease or condition (group of diseases or conditions) according to the International Statistical Classification of Diseases and Health-Related Problems**

**Class — Diseases of the digestive system (XI):**  
K56.6 — other and unspecified intestinal obstruction

#### **Class — Neoplasms (II):**

C18.0 — Malignant neoplasm of the cecum, ileocecal valve

18.1 — Malignant neoplasm of the appendix

C18.2 — Malignant neoplasm of the ascending colon

C18.3 — Malignant neoplasm of the hepatic (right) flexure of the colon

C18.4 — Malignant neoplasm of the transverse colon

C18.5 — Malignant neoplasm of the splenic (left) flexure of the colon

C18.6 — Malignant neoplasm of the descending colon

From 18.7 — Malignant neoplasm of the sigmoid colon

C18.8 — Colon lesion extending beyond one or more of the abovementioned sites

C 18.9 — Malignant neoplasms of the colon of unspecified location

C19 — Malignant neoplasm of the rectosigmoid

C 20 — Malignant neoplasm of the rectum

Note: the cipher "C" is used for histological confirmation of the malignant nature of the neoplasm that caused the ALIO.

### **1.5 Classification of a disease or condition (groups of diseases or conditions)**

To date, there is no generally accepted classification of tumor colorectal obstruction.

The working group for Clinical Guidelines for the treatment of patients with ALIO of tumor etiology proposed to divide it depending on the degree of compensation [4]:

- Compensated ALIO: intermittent retention of stool and difficulty in gas discharge; pneumatization of the large intestine with single fluid levels in it may be detected on an overview radiograph of the abdominal cavity;

- Subcompensated ALIO: retention of stool and gases for less than 3 days, pneumatosis and Kloiber cups detected on abdominal X-ray — horizontal fluid levels with domed gas above them; there are no signs of multiple organ dysfunction; conservative treatment is effective;

- Decompensated ALIO: retention of stool and gases for more than 3 days; radiological signs of both large and small bowel obstruction with small bowel levels and arches in all parts of the abdominal cavity; vomiting with stagnant contents; the presence of organ dysfunction.

However, scientific evidence of the validity of the use of this classification to determine surgical approach in patients with intestinal obstruction is insufficient.

The classification of Colo Rectal Obstruction Scoring System (CROSS) proposed by The Japanese Research group on the Safety of colonic stents (The Japan Colonic Stent Safety Procedure Research Group — JCSSPRG) does not provide for its use as a tool for determining the time and type of treatment of intestinal obstruction [5].

- To determine the need for surgical treatment, stratification of patients by stability is necessary in accordance with the criteria of sepsis (septic shock). — **C (Level of evidence — 5)**

**Comments:** the criteria for sepsis are organ dysfunction, the cause of which may be intestinal obstruction or perforation. Patients with sepsis due to intestinal perforation on the background of intestinal obstruction need emergency surgical treatment. It reported that the delay of surgery over 6 hours in patients with septic shock due to gastro-intestinal perforation leads to zero 60-day survival [6]. Criteria of instability of septic patients proposed in determining the approach of treatment in guidelines of The World Society of Emergency Surgery (WSES)

[7]. To assess organ dysfunction, it is recommended to use the Sequential Organ Failure Assessment (SOFA) and quick (fast) SOFA scales.

#### **Examples of diagnosis formulation:**

1. "Cancer of the sigmoid colon complicated by acute intestinal obstruction."
2. "Cancer of the ascending colon complicated by acute intestinal obstruction."

A more accurate formulation of the diagnosis using the international classification TNM is possible when obtaining data on the morphological structure and the tumor stage.

### **1.6 Clinical picture of the disease or condition (group of diseases or conditions)**

The clinical manifestations of tumor ALIO are diverse and depend on many factors. The most common of them are abdominal pain, bloating, lack of stool and gases.

## **2. DIAGNOSIS OF A DISEASE OR CONDITION (GROUP OF DISEASES OR CONDITIONS), MEDICAL INDICATIONS AND CONTRAINDICATIONS TO THE USE OF DIAGNOSTIC METHODS**

Many different diseases and their clinical forms can lead to acute intestinal obstruction syndrome. At the same time, diagnostic tests are universal, regardless of the disease: exclusion of conditions requiring immediate surgical intervention (strangulation, perforation, peritonitis, etc.); differential diagnosis of mechanical and paralytic obstruction; determination of the level and cause of obstruction.

Detection of perforation, strangulation and septic shock is a priority task of the diagnostic stage in patients with colorectal obstruction.

It was found that delay of surgery for more than 6 hours with intestinal perforation and septic shock is associated with 100% 60-day mortality [6].

Therefore, an important goal of primary diagnosis and follow-up during nonoperative treatment is early detection of perforation or threat of perforation of the colon. At the same time, the role of time before surgery in stable patients without peritonitis should not be overestimated. A direct correlation between the time delay of the operation in ALIO with a 30-, 90-day, as well as one-year mortality has not been established [8].

### **2.1 Complaints and anamnesis**

Acute intestinal obstruction often occurs suddenly, manifests itself by the absence of gas discharge and bloating. Bloating and the absence of gas discharge are pathognomonic symptoms of ALIO.

Abdominal pain is a non-permanent symptom in ALIO, it can be cramping, with periods of intensification during the wave of peristalsis. With the progression of the disease, the peristaltic activity of the intestine decreases, which is why the pain, as a rule, changes from cramping to constant for 2–3 days, which serves as a bad prognostic sign.

Vomiting in the early stages of ALIO may be absent, later it becomes repeated, not bringing relief. In the late period, the vomit masses acquire the appearance and smell of intestinal contents.

### **2.2 Physical checkup**

Upon admission to the hospital in case of suspected ALIO, first of all, a clinical checkup should be carried out, in which the condition of the skin is assessed, the body mass index is calculated, thermometry is carried out, pulse measurement, respiratory rate and blood pressure indicators are measured. Auscultation, percussion and palpation of the abdomen are performed. Digital rectal examination is performed in all patients, and vaginal examination is additionally performed in women.

### **2.3 Laboratory diagnostic tests**

There is no specific laboratory diagnosis of ALIO of tumor etiology.

The basis of laboratory diagnostics in ALIO is the identification of systemic disorders that require correction and additional therapy. In a clinical blood test, it is necessary to pay attention to the presence or absence of anemia, which may be one of the markers of the development of postoperative complications, a sign of chronic blood loss, the presence or absence of leukocytosis, changes in the leukocyte formula, as markers of systemic inflammatory response and translocation of intestinal microflora through its stretched wall. Biochemical analysis of blood, determination of electrolytes in blood serum allows to identify water-electrolyte disorders occurring during the development of intestinal insufficiency syndrome as a result of obstruction of the intestinal lumen, changes in the level of liver enzymes and nitrogenous bases,

which may indicate the development of hepatic-renal insufficiency as a consequence of vomiting and dehydration, endotoxemia against the background of intestinal insufficiency [9].

## 2.4 Instrumental diagnostic tests

- Patients with suspected acute obstructive colonic obstruction in the absence of contraindications should undergo computed tomography of the thorax, abdominal cavity and pelvis as a method of choice [10].

### Grade of recommendations — C (Level of evidence — 5)

**Comments:** *abdominal CT in patients with suspected acute obstructive colonic obstruction allows us to visualize the tumor; to stage it; to find distant metastases; to assess the extent of the pathological process in the large intestine [10]; to exclude free gas in the abdominal cavity and identify the presence of gas bubbles in pericolic tissue as an early radiological symptom of tumor perforation and other complications of ALIO. Limitations for the method are the presence of contraindications to the use of X-ray contrast agents containing iodine (drug intolerance, increased levels of urea and creatinine in the blood), the inability to transport the patient to the radiology unit. In this case, preference in diagnostics should be given to ultrasound [11–13].*

- For all patients with suspected ALIO, if computed tomography is not possible, abdominal ultrasound and abdominal X-ray are **recommended** [14].

### Grade of recommendations — C (Level of evidence — 4)

**Comments:** *in the absence of the possibility of performing computed tomography, the diagnostic algorithm includes transabdominal ultrasound and abdominal X-ray. Abdominal ultrasound is an operator-dependent method of investigation, but in the presence of an experienced doctor, it is more effective than abdominal X-ray and can also be performed in a hospital unit, which does not require patient transportation [13,15].*

- For all patients with suspected ALIO, determined by ultrasound and radiology, if it is impossible to perform computed tomography, it is **recommended** to perform irrigoscopy using water-soluble nephrotropic high-osmolar radiopaque agents (V08AA01 Sodium amidotrizoate) [16,17].

### Grade of recommendations — C (Level of evidence — 2)

**Comments:** *if ALIO suspected according to abdominal ultrasound and abdominal X-ray, if it is not possible to perform computed tomography, it is advisable to perform irrigoscopy (A06.18.001) with a water-soluble contrast agent in order to determine the level of the obstruction. Contrast enema with barium sulfate\*\* is not recommended, as it makes it difficult to further visualize the intestinal mucosa during colonoscopy [17,18].*

- It is **recommended** that hemodynamically stable patients with suspected ALIO, in the absence of a high risk of intestinal perforation, undergo colonoscopy to verify the diagnosis and biopsy of the tumor [5,19].

### Grade of recommendations — C (Level of evidence — 5)

**Comments:** *during colonoscopy, the diameter of the tumor stenosis and the possibility of intestinal stenting evaluated, tumor tissue is taken for morphology. In order to prepare the intestine for examination, it is preferable to use cleansing enemas, the performance of which in some cases allows for the resolution of intestinal obstruction, at the same time, may cause diastatic perforation of the proximal colon. Colonoscopy before surgery is not recommended in unstable patients, as well as when the caecum dome is expanded more than 10 cm due to the high risk of intestinal perforation during the procedure [20]. In this case, colonoscopy should be performed in the postoperative period to exclude neoplasms in the remaining parts of the large intestine [7]. In order to reduce the risk of intestinal perforation, insufflation using CO<sub>2</sub> is preferable [21].*

## 2.5 No other diagnostic tests

No.

## 3. TREATMENT, INCLUDING DRUG AND NON-DRUG THERAPY, DIET THERAPY, ANESTHESIA, MEDICAL INDICATIONS AND CONTRAINDICATIONS TO THE USE OF TREATMENT METHODS

The main purpose of medical care for patients with tumor ALIO is the elimination of intestinal obstruction, which allows creating favorable conditions for the early start of oncological treatment.



Surgery is the main method of treatment of tumor ALIO. The volume, urgency and stage of surgical treatment depend on the technical support of the medical institution, the level of surgical and anesthesiological teams, the functional status and degree of surgical and anesthesiological risk of the patient, the extent and presence of complications of cancer, including perforation with peritonitis, abscess, sepsis and septic shock.

### 3.1 Conservative treatment

Non-operative treatment is a stage of preparation for surgery and, unlike small bowel obstruction, is not considered as an independent final method of treatment of tumor ALIO.

- Initial non-operative treatment may be **recommended** for patients with ALIO without signs of intestinal perforation, the purpose of which is to prepare for surgery in the most favorable conditions [20].

**Grade of recommendations — C (Level of evidence — 5)**

**Comments:** to achieve the best conditions, correction of water-electrolyte disorders, anemia, nutritional status, provision of a qualified anesthesiological and surgical team is necessary.

As an indication for immediate surgical intervention, persistent acidosis and dilation of the dome of the cecum greater than 10 cm (a threat of perforation). In the absence of signs of compromise of the intestinal wall, treatment can be continued to optimal conditions with monitoring of laboratory and instrumental parameters every 6–12 hours [20].

- All patients with ALIO should be corrected for hypovolemia and water-electrolyte disorders [22,23].

**Grade of recommendations — C (Level of evidence — 4)**

**Comments:** hypovolemia can have catastrophic consequences for surgical patients and is a major factor in preventable mortality. Hypovolemia in patients before surgery should be eliminated whenever possible.

At the initial stage of correction of hypovolemia, preference should be given to balanced crystalloid solutions (solutions affecting the water-electrolyte balance, ATX B05BB) [22].

- It is **recommended** to provide decompression of the proximal gastrointestinal tract by aspiration

of the contents through a nasogastric or nasointestinal probe in patients with ALIO showing symptoms of gastrostasis [20,24].

**Grade of recommendations — C (Level of evidence — 5)**

**Comments:** although in international guidelines [7] for ALIO, in contrast to small bowel obstruction, the procedure for decompression of the gastrointestinal tract at the preoperative stage not described, its use in small-large bowel obstruction allows us to decrease intra-abdominal pressure, to decrease the concentration of microbial flora, the toxic effect of stagnant contents of the stomach and small intestine. Recommendations for decompression of the gastrointestinal tract at the preoperative stage may be relevant, first, for right colon cancer, manifested by small intestinal obstruction with dilatation of the proximal gastrointestinal tract. With left-sided ALIO, dilatation of the proximal part of the small intestine and stomach is less common, and therefore, in the absence of stagnant contents in the stomach, there is no need to install a probe for decompression of the upper gastrointestinal tract. A Russian study of the effect of gastric decompression on the survival of patients with small bowel obstruction has not been estimated [25]. However, preliminary decompression of the gastrointestinal tract makes it easier to manipulate in the abdominal cavity. In this regard, decompression of the gastrointestinal tract using a naso-gastric (intestinal) probe may be recommended.

- All patients with ALIO are **recommended** to stop enteral nutrition [26].

**Grade of recommendations — C (Level of evidence — 5)**

**Comments:** enteral nutrition has a trophic effect on the intestinal epithelium, prevents mucosal atrophy, prevents bacterial translocation. However, enteral nutrition is not possible in case of gastrointestinal tract obstruction, perforation or ischemia of the intestinal wall [26].

- All patients with ALIO are **recommended** to evaluate the effectiveness of the treatment, clinical — every 6 hours, instrumental (abdominal X-ray or ultrasound) — every 12 hours [6,19,20].

**Grade of recommendations — C (Level of evidence — 5)**

**Comments:** the most important clinical signs of improvement — conservative resolution of ALIO should

include the restoration of gas discharge and natural bowel emptying. Clinical and radiological data indicating intra-abdominal complications (perforation), high lactate levels (serum lactate above 2 mmol/L) and leukocytosis (more than  $18 \times 10^9$ ), a temperature of more than 38.5 °C, an increase in creatinine (more than 2 times compared with admission) should be taken as criteria for stopping non-surgical treatment [20]. In addition, the expansion of the dome of the cecum of more than 10 cm, non-correctable acidosis should be considered as indications for urgent surgery [20]. The decision on the possibility of further conservative therapy should be made every 6 hours. It has been shown that postponement at the beginning of surgery for more than 6 hours with intestinal perforation and septic shock is associated with 100% 60-day mortality [6].

- For unstable patients with ALIO, peritonitis and septic shock, surgery is recommended after intensive therapy and stabilization [27].

#### **Grade of recommendations — C (Level of evidence — 3)**

**Comments:** patients with ALIO, peritonitis and septic shock need intensive preoperative therapy. Risk factors for death include hypothermia (less than 35°C), metabolic acidosis, the presence of clinical or laboratory signs of coagulopathy [27]. In addition, comorbid patients and persons over 70 years of age need intensive care [28]. The target indicators of stabilization of the condition are the restoration of central venous pressure to 8–12 mmHg, average blood pressure > 65 mmHg, central venous saturation to (ScvO<sub>2</sub>) > 70% [29,30]. Treatment of unstable patients with ALIO is advisable to be carried out in the conditions of the intensive care unit.

- Patients with established intestinal perforation and peritonitis need antibacterial therapy as early as possible [31–33].

#### **Grade of recommendations — A (Level of evidence — 1)**

**Comments:** intraabdominal infections caused by perforation of the large intestine are often caused by a mixture of aerobic and anaerobic bacteria. Antimicrobial therapy recommended for intraabdominal infections [31] includes monotherapy with a drug from the carbapenem group and combination therapy with metronidazole\*\* with third-generation cephalosporins or fluoroquinolones. Although metronidazole has been used as standard therapy for

trichomoniasis, anaerobic and amoebic infections worldwide since the 1970s, resistance to metronidazole\*\* remains low [33]. It has been shown that combination therapy with metronidazole\*\* can be an effective and safe treatment option for intraabdominal infections, similar to carbapenem monotherapy [32].

- In order to prevent thromboembolic complications in patients with ALIO, the administration of heparin group drugs and the use of compression knitwear are **recommended** [34].

#### **Grade of recommendations — B (Level of evidence — 1)**

**Comments:** patients undergoing surgery for colorectal cancer are at high risk of thromboembolic complications. In the presence of intestinal obstruction, the risk of such complications is regarded as extremely high. The use of low molecular weight heparins (ATC — heparin group) can significantly reduce the likelihood of deep vein thrombosis of the lower extremities and pulmonary embolism. The use of other drugs of the heparin group does not differ in effectiveness, however, it is associated with a large number of hemorrhagic complications and the development of heparin-induced thrombocytopenia. Additionally, compression stockings are used, as well as a therapeutic pneumatic compression system. At the same time, early termination of bed rest is one of the conditions for successful prevention of venous thrombosis and is practiced in all cases where possible. In patients who have undergone extensive surgery for oncological surgeries, it is advisable to carry out preventive measures combined with the introduction of low-molecular-weight heparins for at least 4 weeks [35,36].

### **3.2 Non-invasive methods of treatment**

No.

### **3.3 Surgical treatment**

The main objective of surgical treatment of ALIO is to save the patient's life from the complications of large intestine cancer, as well as to create favorable conditions for the early start of oncological treatment. Surgery to remove a colorectal tumor in ALIO should be resorted to only in cases where it is necessary to save the patient's life, as well as in situations where the potential risk of an unfavorable outcome of a

staged treatment exceeds the benefits of a one-stage approach.

There are two options for surgical treatment of ALIO, namely: 1) Initial decompression of the large intestine followed by elective colorectal resection; 2) primary colorectal resection. In order to decompress the large intestine, a proximal intestinal stoma can be done; a stent or a decompression colonoscopic catheter (colorectal probe, in the English literature “Dennis Colorectal Tube”) is installed. Primary resection surgery include obstructive segmental resection of the large intestine without anastomosis (Hartmann’s procedure, right hemicolectomy with end ileostomy / ileo-ascendostomy), subtotal resection of the colon and segmental resection of the colon with primary anastomosis. The problem of choosing the optimal surgical approach not solved yet, the search for optimal approaches continues.

### **3.3.1 Endoscopic decompression minimally invasive surgeries**

Minimally invasive methods of surgical treatment of patients with ALIO of tumor etiology include the installation of a self-expanding stent, as well as a colonoscopic decompression catheter proximal to the large intestine tumor. The resolution of intestinal obstruction makes it possible to avoid performing emergency or urgent surgery, which makes it possible to use additional therapeutic and diagnostic measures to prepare the patient for elective surgical treatment, including laparoscopic access. Elimination of ALIO at the first stage of treatment of complicated large intestine cancer reduces the likelihood of severe complications and death, creates conditions for performing surgery with primary anastomosis, and in some cases without preventive intestinal stoma [37].

#### **3.3.1.1 Endoscopic stenting for tumor stenosis**

The most common non-invasive method of treatment that allows to stop ALIO is intestinal stenting with a self-expanding system (a metal uncovered large intestine stent) inserted into the intestinal lumen at the tumor level using an endoscope.

- In the absence of signs of perforation, peritonitis, bleeding, complete occlusion of the intestinal lumen by a tumor of the left colon, the installation of a self-expanding metal stent (uncovered metal stent for the large intestine) is **recommended** [38].

### **Grade of recommendations — B (Level of evidence — 2)**

**Comments:** *the technical efficiency of the method is 80–100%, while clinical improvement is observed in 73–89% of patients. The most dangerous complication of stenting is perforation, which is observed in 12.8% of cases, while “hidden” perforation, detected only by instrumental examination, occurs in 26.7% of cases [39]. Tumor perforation during stenting is a factor of unfavorable prognosis [40], after stenting, lymph node damage and perineural tumor invasion are more often detected [41]. At the same time, with sufficient experience of stenting (at least 40 procedures) and performing radical surgery to remove a colorectal tumor within 14 days, the overall and disease-free survival in the group of stenting and primary resection does not differ [38,42], the rate of anastomosis failure and stoma formation during stenting is lower [43]. Earlier guidelines did not allow the routine use of this method of treatment due to concerns about the deterioration of late results [44].*

- In order to avoid recurrence of obstruction, radical surgery is **recommended** to be performed within 14–30 days from the moment of elimination of ALIO in patients who do not require additional treatment, including neoadjuvant drug and/or radiation therapy [45].

### **Grade of recommendations — B (Level of evidence — 3)**

**Comments:** *after stenting, there were no significant differences in post-resection complications, duration of hospital stay or laparoscopic resections during surgery after 11–17 days compared to 5–10 days. Of the complications associated with the stent, 48% occurred in patients operated on more than 17 days after decompression. Compared with the procedures within 14 days after stoma, the operations within 14–28 days after decompression followed by a significantly higher rate of laparoscopic resections, a higher rate of primary anastomoses and a shorter hospital stay. There was no demonstrated effect of the timing of radical surgery on mortality, disease-free or overall survival [45].*

- Stenting of the tumor in ALIO against the background of antitumor therapy with monoclonal antibodies inhibiting the biological activity of vascular endothelial growth factor (bevacizumab\*\*) is **not recommended** [46].



**Grade of recommendations — B (Level of evidence — 2)**

**Comments:** *the presence of a stent in the tumor channel in patients receiving bevacizumab\*\* for a long time is associated with a high risk of tumor perforation [46].*

- Stenting is **not recommended** in patients with ALIO caused by tumors of the lower and middle rectum [47].

**Grade of recommendations — C (Level of evidence — 4)**

**Comments:** *with a low rectal cancer, a dentate line can get into the stenting zone, which causes severe pain, bleeding, tenesmus and anal incontinence [47].*

**3.3.1.2 Retrograde decompression colonoscopic catheter**

The method consists in transanal decompression of a colonoscopic catheter through the tumor canal, followed by washing of the proximal colon. It is performed during colonoscopy under the control of abdominal X-ray.

- In the absence of signs of perforation, peritonitis, bleeding and complete occlusion of the intestinal lumen by a tumor of the left colon, the installation of a decompression colonoscopic catheter is **recommended** as an alternative to stenting [48].

**Grade of recommendations — C (Level of evidence — 4)**

**Comments:** *carrying out a contrast tube is possible with a diameter of the tumor channel of at least 3 mm. The technical efficiency of the method is 80%, clinical — 72.5%; the rate of intestinal perforation can reach 10%.*

*A potential advantage of the method is the ability to perform lavage of the proximal large intestine, and, presumably, less trauma of the intestine in the tumor zone due to the absence of stretching of the tumor canal that occurs during stenting. A significant limitation of the method for use is the lack of data on its oncological safety [43].*

**3.3.2 Surgical treatment**

The primary task of surgical treatment is the elimination of intestinal obstruction and the preservation of the patient's life. In the presence of a colorectal oncologist or coloproctologist in a medical institution, the decision on the scope of surgical treatment made based on the individual features of the patient — in the absence of peritonitis, both resection and decompression

procedures (intestinal stoma) are permissible. A rational method of surgical treatment for ALIO in non-specialized hospitals is the proximal stoma followed by radical surgery to remove a large intestine tumor, which is preferably performed in specialized medical institutions of oncological and proctological profile.

- The presence of persistent acidosis and/or expansion of the cecum dome more than 10 cm should be considered an indication to discontinue further therapy and perform urgent surgery [20].

**Grade of recommendations — C (Level of evidence — 5)**

- In all patients planning for intestinal stoma are **recommended** to mark the area of the presumed stoma before surgery [49].

**Grade of recommendations — C (Level of evidence — 5)**

**Comments:** *if the patient supposed for a stoma, then the course of the procedure itself and its consequences should be carefully explained to him. The most optimal before performing the operation is to consult a specialist in the rehabilitation of stoma patients. In emergency situations, it is not always possible to comply with the above recommendations, in such cases, the marking of the area of the intended removal of the stoma should be carried out by the operating surgeon. Marking is performed in the patient's standing, lying and sitting position, taking into account his/her individual and constitutional characteristics, in accordance with clinical recommendations for the treatment of patients with intestinal stoma [50].*

- Patients without signs of intestinal perforation, peritonitis, abscess formation, operated on for ALIO of tumor etiology, are recommended to undergo antibiotic prophylaxis with systemic antibacterial drugs (ATC J01) [51].

**Grade of recommendations — A (Level of evidence — 1)**

**Comments:** *a single administration of a broad-spectrum antibacterial drug (ATC: J01CA, J01DC, J01DD, J01DE, J01DH, J01M) is considered effective immediately before surgery, and if the duration of surgery is more than 3 hours, its repeated administration. The administration of systemic antibacterial drugs can reduce the incidence of infectious complications, shorten the patient's hospital stay, and reduce the cost of treating complications after surgeries [51].*

• Intraoperative decompression of the small intestine is **recommended** for all patients with ALIO [49].

**Grade of recommendations — C (Level of evidence — 5)**

**Comments:** decompression of the small intestine is necessary to eliminate abdominal compartment syndrome, provide conditions for suturing the abdominal wall wound without tension, reduce the concentration of microbial flora, eliminate the toxic effect of stagnant stomach and small intestine contents, normalize respiratory function, reduce the risk of aspiration pneumonia, improve perfusion of the intestinal wall, restore motor and suction functions of the intestine.

According to a systematic review, there are no statistically significant differences in the results of treatment of patients with ALIO when using a nasogastric probe with manual decompression of the small intestine or “open” decompression of the intestine [52]. According to the results of the meta-analysis, the use of a nasointestinal probe has no advantages over a nasogastric one in the treatment of a thin-bowel obstruction [53].

The choice of the method of decompression of the digestive tract should be decided individually for each patient, based on the characteristics of his/her disease, the experience of the medical institution and the operating surgeon.

**3.3.2.1 Loop stoma**

The loop ileostomy/colostomy is an alternative to stenting in the “bridge to surgery” strategy, when treatment aimed only at eliminating acute intestinal obstruction in order to create optimal conditions for performing the main stage of surgery—removal of a large intestine tumor [37,54].

• In case of ineffective treatment, absence of signs of peritonitis, as well as an alternative to stenting, proximal loop intestinal stoma is **recommended** [55–57].

**Grade of recommendations — B (Level of evidence — 2)**

**Comments:** the advantage of a loop stoma is the relative simplicity of the surgery, reliable decompression of the large intestine, the possibility of performing a total colonoscopy (during the formation of a double-barrelled colostomy), which allows detecting synchronous neoplasm in 2.3–12.4% of cases [55]. The question of choosing an ileo- or colostomy

is decided individually, depending on the specific clinical situation. The rate of complications in both variants of surgery is comparable. However, patients with ileostoma have a higher risk of dehydration [56]. It was shown that patients who underwent the formation of a loop stoma at the first stage were statistically significantly less likely to have an intestinal stoma after surgery to remove a large intestine tumor — 29% versus 67% in the stenting group ( $p < 0.001$ ) [57].

At the same time, it should be pointed out that there was a higher incidence of severe complications in the stented patients — 15.3% versus 5.8% in the stenting group, but this did not affect the overall and disease-free survival, which was comparable in the groups [57]. In comparison with primary large intestine resection, the rate of cumulative mortality and complications are comparable. However, in the group of patients with stoma, it is more often possible to form an inter-intestinal anastomosis — in 89.3%, as opposed to 49.2% when removing a large intestine tumor at the first stage of treatment. In 9.4% of cases, patients remain with a permanent stoma, while in the group of primary resections this indicator is 21.6% [54]. In the case of intestinal obstruction caused by a rectal tumor, it is advisable to refuse from performing primary resection of the rectum by Hartmann, since this significantly complicates the subsequent rehabilitation of the patient. In addition, when the tumor located in the middle or low rectum, especially in the case of locally advanced tumors, resection deprives the possibility of neoadjuvant chemoradiotherapy, thereby discrediting the principles of oncological radicalism [58,59].

• In unstable patients with tumor ALIO or with technical difficulties in removing a loop colostomy, a wall colostomy can be used as a decompression surgery [60].

**Grade of recommendations — C (Level of evidence — 3)**

**Comments:** for patients with tumor ALIO, it is not recommended to form a parietal colostomy, including a cecostomy, because it does not provide a complete shutdown of the passage of intestinal contents and full-fledged relief of complications of the tumor process. This surgery can be justified only in limited cases in critical condition, when stenting or the formation of a loop intestinal stoma cannot be performed [60].

### 3.3.2.2 Colorectal resection

The most frequently performed radical surgery for cancer of the left half of the colon complicated by ALIO is colon resection with the formation of a terminal colostomy (Hartmann's procedure) [12]. When neoplasms are located in the right parts of the colon, operations performed with anastomosis, and if necessary, resection of the colon performed without creating an anastomosis, a single-stem ileostomy is formed.

The advantage of this type of surgery is the exclusion of the likelihood of anastomosis leakage, as well as the removal of the tumor at the initial stage of treatment. However, it should be noted that resections are associated with a high level of postoperative mortality — 9% and postoperative complications, including those associated with intestinal stoma. The risk factors for death are the elderly age of patients — over 70 years old, high anesthetic risk — ASA3, cardiovascular insufficiency and neurological disorders. The low rate of stoma reversal is also important — only 35% of patients subsequently manage to restore natural defecation [12]. It was shown that the average number of lymph nodes in the removed specimen after emergency surgeries is lower than in elective surgery (8.7 vs. 21.0) [61]. It should be noted that dozens of randomized studies and meta-analyses have been done on choosing the optimal strategy for surgical treatment for patients with ALIO. In the analysis of Pubmed over the past 5 years, 10 meta-analyses were found on the request of "large bowel obstruction", dedicated to choosing the optimal primary surgery: stoma, stent, resection. Of these, the only study showed that primary decompression surgery, in particular a stent, had advantages over primary resection in terms of hospital — 90-day mortality: 6.5% vs. 8.1% (HR 0.65, P = 0.01) [62]. The same results of the overall 3- and 5-year survival were obtained when comparing the stoma and stent with primary resection, with the exception of the only meta-analysis where the stoma and stent had advantages. In the same study, a higher 5-year disease-free survival rate was established with the use of a stoma and a stent. According to 3-year disease-free survival in two meta-analyses, the advantages of primary resection were established [63,64]. The stoma and stent groups had clear advantages in terms of the

rate of complications and the primary anastomosis, with some advantage of primary resection in terms of the total duration of inpatient treatment. The number of removed lymph nodes was either equal [63], or the stoma and stent group had an advantage [65].

In general, compared with emergency surgery, self-expanding metal stents and stomas improve short-term surgical treatment results with comparable overall and disease-free survival. At the same time, stable patients can benefit from emergency resection surgery, including primary anastomosis, unstable patients — from decompression with a stoma, stent or colorectal probe [66]. Analysis of the results of surgical treatment of ALIO, according to the prospective national registry of the Netherlands, showed mortality after emergency resection from 2.9% in patients < 70 years old to 32.2% in elderly patients with high risk. For frail elderly patients, postoperative mortality of over 30% requires the search for alternative treatment strategies [67].

- In stable patients with ALIO without perforation and peritonitis caused by a colon tumor, in the presence of a qualified team of oncological surgeons or coloproctologists, after further examination in accordance with clinical guidelines for the treatment of colon cancer and rectosigmoid junction, it is possible to perform surgery to remove a colon tumor [63,64].

#### Grade of recommendations — C (Level of evidence — 1)

**Comments:** *taking into account the data available today, resection should be resorted to only in cases when they are performed by a qualified team of surgeons, oncologists or coloproctologists, there are conditions for conducting a qualitative morphological examination of the removed tumor, as well as when other treatment options cannot be applied. The availability of a qualified team is of particular importance in the case of resection that require compliance with oncological principles of surgery. The surgery volume for emergency resection in the absence of perforation and peritonitis should not differ from the elective surgery, with the exception of the issue of the formation of an inter-intestinal anastomosis. If it is impossible to perform surgery according to the established principles of colorectal cancer treatment in patients without perforation,*

resection should not be performed. The surgery volume must be limited by decompression stoma.

- If perforation, peritonitis, abscess formation, diastatic ruptures and ischemic changes of the colon are detected, colon resection is **recommended** without anastomosis [12,27].

#### **Grade of recommendations — C (Level of evidence — 4)**

**Comments:** Two main mechanisms lead to intestinal perforation and peritonitis against the background of ALIO of tumor etiology. Firstly, it is the formation of a defect in the intestinal wall at the tumor level due to necrosis and decay of tumor tissue; secondly, a diastatic rupture of the wall of the distended intestine located proximal to the site of obstruction. The second variant often more severe and is associated with high mortality due to diffuse contamination of the abdominal cavity and the rapid development of severe septic shock [68]. In general, in this situation, it is necessary to make every effort to remove the affected area of the intestine together with the tumor. However, the treatment approach should be balanced and take into account the severity of the patient's condition. Unstable patients can undergo only those procedures that they can tolerate, and this usually corresponds to technically simple and quickly performed operations (Hartmann's procedure, right hemicolectomy without anastomosis, subtotal colon resection is without anastomosis) [12,27].

- Operations to remove tumor of the large intestine with anastomosis are **recommended** to be performed only after the resolution of the symptoms ALIO in stable patients without severe comorbidities, in the presence of a qualified team of surgeons-oncologists or coloproctologists, in accordance with clinical guidelines for the treatment of patients with colorectal cancer [7,89,90].

#### **Grade of recommendations — C (Level of evidence — 4)**

**Comments:** with ALIO, the risk of potentially fatal complication is higher — the anastomosis leakage. The rate of anastomosis leakage in ALIO is 11.2% — 14.3%, while the mortality rate reaches 17.1% [69,70]. The most common anastomosis leakage occurs after subtotal colectomy — 14%, left hemicolectomy — 13%, resection of the transverse colon — 10.3% [12]. Risk factors for an unfavorable prognosis during surgery with anastomosis include

the patient's age over 70 years, high anesthetic risk (ASA > 3), anemia (Hb < 75 g / l), chronic kidney disease (glomerular filtration rate (GFR) < 45 ml/min / 1.73 m<sup>2</sup>), chronic heart failure, respiratory failure, neurological deficit.

In the presence of any listed risk factors, the formation of an anastomosis should be avoided in favor of stoma [12,71]. The complicated postoperative period may be the reason for the late start of chemotherapy, or even refusal to carry it out.

### **3.4 Palliative treatment of patients with ALIO**

The main goal of treating patients with stage IV large intestine cancer and acute intestinal obstruction is to increase the patient's life expectancy and improve its quality. Available treatment options include the use of systemic corticosteroids and gastrointestinal motility stimulants, symptomatic treatment — nasogastric intubation and parenteral nutrition, intestinal stenting and surgeries — proximal stoma formation and intestinal resection. However, overall survival is low, regardless of the type of treatment. Universally poor outcomes suggest that acute intestinal obstruction against the background of incurable large intestine cancer should be considered as a preterminal event [72]. In such situations, an individualized multidisciplinary approach with increased patient participation in choosing the scope of treatment is preferable [73]. If signs of perforation, strangulation and peritonitis detected in patients with stage IV large intestine cancer, emergency surgical treatment is necessary. It is necessary to strive for the implementation of the minimum possible surgery volume, giving preference to the formation of a proximal stoma. If intestinal perforation, ischemia and abscess detected, resection should be performed.

In patients with a disseminated form of large intestine cancer complicated by compensated large intestine obstruction, it is possible to perform surgery in the volume of palliative large intestine resection. The basis for performing such a surgery is the decision of a multidisciplinary oncological council. Currently, there is no convincing data on the benefits or disadvantages of performing palliative bowel resection in patients with disseminated cancer. The results of existing studies contradict each other; most of the studies



are retrospective, which is why many significant variables, such as the number of metastases, their size, and characteristics of target organs may not be taken into account, which does not allow using accurate methods of statistical information processing [74]. The reasons for performing palliative resection are the expected improvement in the patient's quality of life and ensuring optimal conditions for chemotherapy.

The issues of pain syndrome control and nutritional status support in palliative patients are not considered in these recommendations.

- In case of tumor ALIO in patients with stage IV colorectal cancer with a short life expectancy, the use of the intestinal stenting method is **recommended** [75].

#### **Grade of recommendations — B (Level of evidence — 2)**

**Comments:** *bowel stenting as part of palliative treatment of patients with obstructive pulmonary embolism can eliminate the need for the formation of an intestinal stoma, which potentially allows for an acceptable quality of life for patients [53]. However, despite the high rate of technically successful stenting (in the presence of only one tumor obstacle) — from 90% to 100% of cases, a shorter duration of hospitalization compared to the formation of a stoma [76], early postoperative complications more often occurred during stenting [44]. The recurrence rate of acute intestinal obstruction is higher in the group of patients undergoing stenting — 20.7% versus 9% in the surgical treatment group [75].*

- In patients with stage IV cancer, if it is impossible to stent the intestine, there are several areas of intestinal obstruction, as well as, if drug anti-tumor treatment is carried out, surgery is **recommended** in the volume of proximal colostomy / ileostomy [77].

#### **Grade of recommendations — C (Level of evidence — 4)**

**Comments:** *the basis for treatment of patients with disseminated colorectal cancer is chemotherapy. Because the presence of a stent in the tumor canal in patients receiving bevacizumab\*\* for a long time is associated with a high risk of tumor perforation, other methods of large intestine decompression should be used [46]. Stoma is a relatively simple procedure that allows rapid and reliable decompression of the large intestine [77].*

## **4. MEDICAL REHABILITATION AND SPA TREATMENT, MEDICAL INDICATIONS AND CONTRAINDICATIONS TO THE USE OF REHABILITATION METHODS, INCLUDING THOSE BASED ON THE USE OF NATURAL THERAPEUTIC FACTORS**

- In patients with laparotomy access, it is recommended to use epidural anesthesia based on local anesthetics and opioids in order to control pain syndrome [78].

#### **Grade of recommendations — B (Level of evidence — 3)**

**Comments:** *the optimal analgesia regimen after extensive surgeries should provide a sufficient level of anesthesia, promote early mobilization, more active restoration of intestinal function and nutrition, and not cause complications [78]. It is preferable to use multimodal analgesia, combining regional methods of anesthesia, as well as, if possible, and the rejection of opioids in order to avoid the development of side effects.*

*Opioids followed by drowsiness and adynamic patients, ileus, episodes of nausea and vomiting.*

*In open laparotomy, epidural analgesia is the optimal method of analgesia in the first 72 hours after surgery, contributing to an earlier restoration of intestinal function and a reduction in the number of complications [79,80]. The use of 0.2% ropivacaine\*\* in combination with fentanyl\*\* provides optimal anesthesia and minimizes the risk of motor block and hypotension due to sympathetic blockade [78,81]. To eliminate hypotension caused by sympathetic blockade, vasopressin and its analogues should be prescribed in the absence of hypovolemia. Preferably, the epidural catheter should be removed 48–72 hours after surgery.*

- After surgery and recovery from post-acute depression, it is **recommended** to prescribe nutritional support in the form of oral, including probe supplemental nutrition, with the restoration of normal intestinal peristalsis, the usual meal can be resumed [82,83].

#### **Grade of recommendations — C (Level of evidence — 2)**

**Comments:** *the use of enteral infusions of salt, monomer-salt and nutrient mixtures, adsorbing intestinal preparations in the postoperative period contributes to a faster restoration of gastrointestinal*

function [84]. Additional oral nutrition (for convenience, special mixtures used, including the sipping method) can increase the total food intake, which allows achieving the target alimentary indicators [85,86].

- Removal of the urethral catheter is **recommended** after activation of the patient, preferably on the 2nd day after surgery [87].

#### **Grade of recommendations — C**

##### **(Level of evidence — 2)**

**Comments:** bladder catheterization used for precise control of diuresis, with urinary retention and the patient's inability to control pelvic functions. Prolonged presence of a urinary catheter increases the risk of urinary infection, prevents early mobilization. If the patient is able to control pelvic functions, then removal of the urinary catheter is possible as early as on the 1–2 days after surgery [87]. A longer stay of the urinary catheter may be required for patients with epidural analgesia.

- Early mobilization in the postoperative period is **recommended** for patients operated for ALIO [81,88].

#### **Grade of recommendations — B (Level of evidence — 3)**

**Comments:** Prolonged stay in bed increases the frequency of thromboembolic complications, respiratory disorders, reduces muscle strength and increases the risk of hemodynamic disorders. The patient's activity determined by both objective and subjective factors. Adequate anesthesia, timely removal of drains and catheters is important. In addition, the patient needs to explain the safety of motor activity after surgery, reassure him about the risk of "suture divergence" in the early postoperative period. The patient's rise from bed, starting from the 1st day after surgery, and regular activity followed by a decrease in the frequency of postoperative complications and the duration of hospital stay [88].

## **5. PREVENTION AND DISPENSARY SUPERVISION, MEDICAL INDICATIONS AND CONTRAINDICATIONS TO THE USE OF PREVENTION METHODS**

### **5.1 Prevention**

Prevention of ALIO is early diagnosis of colorectal cancer and should be carried out in accordance

with the guidelines for the treatment of rectal and colon cancer [89,90].

### **5.2 Dispensary management**

- All patients who have undergone surgery for ALIO are subject to dispensary observation by an oncologist or a coloproctologist [91–93].

#### **Grade of recommendations — C (Level of evidence — 4)**

**Comments:** after radical colorectal resection and adjuvant chemotherapy (if indicated), dispensary observation of patients is carried out, the purpose of which is to identify possible complications, diagnosis of cancer recurrence, detection of synchronous or metachronous neoplasms. Analysis of data from 18 large randomized trials, which included a total of 20,898 patients, showed that in the first 3 years after resection, up to 80% of all cases of recurrence of colorectal cancer develop [91], and within 5 years after surgery — up to 95% of all recurrences [92]. For stage II-III patients who have undergone successful removal of a malignant large intestine tumor (in the absence of a "residual" tumor), an examination may be recommended every 3–6 months after surgery for 2 years, then every 6 months — up to 5 years. Colonoscopy should be prescribed in 1 year after the surgery (or in 1–3 months if a total colonoscopy was not performed at the preoperative stage of the examination). Colonoscopy should be repeated annually for up to 3 years, and then every 5 years [93]. However, if an adenomatous/villous polyp or severe epithelial dysplasia detected, colonoscopy should be repeated annually. More frequent colonoscopy may be recommended for young patients (up to 50 years old). Colonoscopy as part of dispensary follow-up is necessary, first, for the diagnosis of metachronous polyps and their subsequent removal, since patients with a history of large intestine cancer have a risk of developing a second cancer, especially in the first 2 years after surgery [94].

Computed tomography is recommended to detect potentially resectable metastases, mainly in the lungs and liver. It follows from this that CT scanning may not be used routinely in patients with asymptomatic generalized form of cancer who are not candidates for potentially radical surgical treatment. Computed tomography of the thorax, abdominal cavity and pelvic organs should be performed every 6–12 months up to 5 years at stage III, and in patients with stage

II who have a high risk of developing the disease recurrence [95].

## 6. ORGANIZATION OF MEDICAL CARE

### 6.1 Indications for admission in a medical organization

All patients with suspected intestinal obstruction should be urgently admitted in a surgical hospital. In case of acute intestinal obstruction caused by a large intestine tumor, help is **urgent**. The timing of admission of such patients may determine the outcome of the disease. Postponement of the start of treatment or violation of the timing of the stages of treatment leads to a decrease in the overall and disease-free survival rates in these patients and makes the prognosis of a particular patient heavier.

Diagnostic measures at the stage of diagnosis should be carried out in a surgical hospital. The working group recommends that planned surgical treatment, drug antitumor treatment, and radiation therapy be carried out in the conditions of specialized hospital units (oncological, coloproctological).

All patients who are scheduled to undergo surgical procedure for large intestine cancer must give informed consent. It implies that the patient provided with information about the possible benefits and hypothetical risks of treatment, as well as the availability of any alternative methods of treatment. If possible, informed consent should be obtained directly by the operating surgeon. In accordance with the Law of the Russian Federation of November 21, 2011, No. 323-FL "On the Basics of Protecting the Health of Citizens in the Russian Federation", obtaining voluntary informed consent is a mandatory and necessary procedure that reflects compliance with legal and ethical human rights to make an independent decision concerning his health. The conditions for the possibility of obtaining informed consent are the ability of the patient to make informed decisions regarding therapeutic measures, the accessible provision of all information necessary for decision-making. The main issues are: the benefits and risks of the proposed treatment, the planned amount of therapeutic measures, the consequences of refusing treatment.

- It is **recommended** to perform surgeries to remove colon tumors in ALIO in surgical, coloproctological or oncological unit, by a specialist with experience in performing oncological surgeries on the large intestine [69].

### Grade of recommendations — C (Level of evidence — 4)

**Comments:** *the lack of specialization of the doctor in the field of colorectal surgery is a factor of unfavorable prognosis [69]. It has been shown that the overall rate of postoperative complications and postoperative mortality is higher if the surgery was performed by a surgeon who does not have special training. The failure of the interstitial joint in general surgical hospitals is twice as high as in specialized medical institutions (21.3% vs. 10.3%) [96]. In patients operated on in general surgical units, the number of examined lymph nodes in the specimen in 98.3% of cases does not correspond to the required number — 12 or more [96]. Overall and disease-free survival is statistically significantly lower in the group of patients operated on in non-specialized hospitals. In stage III patients operated on after the resolution of ALIO in oncological units, the 5-year overall survival is 50%, while among those operated on against the background of ALIO in non-specialized hospitals — 28% ( $p = 0.02$ ) [97].*

### 6.2 Indications for the patient's discharge from the medical organization

In case of hospitalization for acute intestinal obstruction, the timing of the patient's discharge from the medical organization depends on the amount of medical care provided, the nature of the surgery, and the course of the postoperative period. Discharge during the uncomplicated course of the postoperative period is performed with the improvement of the patient's condition, restoration of gastrointestinal function, relief of endotoxemia and normalization of red blood indicators. An extract from a non-specialized surgical unit with mandatory referral of the patient to an oncological or coloproctological hospital is performed when the symptoms of acute intestinal obstruction are relieved by means of intestinal stenting, or the formation of a proximal loop stoma.

In a situation when the AIO was resolved against the background of conservative treatment, in

order to avoid recurrence of obstruction, the patient is transferred to a specialized hospital (unit) of oncological or coloproctological profile.

## 7. ADDITIONAL INFORMATION (INCLUDING FACTORS AFFECTING THE OUTCOME OF THE DISEASE OR CONDITION)

*Negatively affect the outcome of treatment:*

- Intestinal perforation
- Non-radical removal of the tumor
- Incomplete pathomorphological description of the specimen of the removed tumor
- Refusal to perform adjuvant chemotherapy if there are indications for its implementation.

## CRITERIA FOR ASSESSING THE QUALITY OF MEDICAL CARE

№	Quality assessment criteria	Performance Assessment (yes/no)
1	A digital rectal examination was performed	Yes/No
2	The effectiveness of conservative therapy was evaluated every 6 hours	Yes/No
3	Marking of the intestinal stoma removal area before surgery for ALIO was performed	Yes/No
4	The elimination of intestinal obstruction was performed	Yes/No

When performing resection surgeries for colorectal cancer complicated by ALIO, the quality of medical care provided should be evaluated in accordance with clinical recommendations for the treatment of colon and rectal cancer [89,90].

**Table 1.** Scale of assessment of CEL (levels of evidence credibility) for diagnostic methods (diagnostic surgeries)

CEL	Decoding
1	Systematic reviews of trials with reference method control or systematic review of randomized clinical trials using meta-analysis
2	Separate studies with reference method control or separate randomized clinical trials and systematic reviews of studies of any design, with the exception of randomized clinical trials, using meta-analysis
3	Studies without sequential control by a reference method or studies with a reference method that is not independent of the method under study or non-randomized comparative studies, including cohort studies
4	Non-comparative studies, description of a clinical case
5	There is only a justification of the mechanism of action or the opinion of experts

**Table 2.** CEL assessment scale for methods of prevention, treatment and rehabilitation (preventive, curative, rehabilitation interventions)

CEL	Decoding
1	Systematic review of RCTs (randomized clinical trials) using meta-analysis
2	Separate RCTs and systematic reviews of studies of any design, with the exception of RCTs, using meta-analysis
3	Non-randomized comparative studies, including cohort studies
4	Non-comparative studies, description of a clinical case or series of cases, case-control studies
5	There is only a justification of the mechanism of action of the intervention (preclinical studies) or the opinion of experts

**Table 3.** The scale of assessment of RC (Grade of recommendations) for methods of prevention, diagnosis, treatment and rehabilitation (preventive, diagnostic, therapeutic, rehabilitation interventions)

RC	Decoding
A	Strong recommendation (all considered performance criteria (outcomes) are important, all studies have high or satisfactory methodological quality, their conclusions on the outcomes of interest are consistent)
B	Conditional recommendation (not all considered performance criteria (outcomes) are important, not all studies have high or satisfactory methodological quality and/or their conclusions on the outcomes of interest are not consistent)
C	Weak recommendation (lack of evidence of proper quality (all considered performance criteria (outcomes) are unimportant, all studies have low methodological quality and their conclusions on the outcomes of interest are not consistent)



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### APPLICATION. Diagnostic algorithm

