

**Vinnytsya National Medical University n.a. Pirogov**

**Chair of endoscopic and cardiovascular surgery**

**« APPROVED »**

on the methodical conference of  
department Chair of endoscopic and  
cardiovascular surgery

Chief of the department

\_\_\_\_\_prof. V.V. Petrushenko

« 28 » 08 2017 y.

**METHODICAL RECOMMENDATIONS  
FOR STUDENTS**

Educational discipline	Surgery
Module №	2
Semantic module №	4
Theme of employment	Abdominal ischemic syndrome
Course	5
Faculty	Medical

## 1. Actual topic:

Human life can be compared with the change of seasons from spring to summer to autumn, and finally the winter. You can see both the focal lipid deposits in the intima of arteries (from the formation of "lipid strips") is progressing atherosclerosis, and man as nature comes to the slow fading, the frosty winter numbness of the world. The result of atherosclerosis can certainly be AIS.

Chronic ischemia of the digestive system caused by occlusion of visceral branches of the abdominal aorta and develops due to deficiency of blood flow to a particular gastrointestinal tract in various stages of digestion. It usually begins with functional disorders and lead to organic changes.

The first reports of myocardial infarction, which was preceded by chronic intestinal ischemia, Despre made in 1834. The term angina abdominalis, which survives to this day, introduced into clinical practice G. Bacelli (1905). The first successful surgery on the upper mesenteric artery (trombendarterektomiyu) performed in 1957, R. Shaw et al.

The incidence of AIS is quite high: 75.5% of autopsies in deaths from coronary heart disease as a result of atherosclerosis of cerebral arteries and / or vessels of the lower limbs also exhibit atherosclerosis of the abdominal aorta and its visceral branches of odd, in 50-57% of cases of abdominal ischemia is diagnosed only when breach of acute mesenteric circulation, ie myocardial infarction. All other cases are usually associated with banal diseases - gastro-duodenitis, hepatitis, pancreatitis, etc. Early diagnosis and treatment of atherosclerosis in the abdominal gastroenterology hospitals are not held! While the task of the expert - the diagnosis of AIS as soon as possible because of its primacy to the development of severe events.

Frequency of stenosing lesions of visceral branches of the abdominal aorta, according to autopsy - 19,2-70%, angiography - 4,1-53,5%. At the same time, surgery in this pathology are only 2% of all transactions in the abdominal part of the aorta and its branches.

## 2. Objectives:

- Be able to analyze the precursors and risk factors of AIS (age, dyslipidemia, infringement of blood rheology, adhesive disease, etc.).
- Explain the cause and effect relationship of etiologic and pathogenetic features of the disease (atherosclerosis, ischemia bowel functionality disorders of the digestive system, organic disorders).
- Know the current classification of the AIS (LB Lazebnik et al. (2003)
- Know the clinical signs (symptoms) of AIS.
- Master the techniques of clinical diagnosis of AIS (palpation, percussion, auscultation of the abdominal aorta and the abdominal cavity).
- To interpret the results of clinical and paraclinical examination of the patient with AIS (set of characteristic symptoms, the results of the function tests, data of laboratory examinations).
- To make the algorithm of conservative and surgical treatment of patients with AIS given the stage of the disease, its severity and the presence of complications.
- To make the algorithm preventive measures for elderly and senile patients with AIS to prevent the development of necrotic changes in the digestive system.

### 3.1. Theoretical question for the class:

- Define AIS.

- Name the predisposing factors and immediate causes of the emergence of the AIS.
- The pathogenesis of AIS.
- Classification of AIS.
- Chronic arterial insufficiency of intestine and its extent.
- Clinic AIS, depending on the process.
- Complications AIS.
- Variations clinical course of AIS.
- Algorithm clinical examination of the patient with AIS.
- Algorithm paraclinical examination of the patient with AIS.
- Radiographic diagnostic methods AIS.
- Ultrasound and computer diagnostics varicose AIS.
- Minimally invasive techniques (laparoscopy) in the diagnosis of AIS.
- Conservative treatment of AIS.
- Surgical treatment of AIS.
- Rehabilitation of patients with AIS in early and late after operation period.
- Prevention of AIS contingent threatening people (poly-ing age, signs of general arteriosclerosis, disturbance of lipid metabolism-tion, etc.).

### **3.2. The practical works (tasks) to be performed in class:**

1. Perform a measurement of blood pressure in different parts of the arterial system.
2. Perform palpation and auskultatychny study the arterial system.
3. Conduct and palpation of the abdominal aorta auskultatychny.
4. Perform palpation and auskultatychny research intestine.
5. Identify the clinical symptoms of intestinal failure operation.
6. Identify the symptoms of chronic pancreatitis.
7. Identify the symptoms of acute appendicitis.
8. Identify the symptoms of perforated ulcers.
9. Identify the symptoms of acute cholecystitis.
10. Identify symptom intestinal obstruction.
11. Identify the symptoms of bowel infarction complications (peritonitis).
12. Read angiogram.
13. Interpret the sonogram.
14. Interpret signs laparoscopic MIS
15. To make the algorithm of conservative treatment of patients with initial wash stage.
16. Identify the indications and contraindications for surgical treatment.
17. Identify the indications and contraindications for minimally invasive therapy.
18. Collect a set of tools to perform embolectomy.
19. Perform ligation patient in the early postoperative period.
20. To make the algorithm prevention of AIS in endangering patients.
21. Perform preventive conversation with the patient with the threat of severe forms of AIS.
22. Evaluate the effectiveness of the method of treatment (conservative and surgical)

### **4. Contents subject.**

#### ***Abdominal ischemic syndrome***

Abdominal coronary artery disease - a chronic violation trunk and organ blood flow in the basin of the abdominal aorta and its visceral branches odd that leads to pain, functional, organic and morphological changes that supplying.

Terminology abdominal coronary artery disease varied. There are more than 20 terms defining symptoms present. The most famous ones are "intermittent disperistaltika anemic", "peremezhayucha anhioklerotichna disprahiya", "intestinal angina", "abdominal angina",

"mesenteric arterial insufficiency," "chronic intestinal ischemia," "coronary artery disease of the digestive system", "abdominal ischemic syndrome ". As for modern diagnosis, then, according to ICD-10, the following options: atherosclerosis of the abdominal aorta - I70.0, abdominal aortic aneurysm - I71.4, embolism and thrombosis of abdominal aorta - I74.0, celiac trunk compression syndrome of the abdominal aorta - I77.4, vascular disease of the intestine - K55.

AVERAGE incidence of visceral artery lesions odd abdominal aorta following: a.mesenterica superior(AMS) - 30-33% a.mesenterica inferior(AMI) - 21-23% of the celiac trunk (CT) - 17-20%, splenic artery (SA) - 13-16%.

Currently, the most studied in detail the methods of diagnosis and treatment of chronic ischemic colitis. An attempt allocation of chronic ischemic pancreatitis. However, the complexities involved in the differential diagnosis of this condition with the usual chronic recurrent biliary-dependent and / or alcoholic pancreatitis, making this task difficult. Therefore, at present ischemic chronic pancreatitis (both clinically independent variant of the disease) is not generally recognized. To date, five options selected clinical course of chronic abdominal ischemia:

1. Erosive and ulcerative.
2. Pseudopankreatic.
3. Diskinetichenny.
4. Holetsistopodibnyy.
5. Pseudotumoroznyy.

### **Causes of late diagnosis**

N. Buchart-Hansen (1977) found that only 16.6% of patients diagnosed with chronic ischemia exhibit prolonged after repeated examinations to rule out a variety of functional and organic diseases of the abdominal cavity. Abdominal coronary disease is generally regarded as rare and hard zustrichayeme diahnostuyeme disease, although the main cause approximately 5% of all deaths in hospital is bowel ischemia.

Abdominal coronary disease usually occurs on the background of other extremely severe, life-threatening and more clearly diseases (heart failure, septic shock, thromboembolism, cardiac arrhythmia) or during recovery after a major heart surgery or major vessels.

To diagnose abdominal coronary artery disease does not exist any specific standard laboratory tests. Late diagnosis - the main cause of death in patients with colon ischemia.

Usually patients for admission to a specialized hospital undergoing several tests, which often leads to different interpretations of the disease:

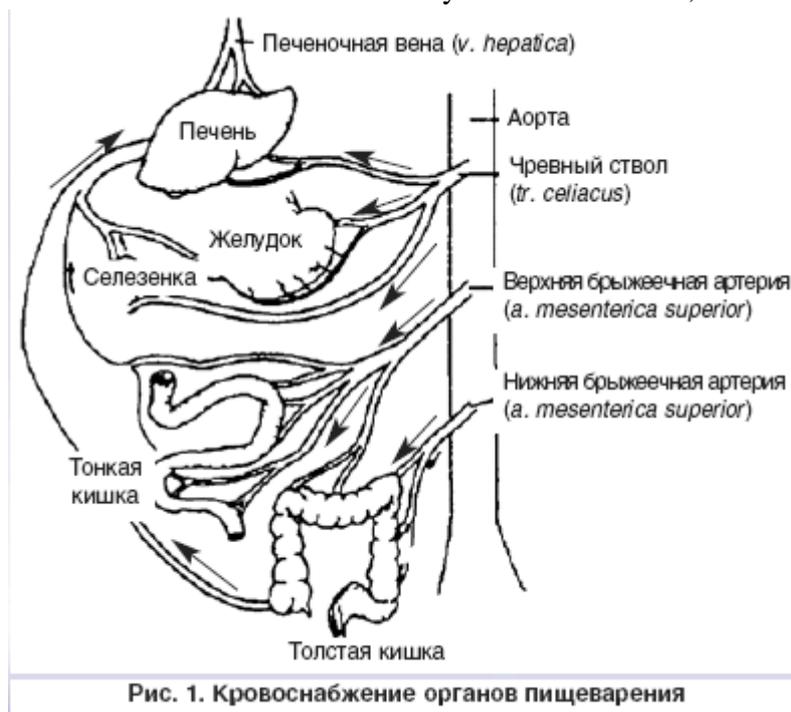
- repeated searches of known non-cancerous diagnostic processes in the digestive organs of unsuccessful conservative standard and spa therapy and, nevertheless, progressive course of the disease;
- long-term inspection and test laparotomy often the supposed malignant tumors of the gastrointestinal tract (GIT), but even during revision surgery visceral arteries is not performed and the diagnosis is unclear;
- a thorough examination of patients exhibiting gastric ulcer or duodenal ulcer (DU): conducting palliative or cosmetic surgery, the clinical effect of which is a small, postoperative clinical picture is treated as postrezektsiyenny syndrome, asthenia ahastralnaya, dumping syndrome, postvahotomnyy syndrome, gastric ulcer cults , postholetsistektomichnyy syndrome;
- because of the inconsistency of complaints put forward that patients and objective data of well-

known diseases of the gastrointestinal tract of patients referred to the category of abdominal form psihonevroza;

- clinical picture of distal kolopatiyi, due to occlusion of the NBA, as patients and doctors associated with the natural involution of the body, aging and age-related characteristics.

### Classification :

Ischemic bowel disease - a disease of people mostly elderly. In these age groups, it occurs 7 times more likely than people in younger age. Bowel ischemia is caused by a decrease or cessation of blood supply due to violation of the inflow or outflow of blood. The blood supply of the small intestine is carried out by TC and the AMS, the colon - on AMS and AMI.



(Fig. 1). The outflow of blood is appropriate for bryzheechnym veins in the portal vein (ischemia rectum rarely develops because of the presence of a rich network of collaterals).

Ischemic bowel disease is divided as follows:

I. Acute ischemia mezenterialnaya:

- neokklyuziyna mesenteric ischemia
- mezenterialnoy artery embolism top
- mezenterialnoy artery thrombosis of the upper
- local segmental ischemia

II. Chronic mezenterialnaya ischemia (abdominal cramps)

III. Ischemia of the colon:

- reversible ischemic colopathy
- Coming ischemic ulcerative colitis
- Chronic ulcerative colitis ischemic, strictures of the colon, bowel gangrene

### Okklyuziyna ischemia

There okklyuziynu ischemia caused by a decrease in lumen ekstraorhannoyi vessels (arteries, veins) and neokklyuziynu, due to a decrease in visceral blood flow to mikrotsirkulyarnomu level.

Chance of a partial or complete occlusion ekstraorhannyh vessels. Violation of permeability may be caused by thrombosis, embolism, decreased lumen plaque, inflammation of the inner lining of blood vessels, compression of blood vessels outside, germination in its wall tumors, etc.

Okklyuziyna ischemia may develop atherosclerosis, systemic vasculitis, abnormal blood vessels, thrombosis complicating heart failure (HF) and its atherosclerotic changes in vessels of thromboembolism in patients with fibrillyatsiyeyu fibrillation, myocardial infarction parietal thrombus, implanted heart valves and so on. Vein occlusion develops less frequently than arteries.

Option disease caused by atherosclerotic mesenteric vascular development is slow, can not long exist without any clinical symptoms, has a mild course and is different from abdominal ischemia that occurs in certain congenital abnormalities of the bowel (megacolon, Hirschsprung's disease, and colon diverticulum etc.), abnormalities of odd branches of abdominal aorta. The most common manifestations of chronic ischemia is abdominal pain (94%) associated with the intake of large quantities of food (88%), weight loss (78%), diarrhea (36%), constipation (18%), vomiting, nausea (33%), the presence of systolic murmurs in epihastralnoy region (68%). When treatment failure occurrence hypochondriacal condition. It is shown that for the prevention of acute illness or move it in the acute stage to avoid rapid reduction in blood pressure (BP), forced diuresis, high-volume once ingested food, refrigerated foods. It is recommended to avoid smoking, excess body weight, normalize blood glucose and serum cholesterol. The negative trend in the patient's condition occurs when the deterioration of cardiac activity (occurrence of atrial fibrillation, heart failure), physical exhaustion, hypothermia, eating, use of certain drugs (drugs dihitalisa, massive doses of diuretics, antihypertensives speed). During exacerbation of chronic abdominal ischemia patients should consult medical professionals focused on the diagnosis and treatment of possible development of necrotic lesions of the intestinal wall, acute pancreatitis, peritonitis, intestinal bleeding that arose against the background of acute ulcers and erosions, gastrointestinal bleeding (Figure 2 ).

During the flare stops oral nutrition of the patient, intravenous isotonic sodium chloride and glucose, blood pressure is regulated by the level and blood volume. In this tightly controlled levels of electrolytes and creatinine serum values hematokrita volume of daily urine output, defined diastase blood and urine aminotransferase, bilirubin and other vital biochemical parameters. During this period, it is recommended to avoid the possibility of an intestinal infection, sepsis, hemolysis, hypercoagulability.

### **Non –occlusive ischemia**

Non-occlusive ischemia occurs with a decrease in cardiac output, hypotension, hypovolemia, dehydration, cramps organ vessels. It develops with congestive heart failure, hypertension, diabetes mellitus (DM), massive bleeding, especially due to traumatic injury of the abdominal cavity, infectious diseases, etc. With the development of heart failure cardiac output is reduced, resulting in decreased blood flow in the gastrointestinal tract (Fig. 3). In addition, while there are hyperactivity of the sympathetic nervous system and excessive formation of angiotensin II, which causes a decrease in visceral blood vessels. Patients with heart failure often receiving cardiac glycosides, which reduce bryzheychnyy circulation while stimulating peripheral release kateholaminov.

Other drugs used in patients with heart failure include diuretics that contribute to the occurrence of hypovolemia, and  $\beta$ -adrenergic blockers that reducing blood vessels, also lead to a decrease bryzhechnoho circulation. These general circulatory and pharmacological agents cause

sustained reduction of blood flow in the gut, which further progresses and accompanied by the development of symptomatic ischemic bowel, requiring hospitalization.

The symptoms of ischemic bowel at this stage of the disease include constant deep pain, hypotension, bloody stools and diarrhea. There are no specific laboratory tests with standard bowel ischemia does not exist, although in Plain radiography of the abdomen can reveal signs of edema of the bowel wall. In the presence of impressions must perform mesenteric arteriography, which helps detect signs of circulatory failure in the affected bowel department. To save the patient at this stage non-occlusive bowel ischemia, it is necessary as soon as possible an accurate diagnosis and begin active treatment aimed at improving circulation by using vasodilators. If the diagnosis is not delivered on time, then slowly and steadily approaching irreversible phase of ischemic ulcers, and within a few days, the patient may die.

With the progression of pathological changes of ischemic hypoxia destroys the epithelial layer of the intestine, from the tops of the villi. Simultaneously ischemic hypoxia causes a pronounced inflammatory response of the mucosa hemostasis and migration of neutrophils, formation of active oxidants and a variety of other toxic substances and suppression of natural protection mechanisms. With the development of myocardial mucosa begins with the absorption of toxic intestinal lumen content.

In elderly patients with colon ischemia who suffer from heart failure, the development of septic complications leading to peritonitis, irreversible shock and death. Mortality of patients who failed to timely diagnose ischemic bowel non-occlusive and start appropriate treatment, up to 90%.

Think about abdominal coronary heart disease in a patient with abdominal pain allow some clinical features. In acute onset of abdominal pain in the elderly who have severe diseases of the cardiovascular system, the differential diagnosis must first think about a possible bowel ischemia. Pain while often quite intense, localized in the periumbilical region, but not accompanied by protective muscle tension in the anterior abdominal palpation of the abdomen. Cutting occurrence of abdominal pain suggests thromboembolism, while the slow development of pain associated with bowel ischemia caused by gradual occlusion of vascular thrombi or different non-occlusive states.

### **Mesenteric ischemia**

Mesenteric ischemia - a multidisciplinary problem. Violation of the mesenteric circulation - in its various clinical manifestations of pathological conditions, ranging from minor symptoms to disorders that cause uncomfortable effects of negligible clinical symptoms to acute disorders with severe and the highest mortality rate, which, according to various authors, up to 50-100% . An important priority in recent studies is the study of factors that can convert chronic abdominal ischemia in acute form.

The presence of advanced atherosclerosis in patients with lesions of the mesenteric vessels confirms the assumption about the nature of chronic abdominal ischemia as a problem that often leads to the development of conditions that threaten the life of the patient.

The main causes of chronic ischemia mesenteric - atherosclerosis and nonspecific aortoarteriitis. The most commonly affected NS and upper intestinal artery lesions of the lower intestinal arteries is less common.

According to the classification BV Petrovsky, chronic mesenteric ischemia accepted subdivided as follows:

I stage - the stage of relative compensation. Impaired function of the gastrointestinal tract are

low and the disease is often found by accident, when examining patients with any other drive.  
II stage - characterized by severe dysfunction of the bowel and abdominal pain after eating.  
Stage III - shows bowel dysfunction, persistent abdominal pain, progressive weight loss.

### **Chronic ischemic disease of the digestive system.**

In recent years there have been introduced such a thing as chronic ischemic disease of the digestive system

(HIDDS) (LA Zvenigorod, 2001). HIDDS pathology mostly elderly.

In practice, the diagnosis of Gastroenterology rare. In addition, when the disease is no clear semiotics, there developed a survey and classification algorithms. Ischemia of the digestive system is chronic, which is caused by occlusion of the visceral branches of the abdominal aorta. The cause of chronic ischemia may be functional, organic or combined changes. Functional include vasospasm, hypoglycemia, politsitemiyu. Functional causes include congenital aplasia, hypoplasia of the arteries, the aorta, congenital arteriovenous shunt hemangioma. The organic changes can be attributed tumor vascular compression and abdominal aortic aneurysm.

There are 4 stages of development HIDDS:

I - phase compensation.

IA - asymptomatic stage. On ultrasonography revealed local changes in hemodynamics.

IB - Stage mikrosymptomatic. There ischemic syndrome due to functional overload (developing local hemodynamic disorders with a tendency to decline in function and collateral compensation).

II - Stage subcompensation. Ischemia is caused by functional load on the digestive organs. Using ultrasound detect local hemodynamic changes of various vascular lesions. When eating hiperemicheskaya no response, or it is paradoxical.

III - the stage of decompensation. With ultrasound diagnosed a variety of vascular lesions of the abdominal cavity with the development of local and systemic hemodynamic disorders in a marked reduction of functional and collateral compensation.

IV - Stage ulcer-necrotic changes in the digestive system. With ultrasound diagnosed a variety of vascular lesions of the abdominal cavity with the development of local and systemic hemodynamic disturbances and lack of functional and collateral compensation.

Diagnosis HIDDS today exposed through:

- identify risk groups;
- palpation, auscultation of the abdominal aorta;
- Ultrasound of the aorta, Doppler studies, computed tomography angiography.

Identified the following clinical variants HIHOT:

- ischemic erosive and ulcerative lesions of gastroduodenal zone;
- ischemic lesions of the pancreas;
- ischemic lesions of the intestine;
- ischemic hepatitis.

Complications:

- acute gastrointestinal bleeding;
- Bowel infarction;
- bowel obstruction;
- acute intestinal trombohemorrhagic pancreatitis (pancreatic necrosis).

Functional class (FC) HIDDS:

I FC - lack of impaired blood flow in the main branches.

FC II - impaired blood flow, pain with food load.

III FC - marked disturbances; surgery.

LB Lazebnik et al. (2003) distinguish functional classes HIHOT, which largely correspond to the clinical stage of the disease.

I FC - No severe clinical symptoms, during Doppler blood flow disorders characterized by the absence of peace and appearance only after the load test.

FC II - signs of circulatory disorders alone and strengthening them after functional loading, severe clinical symptoms: pain, dyspeptic symptoms, weight loss, dysfunction of the pancreas, bowel dysfunction.

III FC - pronounced circulatory disorders alone, constant pain, organic changes in the digestive system.

IV FC - destructive changes in the digestive system.

### **Etiology and pathogenesis**

For etiological moment and realized pathogenetic mechanisms in simplified acute perception mezenterialnyu ischemia can be divided into three fundamentally different types:

1. Thrombotic - is caused by acute arterial thrombosis of the proximal segment of the vessel (most often - mouth AMS) against a background of heart failure, hypercoagulable politsitemii, trauma, pancreatitis, neoplastic processes taking oral contraceptive drugs.
2. Embolic - develops as a result of occlusion caused by displacement with blood emboli, first appearing proximally (against atrial fibrillation, coronary heart disease, thrombosis of the wall of the left ventricle after myocardial infarction, coagulation disorders, aortic aneurysm). Emboli are prone to fragmentation and displacement of the distal segment of the vessel, causing segmental type of intermittent ischemia.
3. Non-occlusive - most often develops on the background of a sharp decrease in systemic blood flow caused by mesenteric atherosclerosis, low cardiac output, vascular spasm bryzheyechnyh, hypovolemia (as a result of shock, sepsis, dehydration, arrhythmia).

Chance and the combination of these factors that develops in the previous serious illness.

Further, depending on the selected three variants of - with compensation of blood flow, blood flow from subcompensation with decompensation of blood flow - realized consistently pathogenic three stages: ischemia, infarction, peritonitis. Some authors identify the stage of functional intestinal obstruction.

### **Clinic**

The first manifestations of chronic disease mezenterialnoy reduced to abdominal pain, often associated with food intake (occurs after 20-40 minutes after eating), sometimes with physical activity. Pain has no clear localization is the nature of spasms, kupiruyetsya antispasmodics, with little objective data - that's a reason to think of acute impairment of mesenteric circulation. Acute onset observed in the vast majority of cases, but there is also a gradual development of pain and (very rarely, perhaps because of the lack of attention interviewing) two-stage. Featured complaints: nausea and vomiting, sometimes mixed with blood. Chronic bowel ischemia leads to disruption of its function, manifested severe bloating, abdominal urchannyam after eating and constipation, prolonged course there is diarrhea.

An objective study of the stomach is often symmetrically piddutyy participates in breathing, soft and malobolisnyy. At later stages, the development of myocardial bowel symptom can be determined Kadyana-Mondor - palpuyeme painful tistovate tumor formation, maloruhome caused by swelling of the colon and bryzheyky. Progression of the process leads to the classic

symptoms of peritoneal.

Chronic ischemia observed weight loss patients. This is due to the refusal of the patient to eat, because eating causes abdominal pain and violation of the suction ability of the intestine.

Characteristic features of abdominal ischemia detected by listening to the abdomen: the noise in the point located at the middle distance between the xiphoid process and the umbilicus, increased intestinal peristalsis and noises after eating. At later stages during auscultation peristalsis dramatically suppressed, sometimes peristaltic noise completely absent. Percussion determined quite mixed: tympanitic areas (less sonorous than in mechanical obstruction) alternate with areas of dull percussion sound, very early, sometimes after 3-4 hours of onset, there is blunting in hood areas of the abdomen.

Typical medical history, complaints, signs of arterial blood flow in other basins, as well as listening to the projection of the visceral branches of the abdominal aortic systolic murmur give reason to suggest the diagnosis of chronic ischemia of the digestive system.

History taking (sensitivity - 78%) can detect the presence of cardiovascular disease, obliterative endarteriitis, metabolic syndrome and diabetes. The sensitivity of the method of palpation and auscultation of the abdominal aorta - 50-60%, ultrasound - 50-75%, Doppler study - 80%, computed tomography (CT) - 78-82%, angiography - 90-95%. The frequency of systolic murmurs in the projection of visceral arteries (14-92,6%) indicates their possible destruction, but its absence is not a reason to exclude ischemia. Nutritional provocative tests are based on the close relationship of pain and bowel dysfunction of meal: test Mikkelsen - within hours the patient should drink a quart of milk, the appearance of pain with evidence of ischemic etiology of the disease. Applicable test "force-feeding", based on a high-calorie daily intake of food (5000 kcal), provoking the typical clinical ischemia, test regular meals with the exception of the usual calorie spicy dishes (four meals). Some authors propose to conduct physical tests - weight lifting, prolonged physical work in an inclined position (laundry, cleaning floors), brisk walking, running, bouncing in place, veloergometry test to identify extravascular compression NA. There are medical tests that provoke the manifestations of abdominal ischemic syndrome (vasospastic agents) and eliminate it (vasodilatory).

### **Laboratory diagnosis of**

Laboratory findings in this disease are nonspecific. Using conventional biochemical methods for studying the functional state of the liver determine violations of the ratio of protein fractions, reducing the amount of albumin and increased globulin content, in some cases - increased alanine aminotransferase values.

Scatological study to determine the presence in the stool of patients with large amounts of mucus, neutral fat, neperevarenyh muscle fibers of the connective tissue.

Assay of D-ksilozoyu to set the state of absorption in the proximal small intestine.

Histological examination of biopsies showing edema of the lamina propria of the mucosa, reducing the number of crypts, developing areas of fibrosis, vascular dilation and anhioktaziyu submucosal layer. Evidence of diffuse chronic colitis is a focal lymphoid-cell infiltrates in the superficial layers of the mucosa and submucosa.

### **Instrumental diagnostics**

#### **Imaging methods**

Plain radiography of the abdomen. Specific radiological symptoms, probably does not exist, although some authors focus on the symptoms "bezhazovoho stomach" when there are diffuse

matte eclipse at low or virtually absent amounts of gases in the intestine, rigidity and thickening of the intestinal wall. However, this symptom is characteristic of the stage of infarction and peritonitis and there quite late. A characteristic feature is the presence of end-stage gas bubbles in the intestinal wall. S. Schwartz et al. (1964) described the radiological signs of ischemic bowel wall: filling defects caused by swelling of the mucosa and submucosa hemorrhage that resemble the "fingerprint" or "smoking a pipe." Between the walls of the colon and barium sulfate suspension may be traced Liners areas enlightenment due to segmental bowel spasms and rigidity that is in a state of ischemia, the possible segmental stenosis. In the colon are visualized mainly in the splenic corner at the point of Griffith. In stenozovanyh sections of intestine, as noted above, disappears haustration dramatically slows the passage of barium sulfate suspension. Colonoscopy. This method helps to detect diffuse or segmental colitis with excessive production of mucus, mucosal atrophy, and often polyps. Rarely seen erosion in a place of transition descending colon to the sigmoid. Perifocal changes in erosions are absent.

Ultrasonography. Has a non-specific symptoms, mainly characterize the thickening of the intestinal wall and the presence of free fluid in the abdominal cavity. However distinguish ischemia from inflammatory infiltration impossible.

Duplex Doppler and color Doppler (CAG). Currently, we study the use of these methods in the data states. Sometimes there are limitations due to gas, blocking the intestines, and difficulty in imaging the NBA, conventional studies rarely allow the diagnosis of mesenteric vascular ischemia. Doppler to study the local impaired blood flow and BWA held NA fasting (12 hours without a meal). Registered with the breach may include: changing the shape of the wave speed and direction of blood flow, increased turbulence, which indicates stenosis. Major stenoses occur in proximal segments of the vessels. Normal waveform of the proximal NA has vysokorezistentnu structure with low diastolic flow. A distal waveform becomes low resistance with continuous diastolic flow. In SMA is normally turbulent flow. Fasting turns vysokorezistentna structure with minimal diastolic flow. After the meal there is low resistance structure with broad systolic peaks, increased systolic and diastolic velocity and continuous diastolic flow. In the presence of significant stenoses in patients fasting turns increase the maximum systolic flow velocity through the constriction zone with significant spectral broadening, poststenoznoyu turbulence and relatively severe diastolic flow. When TSDH visible flow at high speed (Fig. 4). Most professionals prefer to repeat the study in 45 minutes after a standard breakfast patients, since many patients with normal fasting observed flow, and to detect pathology necessary provocation tests. With a significant stenosis in patients after eating revealed changes in SMA. Flow characteristics in the National Assembly does not change significantly even in healthy patients.

In recent years, practical medicine widely implemented intravascular ultrasound. Ultrasound imaging is available not only large but also small vessels. The aim is to identify stenoocclusive ultrasound pathology in the abdominal aorta and its visceral branches, score location, the length of, the degree of injury, hemodynamichnyoyi significance. Also of great diagnostic importance is the identification of veno - occlusive pathology in vena cava inferior and its visceral branches, the condition of collateral compensation, the presence of complications.

Frequency of visualization of all vessels at abdomen adekvatniyi preparation is 90%. Indications for ultrasound of the arteries and veins of the abdominal cavity are: presence of clinical signs of acute and chronic ischemia of the abdominal cavity, venoocclusive signs of disease, the presence of clinical, laboratory and instrumental signs of pathology of the abdominal cavity.

Doppler study. For Doppler assessment of blood circulation need to know exactly localization of

vessels. It analyzes the following parameters: the nature of the image, spectral analysis of blood circulation to the definition of peak systolic and diastolic velocity, of course, audioharakteristika signal. For the intern's important to know that when a color mapping bloodstream colored red or blue, depending on the direction of movement of the erythrocytes. Circulation at high speed (stenosis) is a lighter color, slow blood flow - more vivid. The turbulent flow is represented by a chaotic mosaic of different colors and shades.

The sensitivity of CT was studied at this point enough, but the characteristic features (including gas bryzheytsi and the wall of the intestinal tube) are good.

Recently, to identify changes in the visceral arteries successfully used CT and magnetic resonance imaging (Fig. 6).

Spiral CT significantly reduces the test and makes it possible to scan large extent anatomical region. The value of the method is to conduct computer angiography, which allows you to visualize intravascular cells (plaque, thrombus) to estimate area stenosis visualize metal stents. Angiography. Is the primary method of determining the type and level of occlusion of mesenteric circulation (must perform it in front and side view for precise localization of lesions). The presence of major symptoms of chronic ischemic bowel disease is a direct indication for radiocontrast angiography of the abdominal aorta and its visceral branches.

In ischemic bowel disease, the following methods:

1. Abdominal aortography in the sagittal and frontal planes.
2. Selective angiography of visceral arteries.

Radiographic (angiography) signs are divided into two groups: direct and indirect. Direct is visible directly on aortohrammi deformity, stenosis and occlusion shadows initial division arterial trunk in the form of hourglass, over-approximation (pressure) chrevnoy artery to the SMA and the presence of an acute angle between the celiac artery and aorta (Fig. 7). To these signs also include breakage or absence of contrast in the arteries aortogramm at their full occlusion. Direct signs appear better in the side or one of the oblique projection can also be clearly identified by selective angiography. Direct angiographic features to directly determine the location, extent and length of the lesion as well as its most likely cause. Thus, for the typical localization process of atherosclerosis in the mouths of visceral arteries, large distribution, blurred outlines of the affected artery, the simultaneous involvement in the abdominal part of the aorta. When nonspecific aortoarteriitis often affects the aorta and chrevnaya artery, then BWA. In the affected area of the vessel clear outlines, circular tapered.

For extravascular compression NA characteristic of his approach to the BWA, the formation of the acute angle between it and the aorta, the presence of strains of the arteries as the hourglass.

Indirect signs include:

1. The presence of distinct and extended collaterals between the basins of the NA and SMA.
2. Symptom contrast retrograde arterial trunk
3. Poststenotic enlargement arterial trunk.
4. Lack maligns retrograde contrast material into the aorta at selektyvniyi kateterizatsiyi

stenozovanoi visceral arteries.

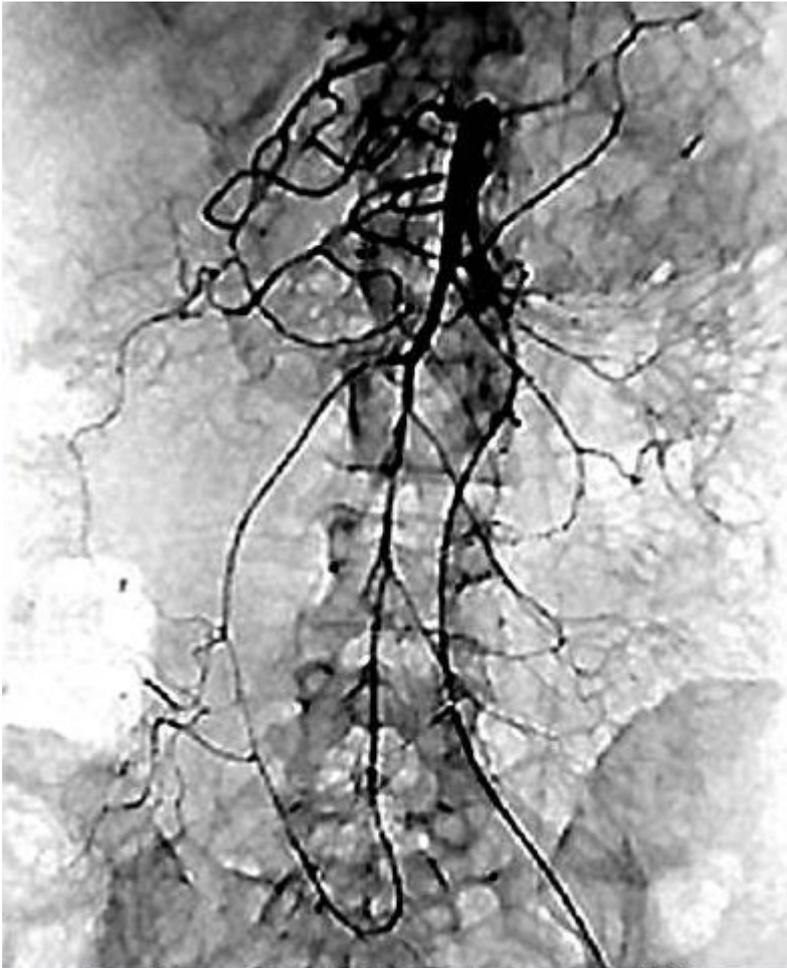


Рис. 2. Выраженный диффузный спазм ветвей ВБА

(Fig. 3)



Рис. 7. Селективная целиакография.  
Стеноз ЧС, селезеночной артерии.  
Постстенотическое расширение общей  
печеночной артерии.  
Атеросклеротическое поражение

(Fig. 4)



Рис. 8. Селективная верхняя мезентерикография. Ретроградное контрастирование ЧС, печеночных артерий через «малую дугу»

(Fig. 5)



Рис. 6. КТ: кальцинированная бляшка в устье ЧС. Атеросклероз брюшной аорты

(Fig.6)



Рис. 5. Эндопротез брюшной аорты (патологическое кровообращение)

(Fig. 7)

Laparoscopy. It can serve as the diagnosis (for suspected violations of mesenteric circulation) and to clarify the prevalence and limitations of the process to determine operability situation. There are quite clear laparoscopic signs of pathology, namely discoloration of bowel loops, no

ripple boundary vessels. Changing the vascular wall picture, guts, if it is in normal lumbar nature, with the development of the pathology of the picture disappears and there is a greater number of vessels oriented along the intestine. Under infarction of the bowel wall is red, swollen.

Intragastric pH-metry. In the terminal stages there is a characteristic effusion. In the study of gastric secretion by this method at rest and against the maximum stimulation of histamine detected violations alkaline source function of the stomach (suppression functions pilorichnyh cortex in patients with lesions of the NA and SMA).

Radioisotope hepatohrafiya. Using radioisotope hepatohrafii showing polygonal cell dysfunction in 54% of patients.

When irrihoskopiya show uneven distribution and fragmentation of barium sulfate suspension, long delay in his gut, loss haustration in stenozovanyh departments intestine.

#### Treatment

Figures 7 and 8, the recommendations of the American gastroenterology Association (2000) on the treatment of chronic mezenterialnoy ischemia and ischemic colitis.

The treatment used two ways - quick and conservative.

Main areas of conservative treatment:

- Diet;
- vasodilators: nitropreparaty,
- β-blockers (metoprolol, carvedilol), a calcium channel blocker (amlodipine);
- symptomatic therapy aimed at reducing structural change and improve the functional state of the digestive system (enzymatic means, first of all - pancreatin preparations in minimikrosfer);
- correction of hyper- and dislipidemii to reduce the progression of atherosclerosis - products containing essential phospholipids, statiny;
- antioxidant agents;
- reparant;
- antihreantna therapy, drugs that reduce blood viscosity;
- hypoglycemic agents in the presence of diabetes;
- treatment of complications.

Dietary measures necessary for each patient AIS are as assigning table number 5 (5P) in MI Pevsner (depending on preferred gastroduodenal lesions, liver or pancreas). The diet of patients with AIS provides:

- 5-6-times meal;
- limitations or high-calorie foods and refined foods (sugar, confectionery, margarine, animal fats, bakery products, etc.);
- source of carbohydrates should be vegetables, including some potatoes (baked or boiled);
- lipotropic products (low-fat cheese, buckwheat, wheat, oat cereal in moderation);
- Essential components of food (seasonal vegetables, fresh juices nekisli, herbs, broth hips, pharmacy yeast);
- products containing complete protein (fish, lean meats, poultry, rabbit, eggs, cheese, milk products);
- functional food and dietary supplements (soy lecithin, sea foods, seaweed, spirulina, vitamin-mineral mixture);
- replacement of animal fats (except fish) vegetable - soy, olive, sunflower, peanut, corn oil;
- Enrichment of food lecithin, choline, inozitolom, magnesium, iodine, vitamins A, B, C, E;
- consumption of dietary fiber, especially pectin (bread of coarse grains, wheat, cabbage, dried

fruit, wheat bran, vegetables, fruits, etc.).

To reduce the severity of oxidative stress in AIS Recommend to enrich foods with antioxidants (vitamins C, E, selenium, methionine). This measure is safe, does not increase significantly the cost of diet and its effectiveness in reducing pain in CP proven in controlled studies (level B).

Reducing pain promotes inclusion in the diet srednolantsyuhovyh triglycerides and hidralizovannyh peptides.

In the development of abdominal coronary artery disease plays a significant role as primary development exocrine insufficiency of the right ventricle (due to chronic ischemic organ atrophy of the parenchyma, fibrosis) and secondary pancreatic insufficiency - enterogenic, vascular. In addition, developing malabsorption due to villous atrophy of the small intestine and its ischemia, suggesting the need for enzyme replacement therapy.

Above it was shown that the AIS arise as primary exocrine pancreatic insufficiency due to the chronic ischemic organ atrophy of the parenchyma, fibrosis and pancreatic insufficiency secondary - enterogenic, vascular. In addition, the AIS developing malabsorption due to villous atrophy of the small intestine. The result - weight loss. That is, patients with AIS enzyme replacement therapy drugs are absolutely necessary. What kind of drug to choose for this therapy? The gold standard is Creon. Prove it easy.

Given that the primary importance in the selection of enzyme replacement therapy for lipase activity is in it, it must be remembered that the lipase - "soft" enzyme and necessary care for the preservation of its activity in the digestive tract.

The main factor inactivation of enzymes - acid medium of the stomach. Note that at pH <4.0-4.5 occurs inactivation of pancreatic enzymes. Thus, when passing through the acidic environment of the stomach "vulnerable" enzyme lost more than 80% of the lipase activity, more than half - of trypsin. A significant inactivation of lipase explain the action of pancreatic and intestinal juices. In addition, the lipase activity decreases with high content of proteases in the sample. The destruction of enzymes is possible not only in the stomach, but at lower pH due to microbial contamination of the small intestine, with marked reduction of pancreatic bicarbonate production and zakislenni duodenal contents, which occurs in the AIS. In the same situation happens deposition of bile acids have a protective effect with respect to lipase and trypsin. Pretsipitatsiya bile salts leads to disruption emulhatsii fat, decrease formation mitsell bile and fatty acids to decrease their absorption.

Of all the possible options for the protection of enzyme inactivation is most effective stainless shell. This shell minimikrosfer Creon provides safety for more than 98% of the lipase activity during the passage of the drug through the stomach.

Enzyme preparations considered effective if the ratio kolipazy / lipase greater than unity, so that the deficit kolipazy (lipase cofactor) leads to reduced activity of the lipase. The standard in this regard is Creon, in which the ratio kolipazy / lipase = 1.9. In lipolitichnu AF activity contribute karboksilesterlipaza and fosfolipase A2. Creon - a drug high in the last two enzymes.

Due to the splitting lipase protease enzymes for replacement therapy should not only have high lipase activity, but lower - protease. It is important that the activity of protease enzyme was sufficient to reduce pancreatic pain. For example, the most effective drug substitution therapy has Creon 10 000 lipase activity 10 000 U. FIP, and protease - 600 Ed. FIP, and Creon 25 000 - lipase activity - 25 000 units. FIP, protease - 1000 Ed. FIP.

It is extremely important form of release of enzyme substitution therapy. It is essential that the drug was dvohobolonochnym. In this first shell - a capsule containing microspheres dissolved in an acidic environment and releases them into the stomach. This ensures good mixing of chyme

in the stomach already. Second - enteric shell dissolves in the duodenal lumen, resulting in him released active enzymes. The principal is the small size of the microspheres so as. they need to be unobstructed evacuation of the stomach along with the chyme. It is proved that the microspheres with a diameter of more than 2.5 mm, they linger in the stomach, that develops asynchronism chyme and enzymes. Creon, which is the gold standard in substitution therapy has microsphere diameter 0,7-1,6 mm, and 80% had a diameter not exceeding 1.25 mm, and therefore the microspheres Creon is minimikrosfer.

The fundamental importance of small minimikrosfer and the inability to use tablets of substitutive therapy due to the fact that the tablet shell in kislotostiykiy come up KDP after chyme. Related to this is the lack of efficiency of tablet tools for replacement therapy. Even an increase in the activity of lipase enzyme preparations in tablet does not allow them to achieve efficiency in Creon replacement therapy.

The small size of the microspheres but adequate mixing of chyme enzyme provides a larger area of contact with the food enzyme substrate. Microspheres should have its own kislotostiku shell to preserve the activity of enzymes in the stomach. At the same time, the shell must be enteric, ie dissolve and liberate enzymes at pH 5,5-6,0. Such pH characteristic of the duodenal lumen, where enzymes and enter the digestive process. An important indicator is the rate of release of enzymes from minimikrosfer with duodenal pH. Yes, Creon release provides more than 90% of the enzymes at pH 5.5 or higher for 45 minutes, what is superior to other drugs.

We turn to the second aspect of the use of enzyme preparations - for the relief of pancreatic pain and dyspepsia (on early indications). This aspect is very important in AIS, as the incidence of pankreatopatiy very high (see above). Mechanism of efficacy of enzyme preparations in this respect because the enzymes that make up the drug, for that matter, their own pancreatic enzymes destroy the lumen of the duodenum sekretuyemi regulatory proteins - rilizinh peptide and secretin holetsistokinin. As a result of reduced production and release of appropriate hormones, and thus the mechanism of feedback inhibited the secretion of the pancreas. Reduced pressure in ducts and parenchyma of the body, it decreases ischemia, stress capsules, resulting in suppressed pain.

The main role in the feedback mechanism plays protease. In this context, it is clear that to relieve the pain of pancreatic enzymes show a high activity of proteases, such as Creon, characterized by this property. To reduce the intensity of pain also recommend bezobolonkovi means (kuzim, kotazim, viokaze). However, none of these drugs has not been registered in Ukraine. For relief of pain associated with pancreatic pathology, including in its ischemia successfully used Creon. The published results of randomized studies that indicate a statistically significant decrease in pancreatic pain while taking the drug such dvuhobolonochnoho microspherical Creon. It should be noted that during the study the patients themselves regulate the dose, choosing the one that led to a reduction in pain intensity (OJ Ramo et al., 1989). It was found that patients take to relieve pain 480-960 Ed. FIP Protease an appointment that meets 1-2 capsules of Creon 10 000 or 1 capsule of Creon 25,000 (when needed and can receive larger doses, such as a single dose - 2-3 capsules). It is important to note that this treatment was effective against pain relief in patients with severe pancreatic insufficiency. It is not surprising, since exocrine pancreatic insufficiency may be an independent cause of pancreatic pain.

It should also be borne in mind that in exocrine pancreatic insufficiency fairly easily associated secondary enteritis, bacterial overgrowth syndrome. As a result, pancreatic pain intensified spazmovymy pain mesogaster typical of enteritis and distenzionnymi pain associated with bloating and stretching of the bowel wall. In appointing a combination of intestinal antiseptics

and minimikrosferychnyh enzyme preparations (Creon) enteropankreatychnyy syndrome becomes less pronounced adjustment of the intestinal flora. It is shown that in CP use this combination indirectly reduces intestinal transit time and normalize bowel motility and pain associated with enteritis, flatulence, the appointment of Creon also reduced.

Creon should be used for the reduction of indigestion, which is pronounced in patients with AIS. For routine treatment of disorders of stool in patients with ischemic abdominal disease, especially the elderly, it is advisable to use prokinetics (mebeverin) and prebiotic (lactulose). Drug of choice for treatment of constipation in the elderly is lactulose (Duphalac, laktuvit, normolakt, etc.), the advantages of which in these cases are:

- poslablyayuschiy effect does not require additional fluid intake;
- does not lead to addiction;
- not absorbed, so it can be used for diabetes;
- does not cause electrolyte imbalance;
- facilitates correction of hyperlipidemia;
- effective renal failure, liver disease;
- in therapeutic doses does not interact with other drugs;
- Pharmacoeconomic profitable.

The use of fibrinolytic agents in mesenteric venous thrombosis ideally displayed in the prehospital phase, but unfortunately, because it is at this stage pathology remains unrecognized, their use is not possible.

Attempts by non-operational treatment justified the absence of peritoneal symptoms. With this emphasis on the fact that, in contrast to intestinal obstruction, preoperative preparation should be radically minimized over time as the delay in restoring perfusion only aggravates the patient, contributing to the progression of necrosis.

Possible targets surgery: reconstructive surgery, eliminate occlusion and restoring circulation to the previous channel (endarterectomy, prosthetics, etc.), creating new ways of blood flow to bypass the affected area - shunt surgery, percutaneous endovascular angioplasty, laser recanalization.

Emergency surgery for acute ischemia is usually limited to resection of the bowel.

Challenges and unresolved issues

In our opinion, the problem with this pathology, multifaceted and relevant today:

- increase cardiovascular disease in the absence of proper medical monitoring results (compared to the modified diet) to increase the flow of complications, including thromboembolism before;
- Abdominal problem diagnosis of coronary heart disease as the early (pre-hospital), and the hospital stage;
- hospytalmomu on stage - the lack of proper equipment and trained professionals from around the clock, without delay the necessary research, and if necessary - radical surgery.

Materials for self

1. In the conservative treatment of AIS is used:

- Creon +
- Kontrikal
- gordoks
- trasilol
- essentielle

2. Conditionally rekonstruktyvni (dekompresiyini) operations at syndromi hronichnoi abdominalnoi ishemiyi.

- The median lihamentotomiya - rozrizannya serpopodibnoyi ties that compresses the celiac trunk. ++
- Krurotomiya - pererizannya of one or both nizhok diafrahmy which shall exercise pressure on the same trunk. ++
- Desolyaryzatsiya - dekompresiya celiac trunk by removing the elements of sun spletinnya i scar tissue that formed as a result of inflammatory processes. ++
- Front vagotomy - the intersection of the left branch vahucha.
- Posterior vagotomy - the intersection of the right branch vahucha.

3. A set of techniques to identify hidden coagulopathy:

- # of platelets;
- bleeding time;
- Activated chasrekaltsyifikatsiyi; tromboelastohrama;
- activated partial thromboplastin time;
- prothrombin time, prothrombin index;
- all right.

4. For abdominalnoho ishemichnoho syndrome characterized triada symptomiv:

- 1) pain in zhyvoti 2) violations of motor-evacuation, suction and secretory functions of the gastrointestinal tract, and 3) progressive weight loss. ++
- 1) abdominal pain, 2) the disappearance of liver dullness, and 3) Doshkopodibnyy stomach.
- 1) The absence of pulsations of the abdominal aorta, 2) Infiltration epigastric 3) Mramornist anterior abdominal wall.
- 1) pain in the right iliac region, 2) positive symptom SHCHetkina-Blumberg 3) overhanging the anterior wall of the rectum.
- 1) Ground 2) Hemotemezis 3) Anemia.

5. The total length of the small intestine:

- approximately 140% of the body length,
- approximately 150% of the body length,
- approximately 160% of the body length, ++
- approximately 170% of the body length,
- approximately 180% of the body length,

6. The total length of the colon:

- 1,25-1,5 of
- 1,5-1,75 m
- 1,75-2 m ++
- 2-2,25 m,
- 2,25-2,50 m,

7. What is "visceral angina"?

- Abdominal-ischemic syndrome ++
- Acute intestinal obstruction,

- Chronic intestinal obstruction,
- strangulated ventral hernia,
- Peritonitis.

8. By extravasal acquired causes of chronic disorders of the visceral circulation include:

- Periarterialnyy fibrosis ++
- tumors of the abdominal cavity, ++
- Hepatitis, cirrhosis,
- Ulcerative colitis
- Chronic hlomerulonefrit.

9. By extravasal congenital causes of chronic disorders of the visceral circulation include:

- Compression sickle ligament, ++
- Compression of medial foot diaphragm ++
- Congenital heart
- Abnormalities of the biliary tract,
- diaphragmatic hernia.

10. By intravazalnyh congenital causes of chronic disorders of the visceral circulation include:

- Compress the solar plexus,
- Hypoplasia, ++
- Fibromuskulyarna dysplasia ++
- Abnormal revival arteries
- Compression of medial foot diaphragm.

11. By intravazalnyh acquired causes of chronic disorders of the visceral circulation include:

- Periarterialnyy fibrosis,
- tumors of the abdominal cavity,
- Atherosclerosis, ++
- Nonspecific aortoarteriit, ++
- Hypoplasia.

12. Stage of decompensation in chronic violation of visceral circulation is characterized by:

- Pain in the chest, shortness of breath,
- Abdominal pain after meals,
- Violation of motor function of the intestine, pohudannya,
- Vzduytya stomach, diarrhea, ++
- pain, flatulence.

13. Step subcompensation in chronic violation of visceral circulation is characterized by:

- The feeling of abdominal discomfort, ++
- Pain in right pidrebir'yi,
- Pain in the lower back, dizuricheskie phenomena
- Pain in the lower back, pohudannya,
- Abdominal pain after meals,

14. Clinical forms of chronic abdominal ischemia syndrome:

- Gastric, intestinal,
- Thick intestinal,
- Dyskynetychna,
- Thinly E.,
- Abdominal, bryzhzhova, ++

15. Bryzhzhova form syndrome chronic abdominal ischemia is divided into:

- gastric, intestinal, ++
- hypokinetic and hiperkynetychnu biliary dyskinesia,
- proximal enteropathy,
- Terminal kolopatiyu,
- Chronic and acute enterocolitis.

16. By absolute hagiographic signs of visceral branches of the aorta in the syndrome of chronic abdominal ischemia include:

- Occlusion of the bifurcation of the aorta,
- Deformation of the total and external iliac arteries
- Deformation, real stenosis of the arteries
- Deformation, stenosis, occlusion of celiac trunk, ++
- Deformation, stenosis, occlusion of the upper bryzhzhovoyi artery.

17. Conditionally - Reconstructive surgery for chronic abdominal ischemia syndrome + bypass are:

- Prosthetics, ++
- thrombectomy,
- endarterectomy, ++
- Dissection crescent ties
- Removal of ganglia.

18. To reconstructive surgery in chronic abdominal ischemia syndrome include:

- Exemption arteries of fibrous tissue,
- bypass, ++
- Prosthetics, ++
- endarterectomy, ++
- Legs crossing the medial aperture.

19. The most common cause of arterial thrombosis leading to the emergence of the AIS are:

- Diseases of the blood
- atherosclerosis, ++
- Trauma,
- Aneurysm,
- Congenital vessels.

20. The most common cause of arterial embolism, leading to the emergence of the AIS are:

- Atherosclerosis of the aorta,

- Rheumatic heart disease, ++
- Aneurysms of the aorta and great vessels,
- myxoma heart
- trombanhiit obliterans.

21. After endarterectomy vessel wall ushyvayetsya by:

- Obvyvnoho continuous suture
- Vuzlovatyh seams
- autovenous lateral hire,
- U-shaped seams ++
- tantalum staples.

22. What phase of coagulation inhibits heparin:

- Only tromboplastykoutvorennya,
- Tromboplastyko,-thrombin-fibrinoutvorennya, ++
- Only trombinoutvorennya,
- Only fibrinoutvorennya,
- Aggregation of erythrocytes.

23. By anticoagulants of indirect action are:

- Groups of alkaloids
- Fibrinolytic drugs
- Drugs Group 4 oksykumarynu, ++
- Fenilindonriyanu, ++
- Thrombolytic drugs.

24. By absolute hits against the appointment of anticoagulants include:

- Bleeding of any localization ++
- Hemorrhagic diathesis ++
- Aplastic anemia
- Cardiac failure,
- Lack of cerebral circulation.

25. to fibrinolysis activators include:

- Fenilin, omefin,
- Gastrotsepin, Venter,
- Niacin, complamin, ++
- B vitamins,
- Reopoliglyukin, polyglukin.

26. Thrombolytic drugs following:

- Korhlyukon, strofantin,
- Tselonid, lantlyd,
- Fibrinolizin, ++
- Tseliaza, ++
- Streptokinase. ++

27. When heparin is administered peredozuvannyai:

- 1% protamine sulfate rozsyn, + +
- tsiton, lobeline,
- amitryptilin,
- 2,5% solution of chlorpromazine,
- 0,3% solution of atropine.

Exersize for autocontrol

1. Patient was hospitalized urgently '78 at surgical clinic on peritonitis. During more than 30 years suffer from abdominal ischemic syndrome.

What is an acute chronic disease complications arose in this case?

- \* A. Myocardial intestine.
- B. bowel volvulus.
- C. Stricture of intestine.
- D. Irritable bowel syndrome.
- E. "Angina abdominalis».

2. A patient with abdominal '43 ischemic syndrome during elective surgery confirmed atherosclerotic occlusion of the superior mesenteric artery found during examination of patients with abdominal aortohrami.

Which of the surgery shows the patient?

- A. Resection of nerve ganglia.
- B. Dissection crescent diaphragm connections.
- C. \* superior mesenteric artery endarterectomy.
- D. Dezobliteratsiya artery.
- E. The release of adhesions artery.

3. Patient 54 asked to consult a vascular surgeon in the direction of a family physician with suspicio on abdominal ischemic syndrome.

What kind of research necessary to hold the patient in order to address the question of the need for hospitalization of the patient to a specialized department and implementation aortoarteriohrafii?

- A. celiocentesis.
- B. Ultrasound of the abdomen.
- S. tomography of the abdomen.
- D. \* Doppler abdominal vessels.
- E. Plain radiography of the abdomen.

4. Describe the physiology of the small intestine.

The total length of the small intestine approximately 160% of the length of the body is about 4/5 of the length of the gastrointestinal tract, 40% is toschaya and 60% - of the ileum. Parasimpatic innervation enhances the contractile movement of the intestinal wall, and sympatic - weakens them. All accepted into food and water, and sekretiruemye stomach, liver and pancreas liquid

(about 9 liters per day) entering the small intestine. Reabsorption are exposed only 2 liters. Main features - secretory, endocrine, motor, suction and excretory. Secretory function - the secretion of the mucous membrane of about 2 liters of juice that contains different enzymes: enterokinase, phosphatases, nucleases, sucrose, lipases involved in the decomposition of chyme to monosaharidov, fatty acids and amino acids. Endocrine - secretion of several hormones (secretin, holetsistokinin, vazointestinum polipeptid - VIP, molitin, hastrynihhibition peptide), which is involved in the regulation of many functions of the digestive system. Motoric - promotion of chymus through the intestines (pendular movements mixed chyme, peristaltic - promoted). Sucking - absorbed in the small intestine: water by passive absorption, electrolytes (potassium, sodium, calcium), proteins, fats, carbohydrates, vitamins, fat-soluble (A, D, E, K), vitamin B12, vitamin C, thiamine and folic acid , trace elements - iron. Excretory - in the intestine through the wall out of salt and some organic matter.

5. What is the operational tactics in patients with AIS with suspected bowel necrosis?

Pain - endotracheal anesthesia. Operational access - middle laparotomy. Novokainova blockade root bryzheyki. Decompression of the small intestine are playing through the nasopharynx, colon - rectum. Chance enterotomichnyy decompression through a hole in the outlet viable loops. The viability of the intestine assessed visually by color, peristalsis and pulsations of vessels, using Doppler, spectroscopy, elektromio-graphy, capillaroscopy. To determine the viability cyanotic neperestaltic who lost bowel tone resort to heating intestine wipes soaked with hot saline solution, and waiting for 5 minutes, commissioning bryzheyku 50-60 ml 0.25% solution of novocaine. In the non-viability perform bowel resection changed area with the removal of the drive loop within 30-50 cm, outlet - 10-20 cm from imposing anastomoza side to side or end to end.

6. What is the postoperative management of patients with AIS?

Program postoperative management of patients multicomponent and includes the following activities: dezintoksikation replacement therapy (colloidal, saline, glucose), improved blood rheology (EBED-lihlyukin, gemodez, heparin), normalization of electrolyte and acid-base status (solutions of salts of potassium, sodium calcium, sodium hidrokarbo-juice), a broad spectrum antibiotic, antiseptic solutions, normalization of breathing, blood circulation, prevention of hepatic, renal insufficiency (ascorbic acid, glutamic, lipoic acid, methionine, Essenciale, forced diuresis), mechanical, chemical and electrical stimulation GIT (enema hypertonic solution Calimin, Proserin, elektrostimulyatsiya), general firming and immunostymulyuyucha therapy (vitamins Proserin, pentoksil, immunoglobulins), hormonal therapy if indicated, HBO.

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