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Complications of ulcerative disease:

Pyloroduodenal stenosis, penetration, malignant degeneration

a video lecture for 4th grade students
in speciality 31.05.01 General Medicine

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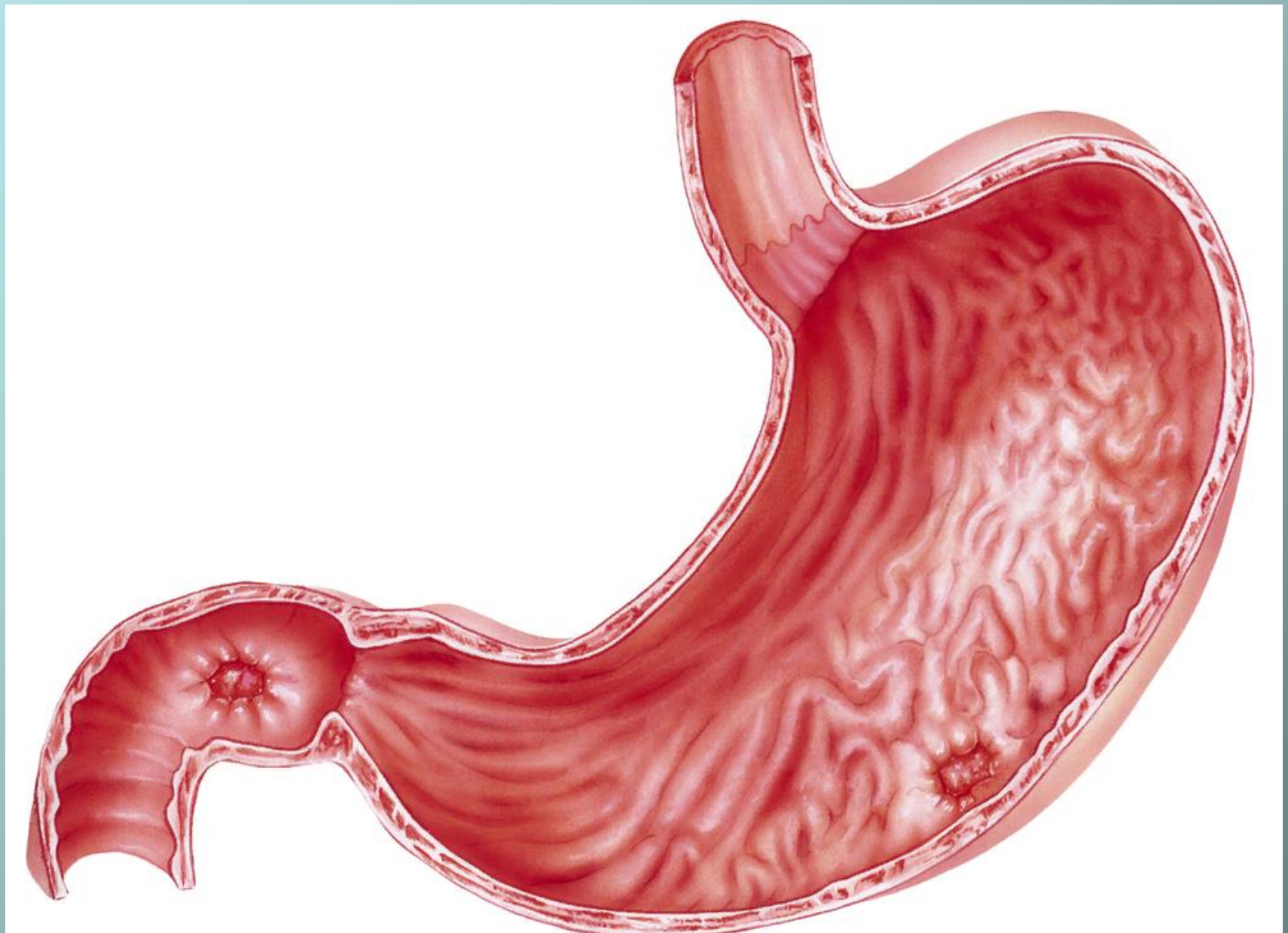
Lecture plan

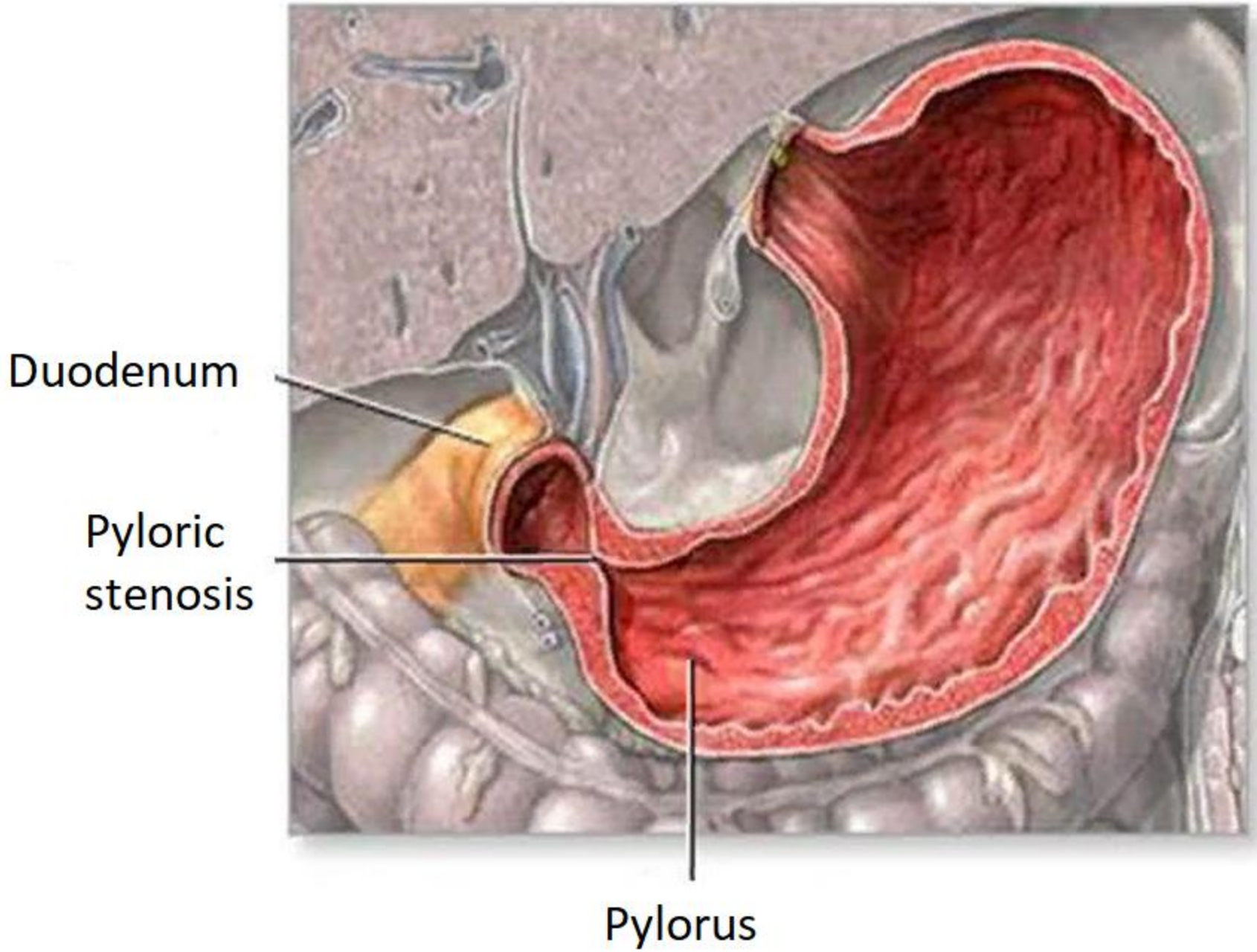
- Complications of gastric and duodenal ulcerative disease
- Anatomic and physiological specifics
- Definition, relevance
- Classification of complications
- Clinical picture and stages of clinical course
- Differential diagnosis
- Surgical tactics, treatment. Surgery types
- Rehabilitation procedures
- Literature sources

Complications of ulcerative disease

1. Bleeding
2. Perforation
3. Penetration
4. Malignant degeneration
5. Stenosis of the gastric outlet, duodenum (cicatricial-ulcer deformation) and the pylorus

Pyloroduodenal stenosis




Duodenum
Pyloric stenosis
Pylorus

Types of gastric outlet disorders

- **Organic**
  - **– cicatricial-ulcer deformation of stomach and duodenum**
  - **– hypertrophy of the muscular coat of stomach its stretching, loss of contraction capacity, dilation of stomach (gastrectasia)**
- **Functional**
  - **– gastrostasis**
  - **– atony, disorder of the motor and evacuation function of stomach and duodenum**

Pyloroduodenal stenosis (PDS)

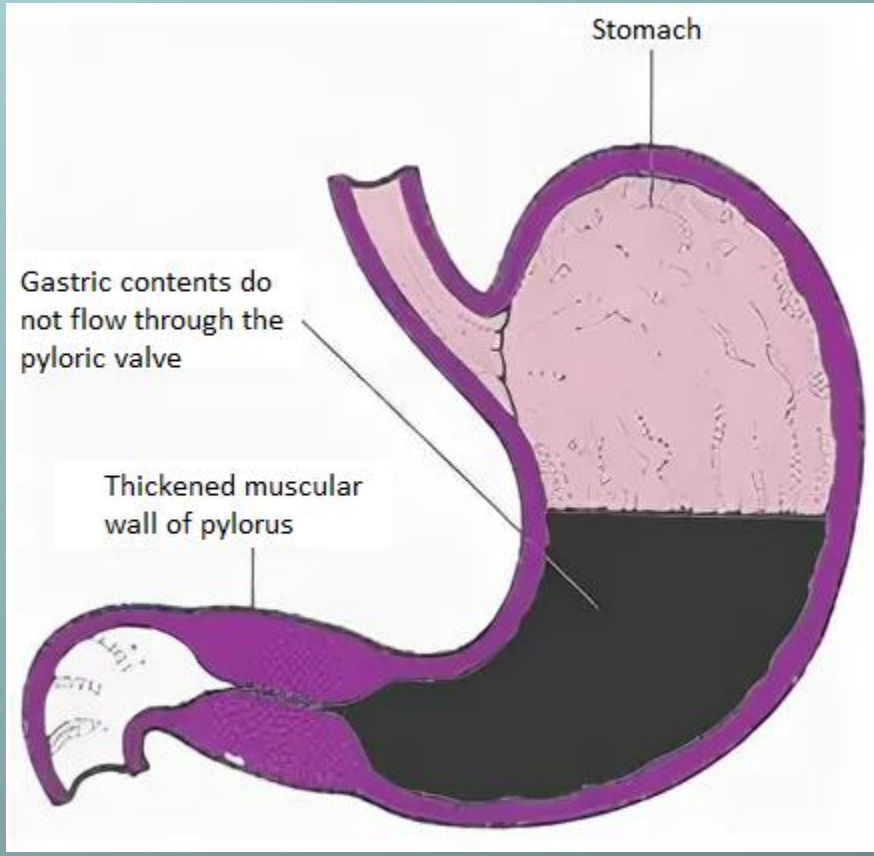
Duodenal bulb stenosis is registered in 90% cases, and 10% cases are pyloric stenosis

Causes of stenosis in the pyloroduodenal area:

1. **scarification of ulcer**
2. **compression of duodenum by the inflammatory infiltration (periduodenitis)**
3. **obturation of the duodenal lumen due to the oedema of the intestinal mucosa (duodenitis)**
4. **pylorospasm**
5. **tumour of the pyloroantral part of the stomach**

Ulcerative pyloroduodenal stenosis

Stenosis of the gastric outlet develops in 5-10% of ulcer patients. In 80% cases, its cause is multiple recurrence of ulcerative disease of the duodenum. Less often, the narrowing in this region develops in ulcers of prepyloric and pyloric regions of the stomach.



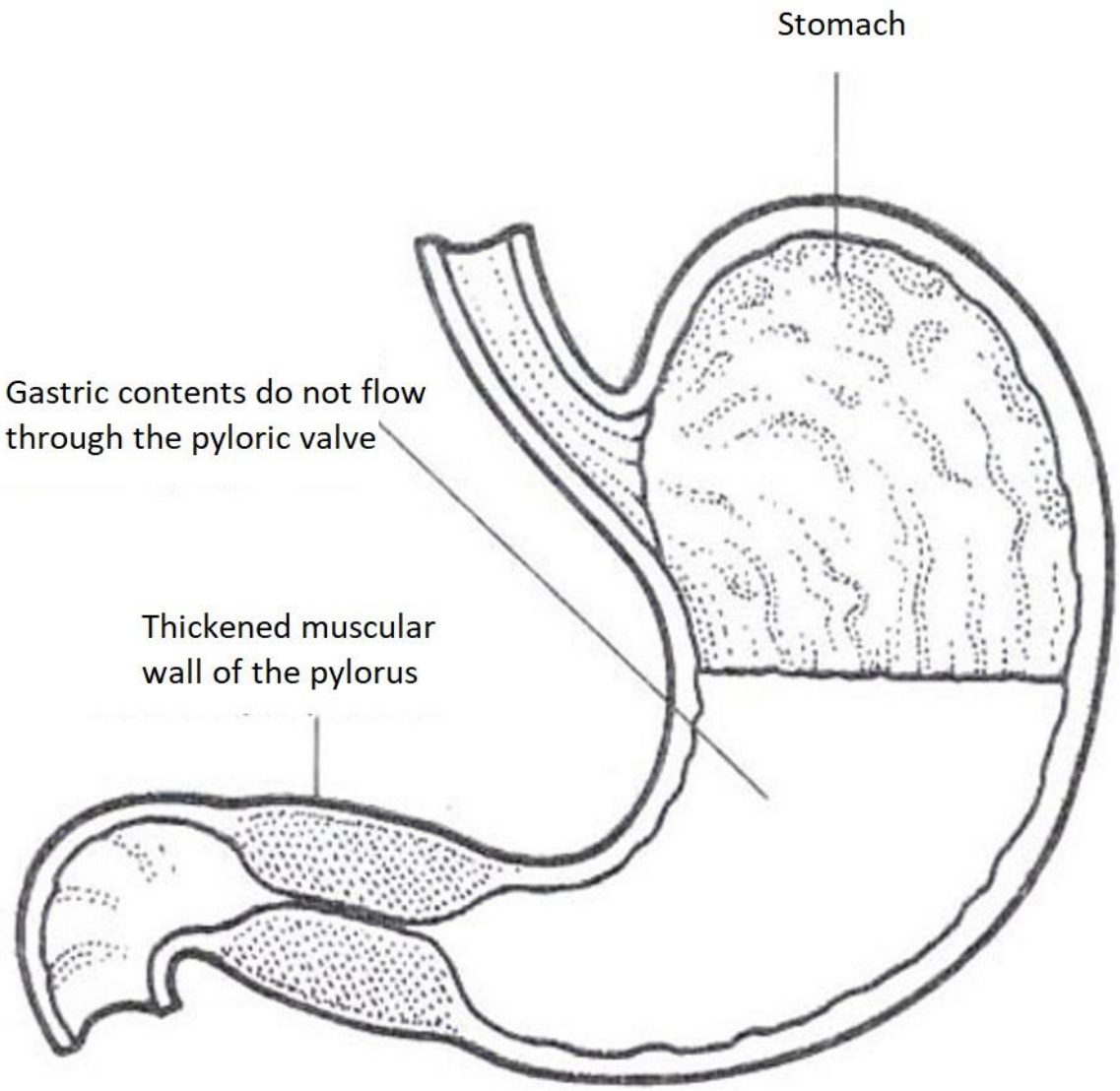
Aetiology

Constriction of the pyloroduodenal part resulting from ulcerative disease is of cicatricial or inflammatory-spastic character. Such a transformation of the pylorus leads to its rigidity, incomplete closure, which creates the conditions for permanent duodenogastric reflux. Entering the stomach, bile components change the pH of the environment to the alkaline one and thus stimulate gastrin secretion with increase in production of hydrochloric acid and pepsin.

Aetiology

The developed antral gastritis and hypersecretion of hydrochloric acid create favourable conditions not only for duodenal ulcer recurrence but also for formation of ulcers in the antral part of the stomach. The continually interchanging periods of ulcerative disease recurrence and scarification processes are the direct cause of progressive stenosing of the pyloroduodenal region.

Pyloric stenosis

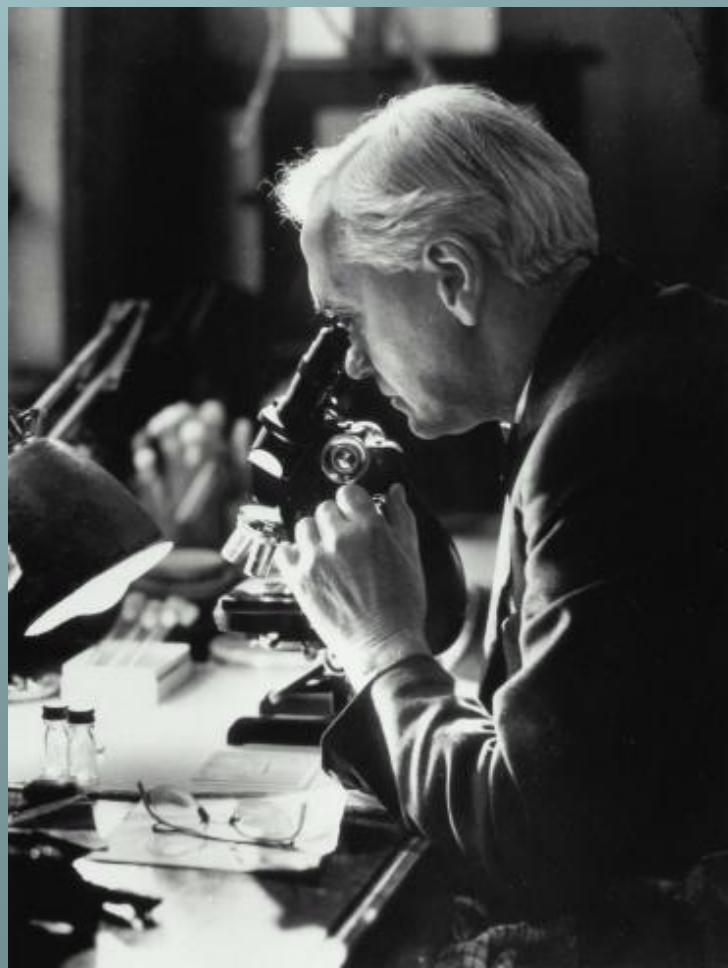


The food cannot enter the duodenum through the pyloric valve
This leads to extreme discomfort and vomiting

Clinical picture of pyloroduodenal stenosis

3 stages of the disease:

1. Compensated stage
2. Subcompensated stage
3. Decompensated stage



Classification of stenosis

Stage I – compensated stenosis:

- **Nausea, heaviness in the epigastrium, belching with air**
- **Moderate dilation of the stomach, narrowing of the pyloroduodenal canal by more than 1cm, delay in barium evacuation by up to 6-12 hours**

Classification of stenosis

Stage II – subcompensated stenosis:

- **Belching with tainted contents, vomiting with food eaten shortly before**
- **Loss of weight, dehydration, pallor of skin**
- **Splashing sound in the epigastrium in the fasted state**
- **Significant dilation of the stomach, constriction of the pyloroduodenal canal to 1-0.5cm**
- **Delay in barium evacuation by 12-24 hours**

Classification of stenosis

Stage III – decompensated stenosis:

- **Growing weakness**
- **Foul-smelling vomit (sometimes several times per day)**
- **Pronounced water-electrolyte disorders**
- **Symptoms of multiple organ dysfunction**
- **Pronounced dilation of the stomach, constriction of the pyloroduodenal canal to 0.1cm, delayed barium evacuation at over 24 hours; the tone, motor function and secretion of stomach are severely lowered.**

Signs revealed at the subcompensation and decompensation stage:

- dehydration (lowered CBV, thickened blood)
- exhaustion (hypoproteinaemia)
- electrolyte balance disturbance (hypochloraemia, hypokalaemia, hyponatraemia)
- hypochloraemic and hypokalaemic alkalosis
- decrease in potassium level by less than 1.5mmol/l
- leads to respiratory and cardiac arrest

Endoscopic criteria for PDS

- **Stage 1: the diameter of the pyloroduodenal canal is shortened by scars to 0.5-1cm**
- **Stage 2: the diameter of the pyloroduodenal canal totals 0.3-0.5cm, the stomach is enlarged**
- **Stage 3: the pyloroduodenal canal is narrowed to 0.2cm, the stomach is enormous, the gastric mucosa is atrophied**

Radiological diagnosis

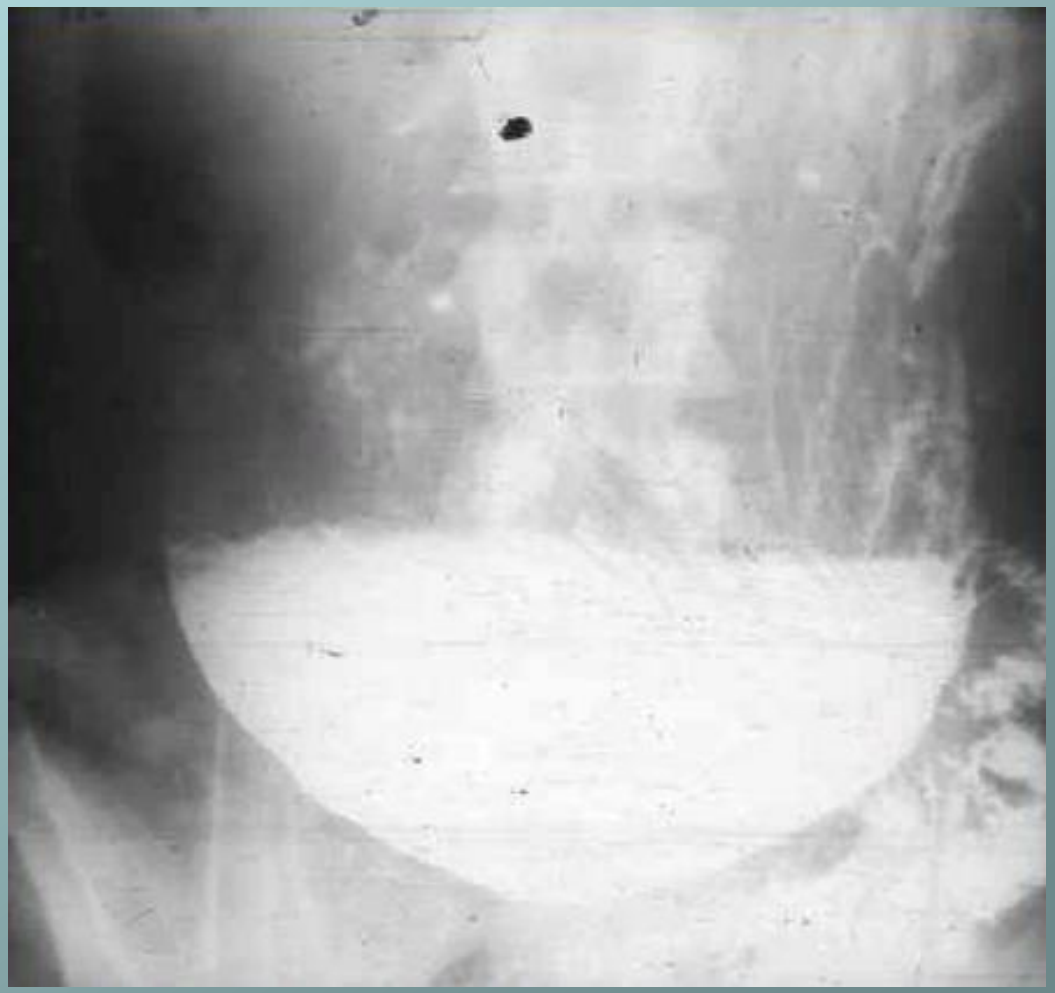
Stenosis at stage I: compensated stenosis

Radiological diagnosis

Stenosis at stage II: subcompensated stenosis

Radiological diagnosis

Stenosis at stage III: decompensated stenosis



Differential diagnosis of PDS

1. Tumour of the gastric antrum (endoscopic biopsy)

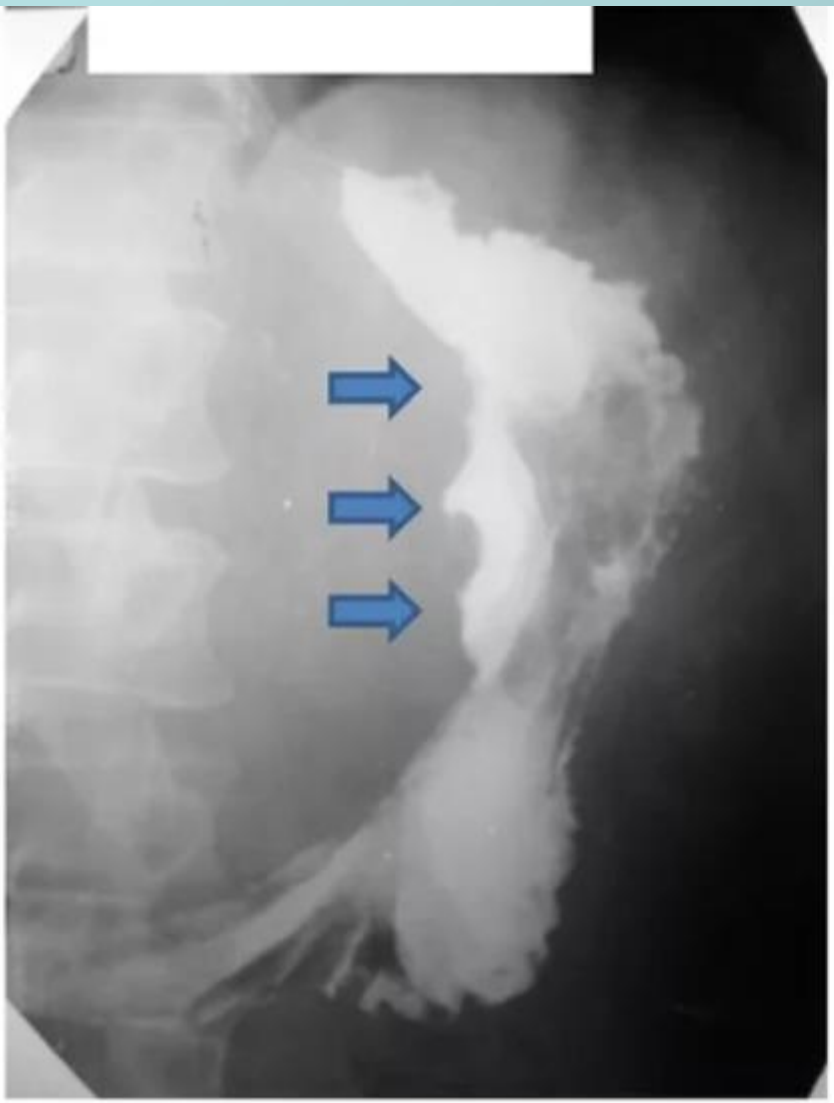
2. Pylorospasm (eliminated by atropine)

3. Compression by inflammatory infiltration (anti-inflammatory treatment required)

Radiological picture of gastric outlet stenosis

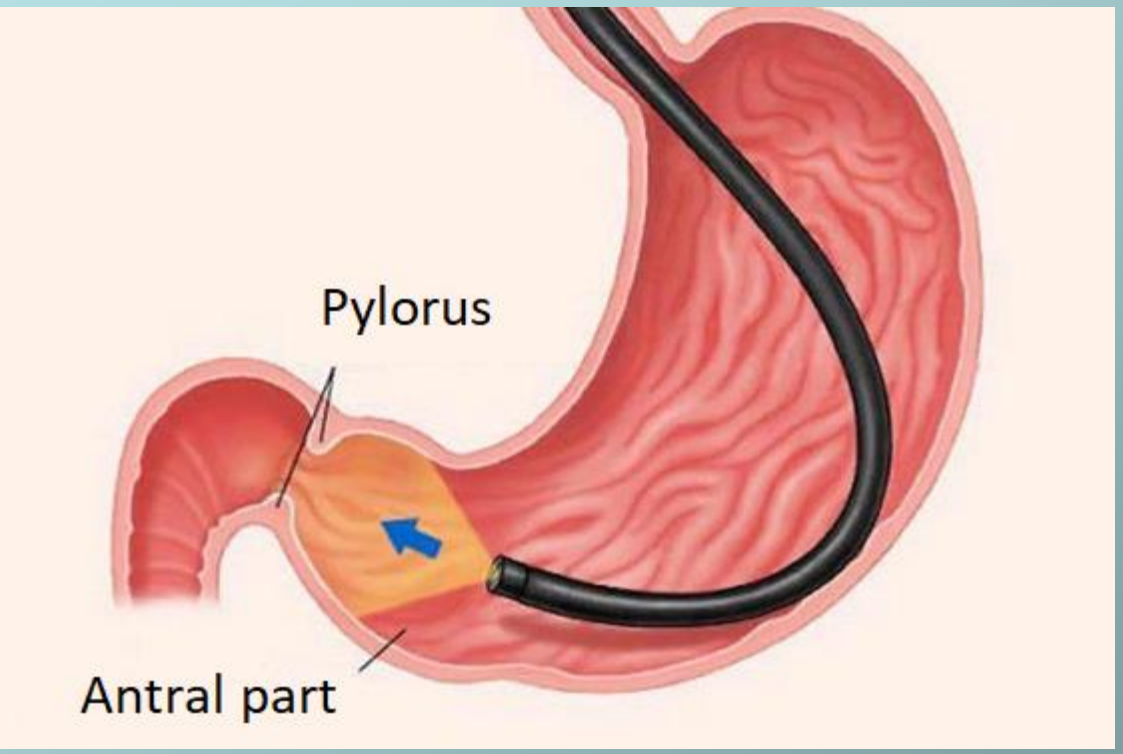
Radiological picture of gastric outlet cancer

Radiological picture of gastric cancer



- Flat wide filling defect in the area of lesser curvature
- Torn margins of the defect
- The crater floor does not protrude beyond the border of the stomach

Stenosis of the gastric outlet. Endoscopic picture



Stenosis of the gastric outlet. Macropreparation

Therapeutic tactics in PDS

Generally, treatment of pyloroduodenal stenosis is to be surgical.

In compensated stenosis, conservative treatment of ulcer is performed, with adhering to a diet, split meals of small volumes, easily digestible food.

In persistence of stenosis signs, indications to surgery are established.

Surgical tactics in PDS

Subcompensated and decompensated PDS – indications to surgical treatment

Surgery is performed after correction of biochemical disorders and restoration of gastric tone

Preparations before surgery:

- **• gastric lavage using a thick probe twice per day until clean water;**
- **• in FDGS, installation of a thin catheter beyond the stenosis area for tube feeding;**
- **correction of water-electrolyte disorders, protein balance, volemic disorders, avitaminosis and anaemia.**

The duration, extent and character of preparations before surgery depend on the stage of stenosis and homeostasis impairments resulting from it.

Surgical tactics in PDS

Aims of the surgery for stenosis:

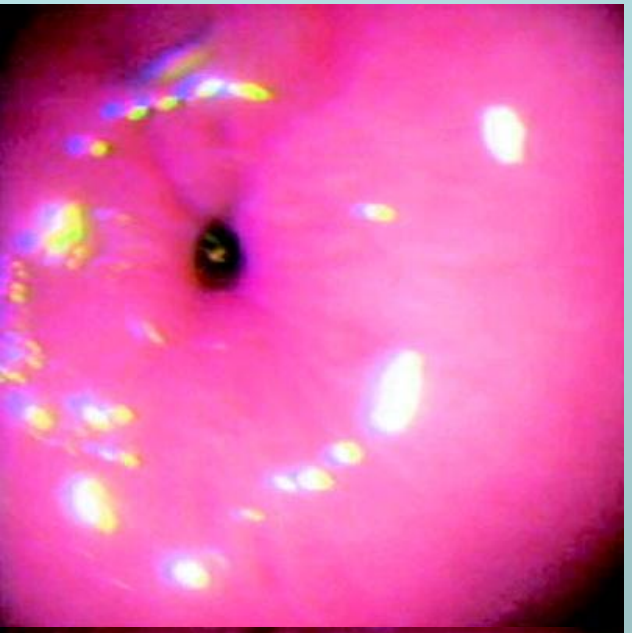
- elimination of the food evacuation function impairment
- removal of the stenosing ulcer
- stable suppression of acid- and pepsin-producing function of the stomach

Surgery types:

– gastric resection according to Billroth II (more frequently)

– gastroenteroanastomosis for debilitated patients

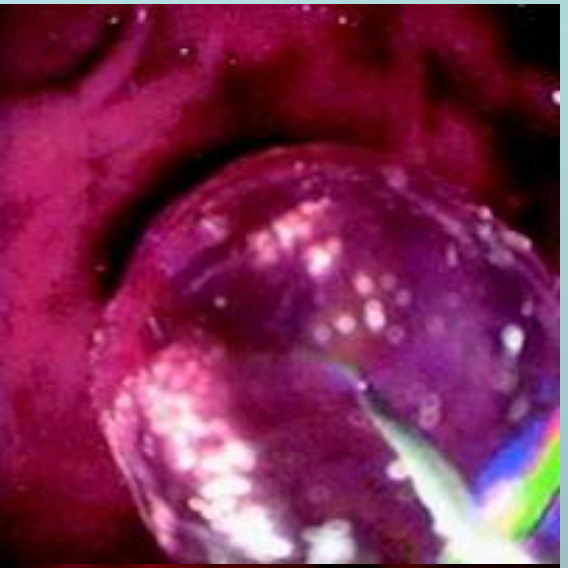
Balloon dilation in pyloric stenosis



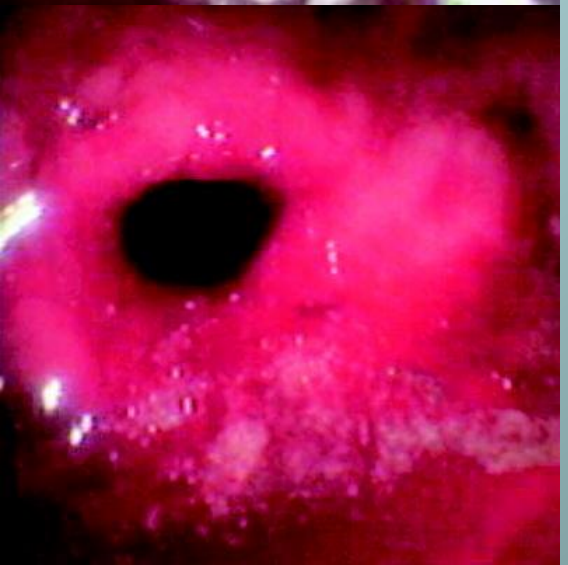
Endoscopic picture in pyloric stenosis
appearance before surgery

the probe is introduced into the pylorus

Balloon dilation in pyloric stenosis



the balloon is inflated

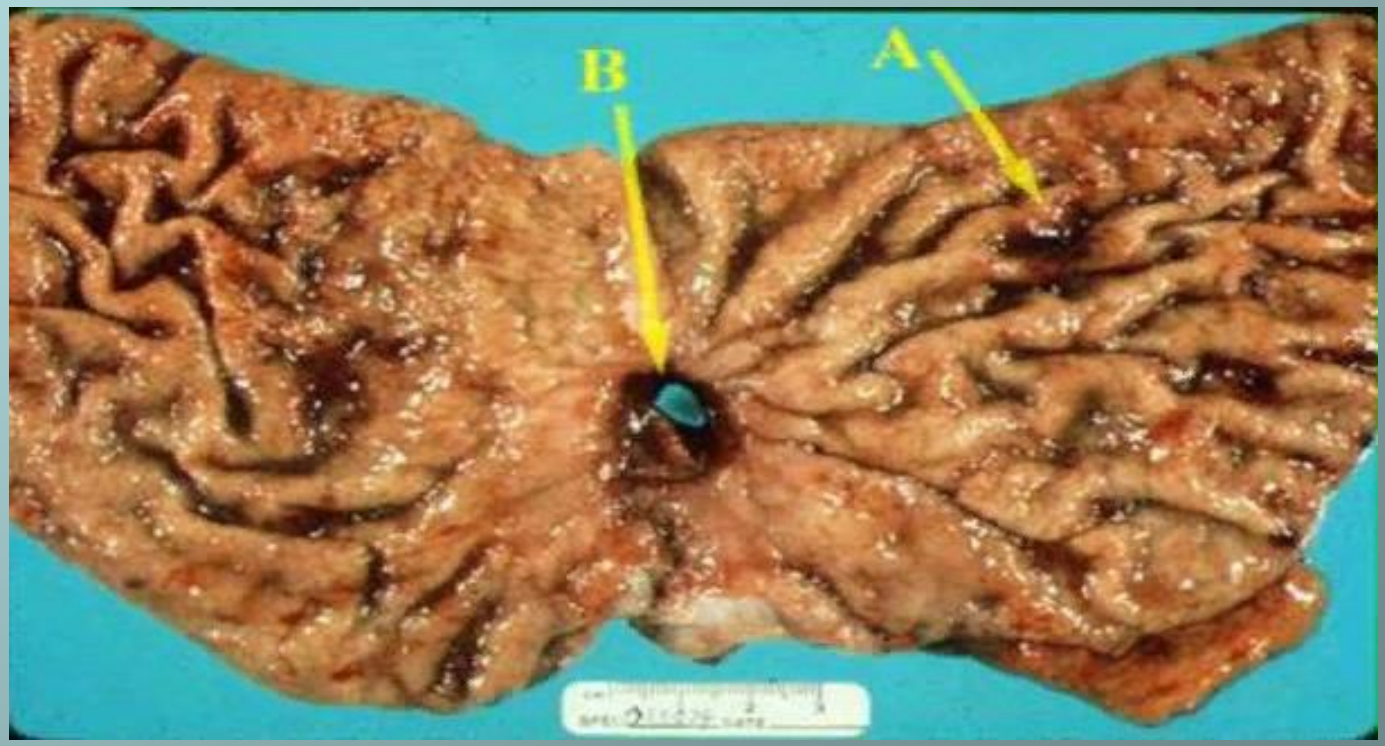


appearance of the pylorus after balloon dilation

Penetrating ulcer

Penetration is the “growth” of the gastric or duodenal ulcer into adjacent organs or tissues.

Frequency of gastric and duodenal ulcer penetration is 15%



Pathogenesis and anatomical pathology:

In prolonged presence of ulcerative disease, formation of a chronic ulcer is observed. The destructive process in the ulcer crater is slow with gradual destruction of all abdominal wall layers one by one, inflammation of tissues in the area of ulcer floor approaches the serous cover and then involves it.

Pathogenesis and anatomical pathology:

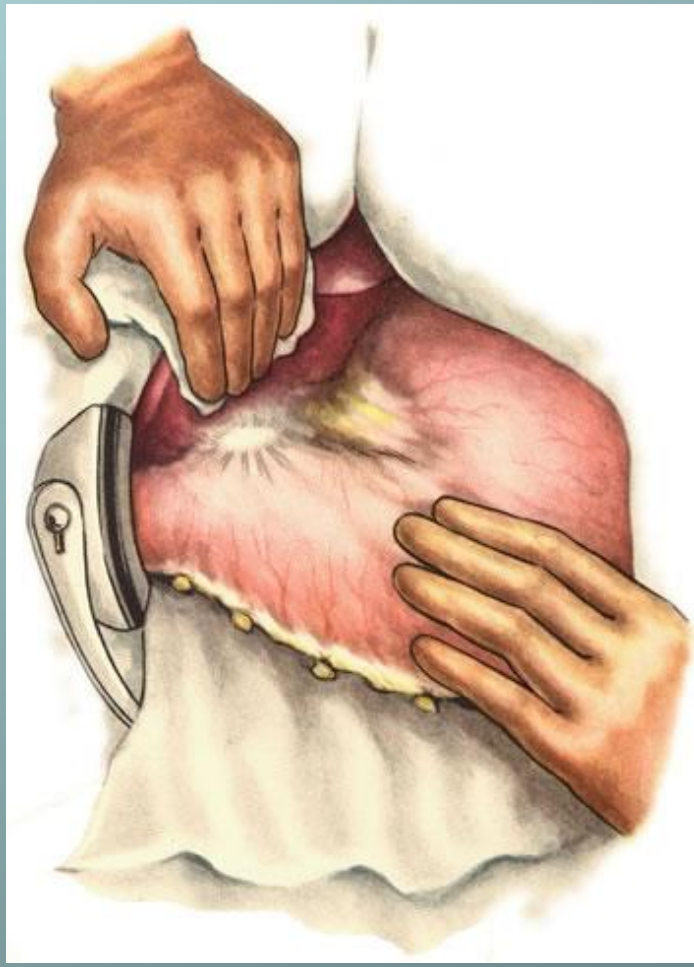
A reaction with local deposition of fibrin develops on serosa, the fibrin providing for gluing and adhesion of the ulcer floor and the adjacent organ. After destruction of the serous membrane, the tissues of the adjacent organ become the ulcer floor and the surrounding area of the gastric wall adheres solidly to the adjacent organ due to the adhesion process (which prevents perforation into the free abdominal cavity). The organ penetrated by the ulcer is involved into the inflammation.

Gastric ulcers more frequently penetrate:

- **lesser omentum**
- **abdominal wall**

Duodenal ulcers more frequently penetrate:

- **pancreas**
- **hepatoduodenal ligament**



Stages of penetrating ulcer formation

- I – stage of intrusion of the ulcer (necrosis) through all layers of the gastric or duodenal wall
- II – stage of fibrous adhesion to the adjacent organ
- III - stage of completed perforation and intrusion into the tissue of the underlying organ

Clinical picture of penetrating ulcer

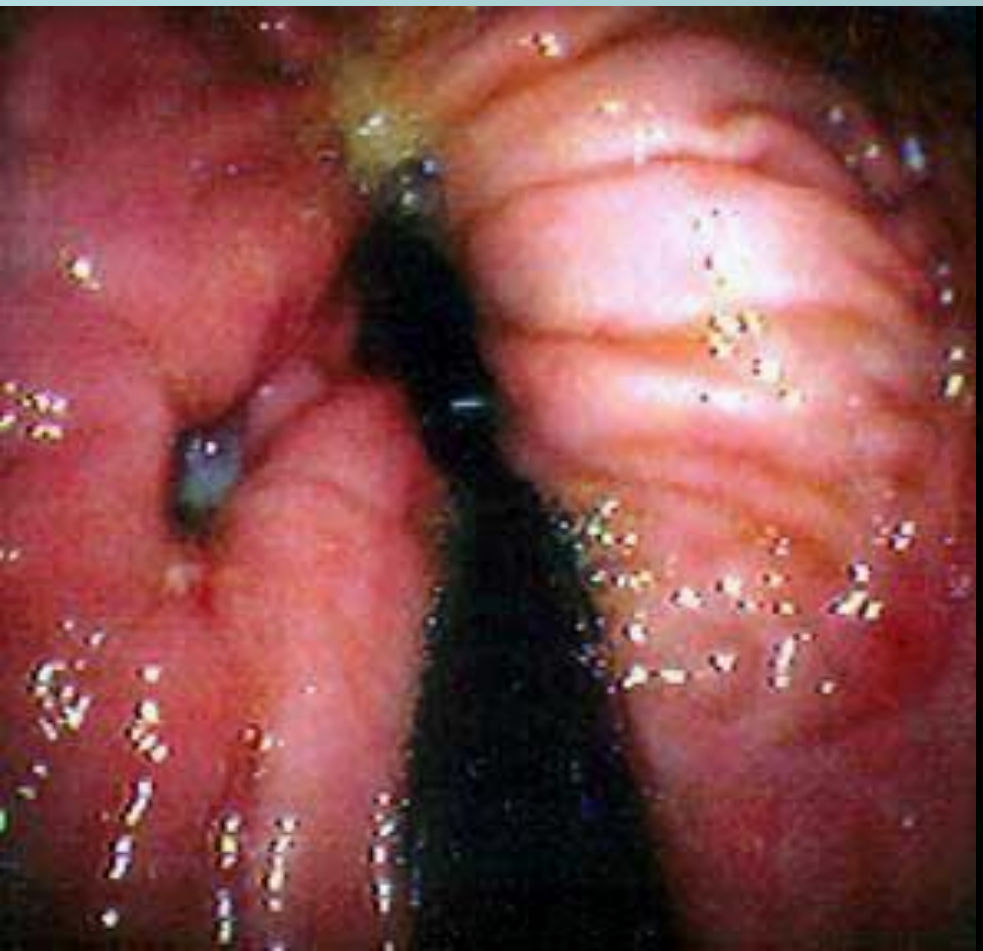
The character of ulcerative pain changes (fasting, nocturnal), seasonality, early and late pain after food intake.

- **Pancreatitis signs in penetration into the pancreas**
- **Pain in the right subcostal area in penetration into the pancreatoduodenal ligament**

Specifics of clinical picture in penetrating ulcer

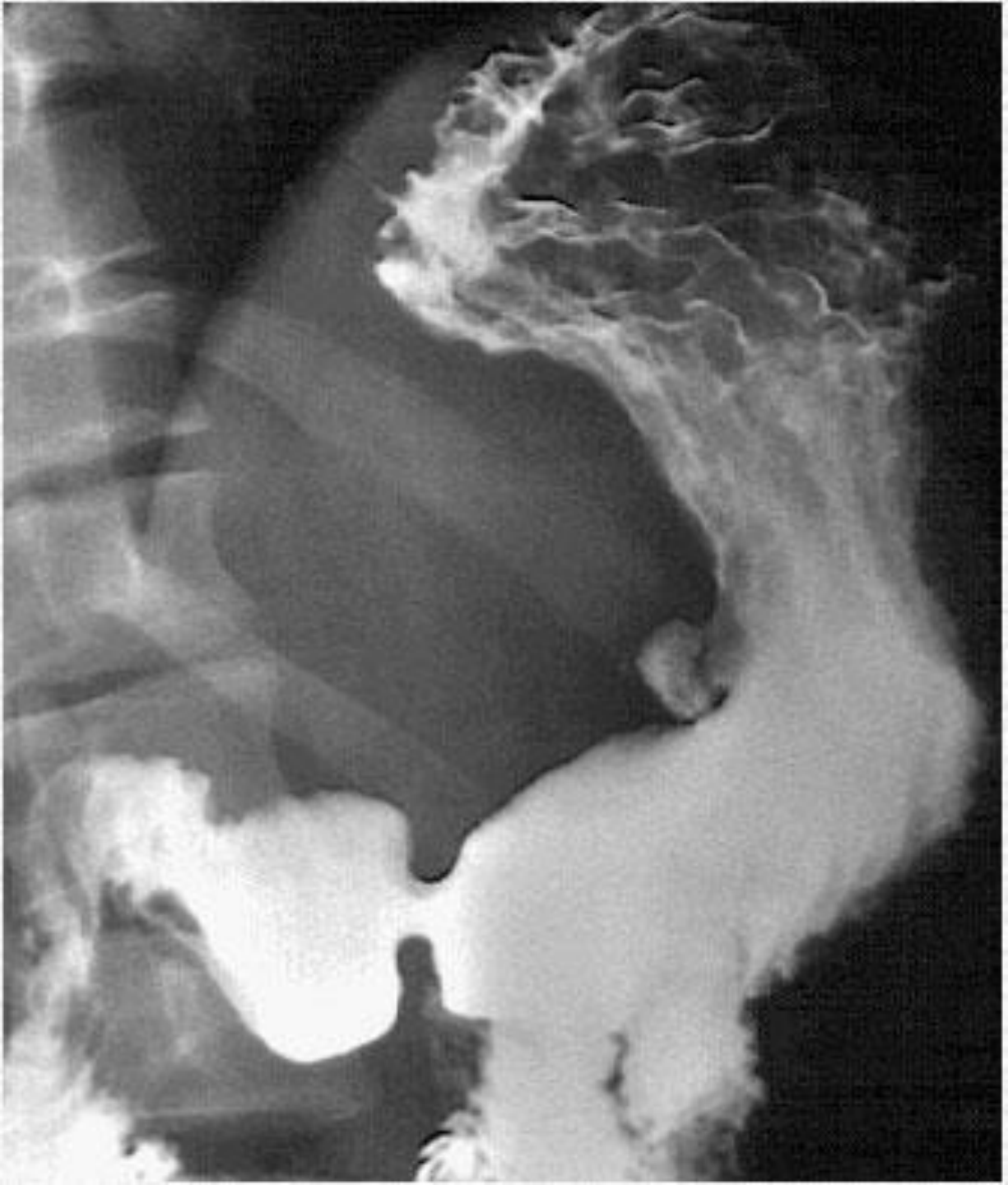
- Severe course of the disease
- Permanent pain syndrome
- Disappearance of the association between the pain and intake of food or antacids
- Appearance of pain irradiation
- Appearance of symptoms characteristic to diseases of the adjacent organs involved into penetration
- In case of penetrating a hollow organ (gall bladder, large intestine, common bile duct), a fistula is formed

Endoscopic picture in penetrating ulcer



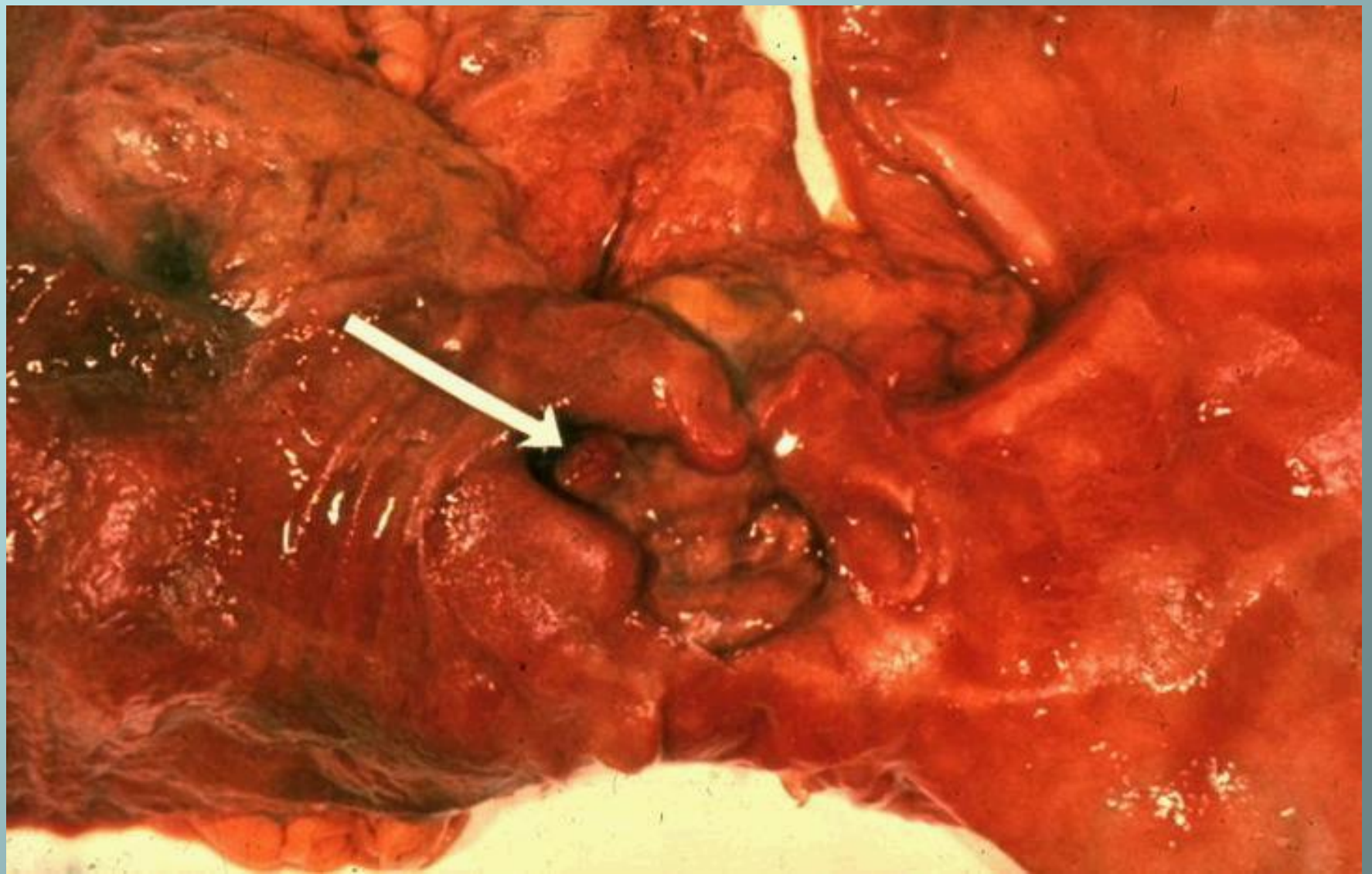
Radiological signs of penetrating ulcer

- A deep Haudek niche in the stomach and duodenum spanning beyond the organ
- Gastric and duodenal deformity
- Change in the relief of the gastric and duodenal mucosa

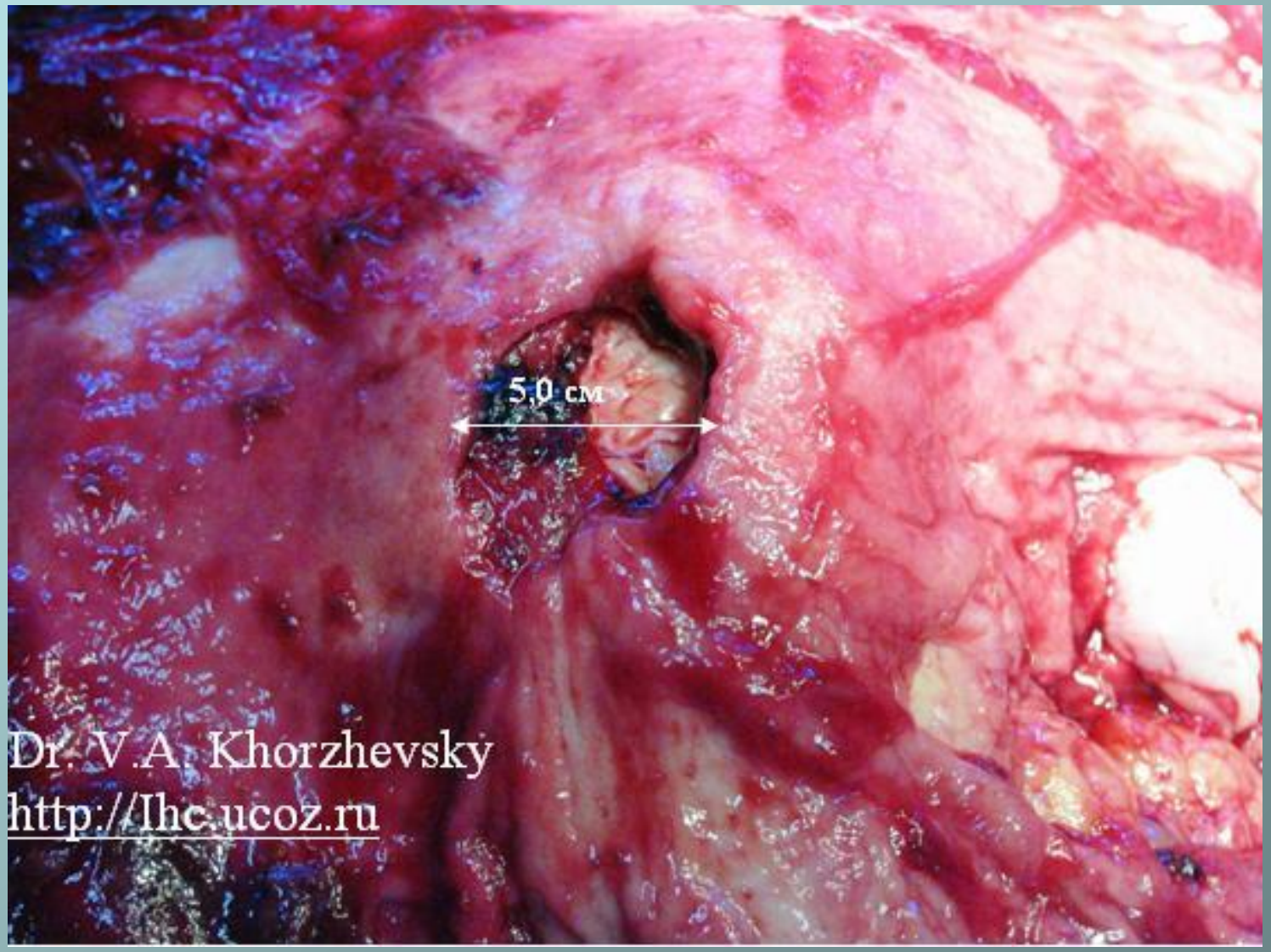


Radiological picture in penetrating ulcer

Penetrating duodenal ulcer. Macropreparation



Gastric ulcer with penetration. Macropreparation



Surgical tactics and treatment in penetrating ulcer

- Conservative treatment is ineffective
- Indications to emergency or scheduled surgical treatment

Treatment

Surgery is indicated for penetrating ulcer, the high efficacy of surgical treatment is considered to be confirmed today, the method of choice at the present time is gastric resection with more frequent resection according to Billroth II modified by Hofmeister-Finsterer.

Results: in the earliest postoperative period, complications may develop in 5-17% of the cases. Average case fatality rate amounts to 2-5%.

Types of surgical interventions in penetrating ulcer

- Gastric resection according to Billroth I
- Gastric resection according to Billroth II

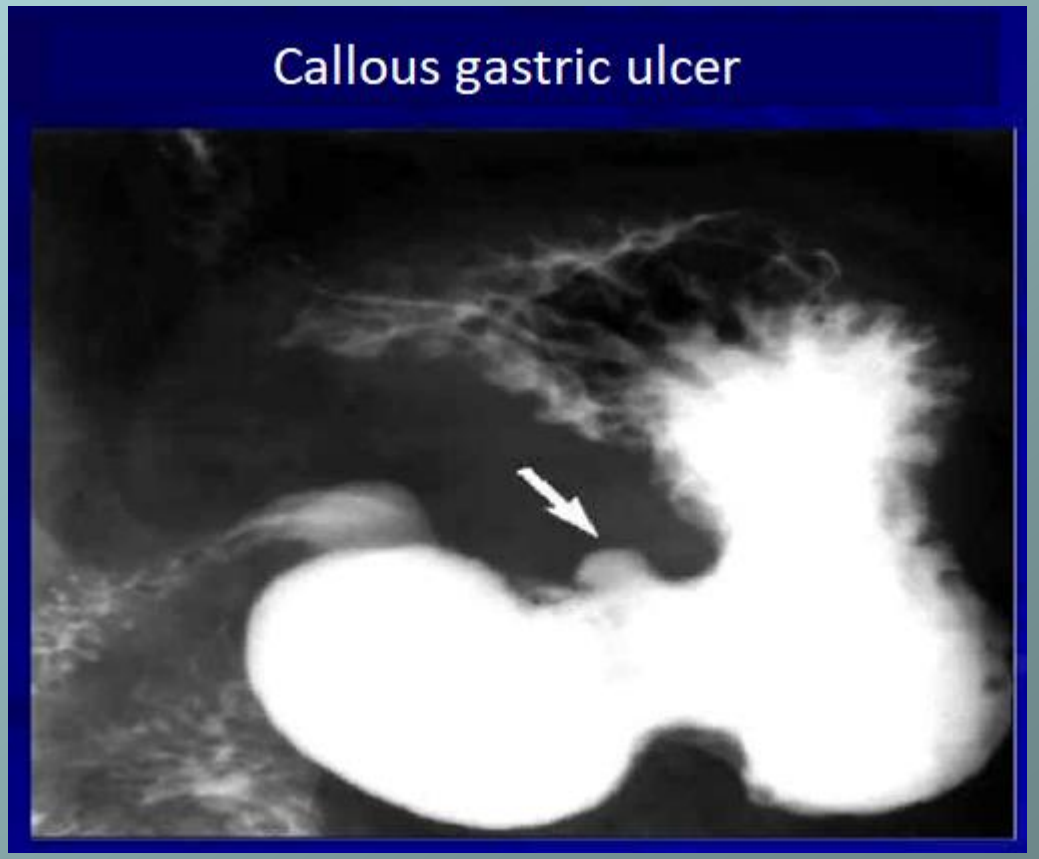
In a number of cases, the surgical may be extended and combined with resection of a part of the liver and spleen, atypical resection of the pancreas and some other interventions

Malignant degeneration of gastric ulcers

Malignant degeneration is the transformation of gastric ulcer into cancer. Duodenal ulcer become malignant very rarely. This complication is observed in 5-10% of ulcerative disease patients in long-term course of the disease.

Malignant degeneration of gastric ulcers

Callous ulcers of the lesser and especially greater curvature (80-90% ulcers become malignant), antral and cardial parts of the stomach undergo malignant degeneration most frequently.

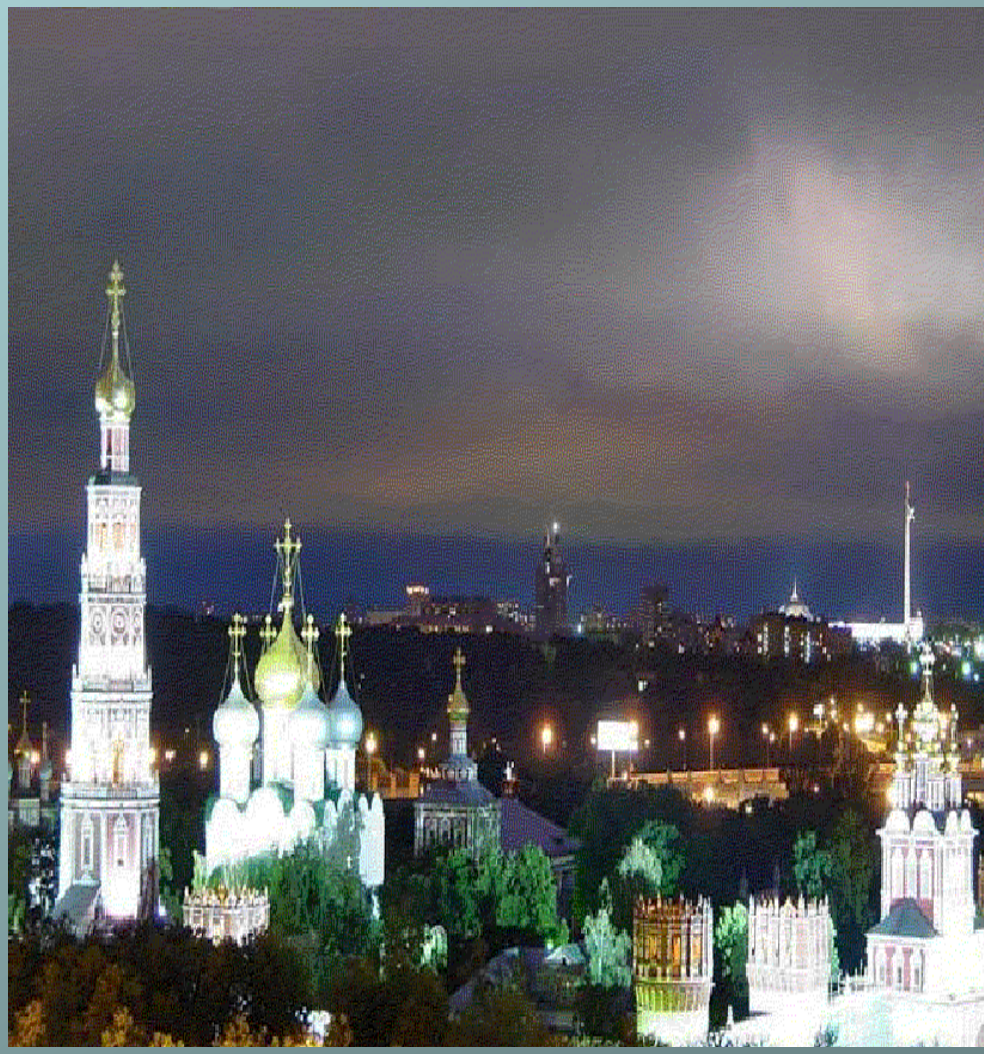


Malignant degeneration of gastric ulcers

On their own, the dimensions and the localisation of ulcer cannot be decisive in differential diagnosis of ulcer and cancer. However, if the size of the ulcerative defect in stomach is over 2cm, it is also necessary to consider the possibility of malignant degeneration and, in this connection, it is necessary to conduct thorough examination of the patient.

Frequency of malignant degeneration of gastric ulcers

- **M. Grespi and N. Munoz (1981) - 1-7% cases**
- **R.A. Melnikova (1983) - 13-14% cases**
- **A.A. Britvin (1984) - over 14% cases**



Frequency of malignant degeneration of gastric ulcers depending on its location (S.S. Yudin, 1955)

- greater curvature ulcers – 100% cases
- lower third ulcers – 65% cases
- middle third ulcers – 25% cases
- lesser curvature ulcers – 10% cases

Group of increased risk of stomach cancer development

(S.K. Lotokov, 2000)

1) patients with chronic atrophic hypoacid gastritis
2) patients with chronic gastritis with subtotal and total impairment of the stomach
3) patients with large chronic ulcers against the background of atrophic gastritis
4) patients with sessile gastric polyps (with a diameter of over 1.5cm) and especially with ulcerated mucosa above them or against the background of chronic atrophic gastritis
5) patients with multiple gastric polyps

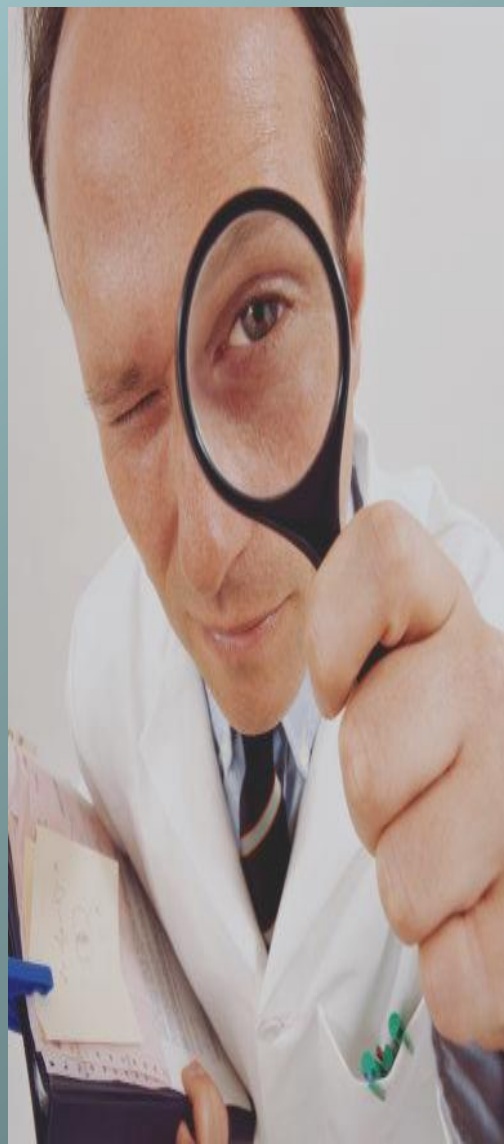
Clinical picture and symptoms of malignant degeneration of ulcer

- **Local symptoms**

1. Constant pressing pain
2. Gastric discomfort
3. Constant sensation of overfilled epigastrium

- **General symptoms**

1. Generalised weakness
2. Absence of appetite and satisfaction from food
3. Cachexia
4. Anaemia



Specifics in clinical manifestations of malignant degeneration of ulcer

- Change in the character of pain syndrome
- Decrease of pain intensity
- Disappearance of their periodicity and dependence on food intake
- Development of symptoms characteristic to stomach cancer
- Syndrome of lesser signs

“Lesser signs” syndrome:

- decreased appetite
- appearance of food aversion
- unprovoked weakness
- increased fatiguability
- disturbed sleep
- loss of interest to work and the environment
- loss of weight, torpidity, depression
- increased ESR, anaemia
- decreased acidity of gastric juice to the extent of acholia

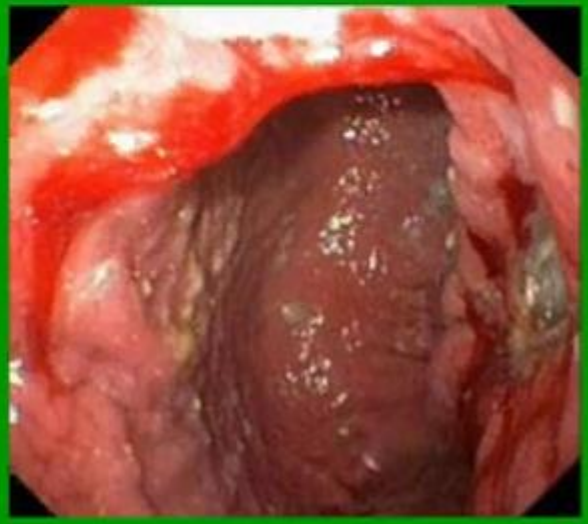
Diagnosis

- **FGS with biopsy and histological analysis**
- **Radiological diagnosis with contrast agent**
- **Ultrasonography of the abdominal cavity (metastases)**

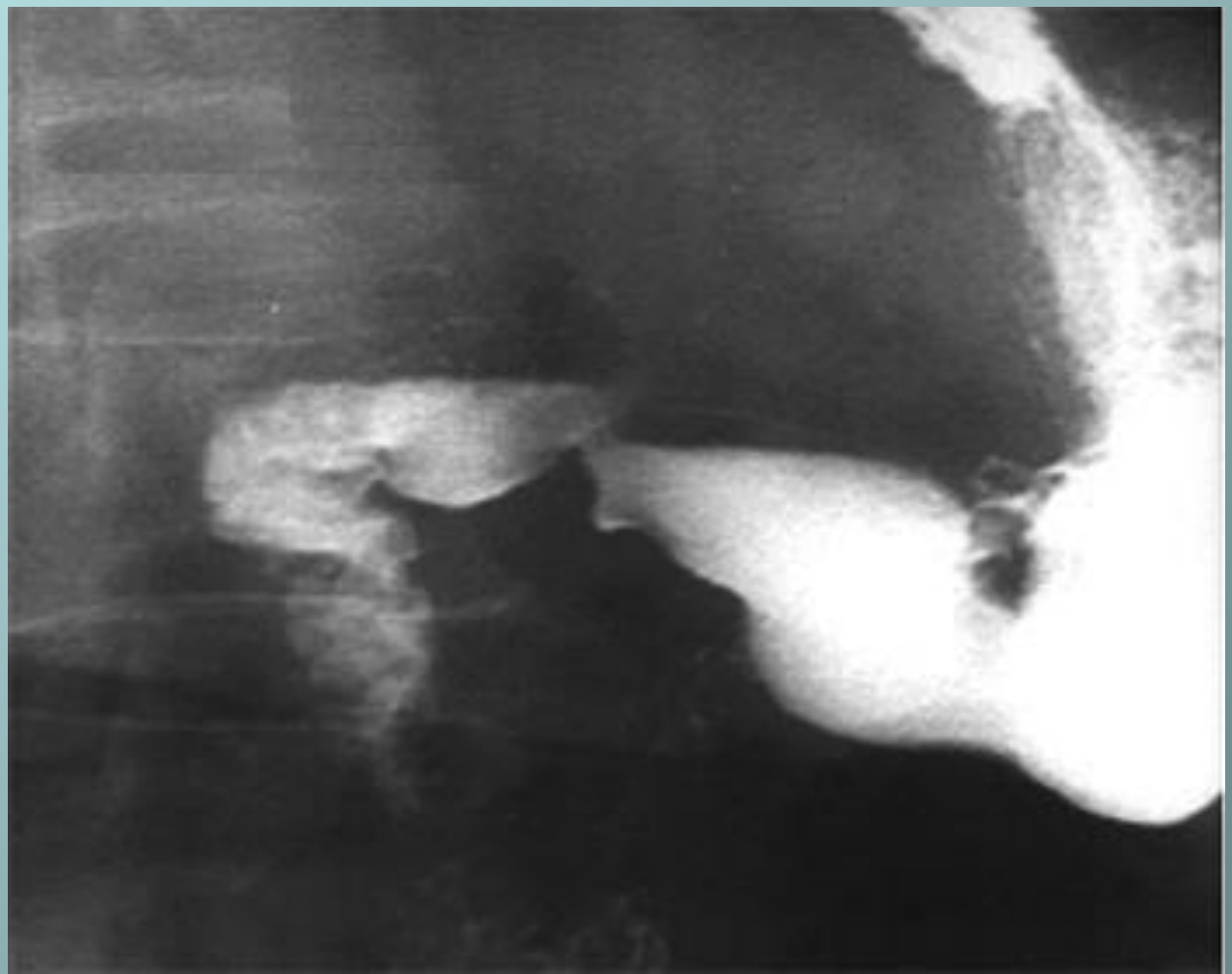
Diagnosis

- Rg:
  - Filling degect ("plus-tissue")
  - Increase in the size of ulcerative defect
- FGDS:
  - Infiltration of ulcer margin
  - Tuberous surface, vulnerability to wounding

Absolute indication to surgery according to oncological principles



Radiological picture of malignant degeneration of ulcer in the antral part of the stomach



Morphological radiological signs of malignant degeneration of ulcer

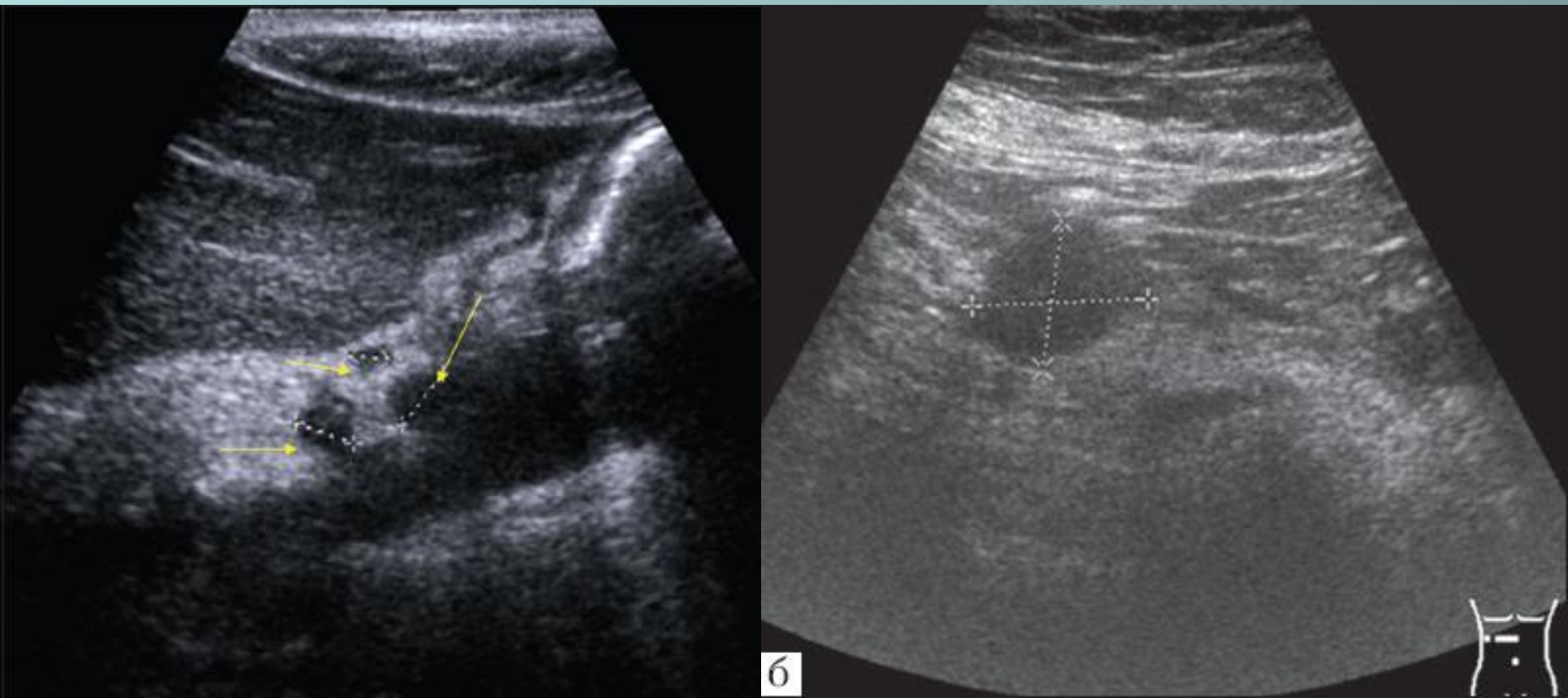
- **Saucer-shaped ulcer with raised margin**
- **Infiltration of deep layers of the gastric walls without distinct border with healthy tissues**
- **Destruction of the gastric mucosa relief, mucosal break (malignant relief)**

Ulcerated carcinoma

macropreparation

endoscopic picture

Metastases in lymph nodes of the paracardial area



Complications of ulcerated carcinoma

- **Bleeding (chronic microhaemorrhage, massive bleeding)**
- **Perforation into the free abdominal cavity and peritonitis**
- **Invasion into adjacent organs**

Indications to surgical treatment:

ABSOLUTE:

- Perforated ulcer
- Profuse or recurrent gastroduodenal bleeding
- Pyloroduodenal stenosis and severe gastric deformities with disorders in its evacuation function
- Malignant degeneration of ulcer

RELATIVE:

- Chronic, recurrent ulcers not responding to repeated conservative therapy
- Ulcers with repeated bleeding in medical history
- Callous and penetrating gastric ulcers not cicatrising in conservative treatment for 6 months
- Recurrence of ulcer after previous suturing of perforated ulcer
- Multiple ulcers with high acidity of gastric juice

Surgical tactics in malignant ulcer

1. In malignant degeneration of gastric ulcer, the only way of treatment is gastric resection.
2. The resection must be subtotal or total with removal of the greater and lesser omentum as well as all regional lymph nodes.

Prognosis: severe, depending on the time of revealing the complication, presence of metastases in lymph nodes, the extent of surgery, the patient's age and concomitant pathology.

Surgical tactics in complicated malignant ulcer

In complicated malignant ulcers, emergency surgery is indicated:

In bleeding – laparotomy, gastric resection and ligation of the vessels along the area

In perforation – laparotomy, suturing of the perforation according to Oppel-Polikarpov in peritonitis or gastric resection

S.S. Yudin “Studies of gastric surgery”

Principles of surgical tactics
(ulcerated gastric carcinoma):

“With increasing ulcer size, crater depth and the patient’s age, as well as with decreasing acidity, the danger of cancer development from ulcer is greater, therefore requiring a prompter gastric resection”.

LITERATURE RECOMMENDED FOR 4TH-GRADE GENERAL MEDICINE FACULTY STUDENTS ON THE COURSE OF SURGICAL DISEASES

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