

GASTROINTESTINAL AND THE ACCESSORY DIGESTIVE ORGANS IMAGING

Radiological methods take leading positions in many-stage process of diagnostics of diseases of digestion.

Among research techniques of the alimentary canal X-ray inspections conserve the important value in detection of morphological and function modifications of a system of digestion.

Primary methods of diagnostics of diseases of gastrointestinal tract - *radiology examination* and an endoscopy; ultrasonic, CT, MRI are padding methods.

The basic singularities of a X-ray inspection of the alimentary canal:

1. If at study bones, lung the leading part is played with roentgenograms the discernment of illnesses of an esophagus, a stomach and an intestine is grounded on combination of fluoroscopy and filming.

Advantage of fluoroscopy:

- Study of motor function of gastrointestinal tract;
- A choice of an optimal projection, the moment of filling and a motility and a degree of a compression for aiming snapshots.

The fluoroscopy is necessarily supplemented by radiography, with the purpose:

- Visualization of shallow morphological details (1-4 mm);
- Documenting of the detected modifications, including, zones rigidities of a wall.

In conditions of natural visibility, i.e. without application of contrast agents, judge only presence and allocation in the alimentary canal of gas, and also stones or the foreign bodies strongly absorptive X-rays.

2. The basic method of a X-ray inspection of an esophagus, a stomach and an intestine - synthetic staining by injection in a gastrointestinal tract of a contrast agent. Use fluid well aqueous cloud of barium sulphate at the rate of 100 g of barium sulphate on 100 ml of boiled water. For examination of an esophagus contrast cloud can be more heavy-bodied.

The procedure peroral staining is basic at examination of an esophagus, a stomach and a small bowel.

Leading method of a X-ray inspection heavy-gauge and a rectum serves them retrograde staining. The peroral procedure is applied mainly to a rating of function of a colon.

Drugs of barium counterindicative at suspicion on perforation of gastrointestinal tract (GT): their hit in a abdominal cavity leads to a heavy peritonitis. In this case and in the early postoperative term at imposed on GIT anastomoses use the water-soluble contrast agent (Gastrografinum badly absorptived in an intestine) is expressly intended for examination GT of 76 %. At risk of an aspiration and fistulas with a trachea and bronchuses Gastrografinum counterindicatives because of hyperosmolarity and dangers of a fluid lungs: use nonionic contrast agent (CA).

3. The important principle of examination of the alimentary canal is two phase examinations. The study of each department of the alimentary canal should be effected at "hard" stuffing by its contrast agent for definition 1) positions, 2) forms, 3) magnitudes, 4) contours, 5) removable and 6) functions of a member, and also at small stuffing - for study of a land forms of a mucosa. Sequence of these two phases is various for each department.

4. Obligatory condition of successful carrying out of examination is the palpation and a compression of members with the help of express radiographic cones. All departments of the alimentary canal, except for an esophagus and a rectum, study with application of a dosed compression at various degree of admission of a member a contrast agent.

5. A following principle of examination of the alimentary canal is polypositional, or multiaxial, the examination consisting in a repositioning of a sick status for definition of all walls of the investigated member, its relationship with environing tissues.

Double contrast study: after carrying out of particulate stuffing introduce gas into a lumen of a member or a gas-making admixture.

Polygraphy - a method with usage of several snapshots on one film; in an event of lack of crossed contours on a fixed field this indication is considered as lack of a peristalsis, i.e. an indication of an organic lesion of the given field of the alimentary canal.

CT has following priorities at examination GT:

- A rating of wall thickness of members GT (under condition of its adequate distention) and a discernment of its infiltration;
- Detection intramural and extraorganic pathological modifications;
- Differentiations of primary lesions GT from pressure from the outside and from infestation of a wall at swellings of the next members.

Express procedure for CT a stomach and a colon is the distention of walls water (normal saline solution). Air, 2 % cloud of barium, Gastrografinum is applied also.

The angiography is applied at a gastrointestinal bleeding in an event of an alleged operative measure or embolization.

Ultrasonic investigation GT. A principal value transabdominal ultrasonic - a discernment of diseases of the parenchymatous members clinically similar to illnesses GT. The intra-abdominal swelling can be found and its attitude to GT fixed, the thickening of a wall of a stomach or an intestine is specific, metastasises in lymph nodes are detected. Express procedure of ultrasonic GT - a distention of walls of a stomach and a colon water (normal saline solution).

At intracavitary – through esophagus and colon with endoscope ultrasonic research carry out. With this mode is possible research the anatomical layers of a wall of members GTI, include of depth and an expansion of a tumoral germination of a wall.

MRI visualizes a dwarfed wall of the alimentary canal, but yields under regional permission CT.

Radionuclid research techniques GTI. The basic direction - a rating motorly - evacuation abilities. Examination motorly – evacuation functions of a stomach. The procedure of examination consists of outside filing with the help of the gamma – camera. In lunch add any marked colloid activity 37-74 MBq. The detector of the scoop position to collaterally forward abdominal wall. Recording of the information begin right after reception of lunch. Duration of examination of 30 min. The information is represented as a series of scintigrams and the dynamic curves built from two regions of interest - naturally a stomach and intestines. Outcomes of the computer, radionuclide imaging of stomach estimate quality and quantitatively. At qualitative analysis pay attention to a position and the form of a stomach, presence and singularities of allocation radiocolloid. The quantitative motility of a stomach is characterized with following parameters: Time of half bleeding of a stomach, velocity of transferring in a small bowel. Clinical value radionuclide imaging of stomach is connected to a rating of effect of operative measures on a velocity and character of bleeding of a stump of a stomach.

Examination with the marked erythrocytes can reveal even a small gastrointestinal bleeding (0,1 ml / mines).

Radiological examination of an esophagus. Diagnostics of diseases of an esophagus is complex. Now radiological and endoscopic methods are leading.

Observations to a X-ray inspection of an esophagus:

- 1) A dysphagia;
- 2) A foreign body;
- 3) A bleeding from upper department GT;
- 4) A pain or prelum mediastinal set of symptoms;
- 5) A lesion of members of a mediastinum;

6) Planning operation or an irradiating.

Examination will be carried out on an empty stomach. Beforehand effect survey fluoroscopy and radiography of members of a thorax and an abdominal cavity for elimination of primary modifications in other members. Then initiate examination of an esophagus with the help of the baric cloud. For the first investigation phase standard fluid baric ыгызутышщт is used, and the baric dough is applied to the second stage (hard stuffing).

Radioanatomy. At examination of a land forms it is possible to reveal 2 - 4 longitudinal collateral tucks on all stretch of an esophagus. The breadth of an esophagus at hard stuffing is on the average peer 2 cm, it is possible to reveal behind the screen physiological narrowings:

1. Ring - pharyngeal (a pharyngoesophageal sphincter);
2. Aortal, it is stipulated by pressure of an aortic arch;
3. Bronchial – prelum of left-hand primary bronchus;
4. Phenic, the bound with a prelum of an esophagus legs of a diaphragm;
5. Cardial, it is stipulated by a sphincter of cardial part of stomach.

Velocity of transit on an esophagus fluid (contrast mass) the baric cloud of 2-3 seconds, the baric dough{*paste*} - about 6 seconds.

The pharynx and esophagus are researched in direct, oblique and side positions. In a direct position of the patient the cervical department of an esophagus is most well seen. In the first oblique position optimal conditions for examination of a thoracal department of an esophagus, and in second oblique - a belly department of an esophagus are framed.

At examination of an esophagus of the radiologist interests:

- Character of transit of contrast mass;
- A status of contours and an elastance of walls on all its stretch. Contours in norm sleek. The peristalsis is represented as surface wavy modifications of its contours.

The basic radiological sets of symptoms of illnesses of the alimentary canal.

1. A set of symptoms of dislocation of a member.
2. A set of symptoms of narrowing of the alimentary canal:
 - a) Diffuse narrowing;
 - б) Restricted (local) narrowing.
3. A set of symptoms of dilating of the alimentary canal:
 - a) Diffuse dilating;
 - б) Restricted (local) dilating.
4. A set of symptoms of a motorial dysfunction of the alimentary canal.
5. A set of symptoms of pathological modifications of a land forms of a mucosa.

Radiologyl indications of foreign bodies and diseases of an esophagus.

There are following radiological indications *of a foreign body of an esophagus*:

1. A shade of a foreign body (contrast foreign bodies).
2. Defect of stuffing (non-contrast foreign bodies).

To the patient yield to drink 10-15 ml of heavy-bodied aqueous cloud of fixed white. At X- raying watch, whether has taken place detentions of a contrast agent in what or a department of an esophagus (on a foreign body). Suggest to drink approximately 50 ml of water. From a normal mucosa thus scurf of contrast mass is washed off even. But on a foreign body barium remains. At suspicion on perforation are applied nonionic CA.

At children at the first 24 o'clock of life air fulfills all GT, at dead - is not present.

Diverticulums of an esophagus fall into to malformations. But are and got - traction. This restricted diverticulum of walls. Local augmentation of a shade of an esophagus: if the shade of the spherical form - a pressure diverticulum and if the apex of a shade is pointed is typically for a traction diverticulum.

The achalasia is stipulated by a spastic stricture in belly part of esophagus; the release

phenomenon of esophagus-stomachal transferring is broken. The X-ray inspection is basic in production of the diagnosis. The sharp even augmentation of a shade of an esophagus, time-lagged progression of barium in subjacent departments, the symmetric funnel-shaped narrowing of an esophagus with smooth contours is marked, reminds “a murine trailing-edge piece” and is not uncovered at a swallowing. Breaking of motor function is well demonstrated with the marked colloid.

Cicatricial stricture an esophagus - the particulate augmentation of a shade above a reduced lumen, is more often in range of physiological narrowings. In differential diagnostics the fact of a chemical injury in an anamnesis though some patients hide.

The cancer of an esophagus has following radiological indications: an atypical land forms mucous, a rigidity and narrowing esophagus lumen; defect of stuffing and an irregularity, wavy contours; defect of stuffing and a niche; above narrowing dilating; a regurgitation - a revertive carrier of a contrast agent in overlying departments. The most precise methods for definition of a cancer of esophagus – CT: depth of a lesion and augmentation of lymphonoduses is demonstrated.

Hernia esophagus foramens of a diaphragm - transition of members of an abdominal cavity or retroperitoneal space in a thoracal cavity through natural foramens or through defects of diafragm.

Will be recognized after detection of a part of a stomach or a member in a thoracal cavity, above a diaphragm. Represent hit a stomach through a foramen of esophagus in a mediastinum. The basic indication of an axial hernia is presence in range a foramen of esophagus of a diaphragm of typical tucks of a mucosa of a stomach which are prolonged directly in tucks of a subphrenic part of a stomach. Other obligatory indication of an axial hernia shift of a cardial department of a stomach above a diaphragm serves. At an acute strangulation of a hernia the X-ray inspection is not effected more often because of a heavy status of the patient. At suspicion on a strangulation of a hernia a foramen of esophagus of a diaphragm should be conducted a X-ray inspection the water-soluble contrast drug in an aspect of possible perforation of a wall of a stomach or an esophagus.

Radiological examination of a stomach. Observations: complaints to stomachal discomfort.

Technique of examination. Express preparing of patients which consists in following is necessary for a X-ray inspection of a stomach: before examination of the patient has dinner in routine time with decrease of volume of received nutrition half due to carbohydrates, but caloric value should be preserved. The supper should be also in routine time as one glass of tea or coffee and a scrap of a white loaf with oil (a mild supper). Necessities for cleansing enemas are not present. In day of examination of the patient it is impossible drink and smoke at all since nicotine produces an abundant mucifying.

Examination of a stomach begins after survey fluoroscopy of thoracal and belly cavities. Examination by the first stage:

1. A land forms mucous a stomach. For a stomach are characteristic: a) the longitudinal tucks placing to small curvature; б) plexiform tucks - short, sinuous, skew and further crossly directional aspect with flock of anastomoses. In range of a skew field of a stomach there are 5-8 longitudinal tucks a breadth 0,3-0,5 cm.

Except for study of a land forms, it is paid attention to detection of a sign of a hypersecretion and a phenomenon of mucilage. The first sign shows and on an empty stomach, but is convincingly determined and on character of omitting of the first portions of a contrast agent on a direction to a sine. There is a pattern recalling “a portion of the heavy-bodied syrup, a seeking the bottom glass of tea”. At presence of a great many of secretory fluid there is a characteristic trilaminar pattern: the nappe (an intermediary layer ranges above a layer of barium and adjoins from above on stomachal bladder.

Hard stuffing of a stomach. The form of a stomach happens as a fishing hook and a post horn.

Position of a stomach. Three quarters of a stomach in the left-hand half of belly lumen, one quarter - in dextral ranges. The inferior contour of a shade of a stomach at men ranges at a level of IV lumbar vertebra or is higher on 3 - than 4 cm; at women - is lower than this line on 3 - 4 cm.

Drawing of a shade of a stomach. The shade of the filled in contrast mass of a stomach, as a rule, homogeneous, in the upper department of it is almost always taped air stomachal bladder with an air clarification.

Contours of a shade of a stomach. Contours of small curvature always should be smooth, and major curvature, as a rule, serrated, that is stipulated by transferring of tucks mucous from a back head on front.

Displaces a stomach. The normal stomach easily displaces at penetrating belly respiration and shows a repositioning, forms and the dimensions. All this testifies to a preserved elastance of walls and "loose" (soldered with other members) a locating in a belly lumen.

Evacuation from a stomach. The contrast mass from a stomach, on the average, is evacuated through 1,5 - 2 hours, in 4 hours the stomach is free completely from contents. If the baric cloud is discovered in a stomach through 6 - 8 clocks, speak about a time-lagged evacuation, in 12 clocks there is a suspicion on narrowing the gatekeeper and if in 24 hours is testifies to a stenosis, at a 48-hour and greater determination of contrast mass in a stomach is an organic stricture of the gatekeeper without any doubt.

Tone of a stomach. Tone is a status shortening abilities of muscle elements of a member, defining magnitude of a lumen. Walls of a considerable proportion of the alimentary canal in the empty status close, and consequently the lumen of a member is practically represented as a fine-bored cleft. At transit of nutrition or the baric cloud of a wall of a probed member show in a normality some resistance. The radiological rating of tone of a member is reduced to clearing up of how the cavitory member is unfurled (shaped) at filling in its contrast mass. In particular, it is accepted to distinguish the normal (orthotonus), boosted (hypertone), the under (hypotone) and lack of tone (atony).

Radiological indications of boosted tone are: time-lagged progression of a contrast agent, decrease of a shade of a probed member due to decrease of a lumen owing to the abbreviated status of a muscular wall.

Indications of the under tone, on the contrary, are connected to a release phenomenon of muscles of walls of a probed member and will consist in fast transit of the baric cloud after course of a lumen and augmentation of a shade of a probed member in connection with dilating (augmentation) of volume of its lumen.

Peristalsis. Peristalsis GT will consist in rhythmic, following one after another at regular intervals, cuttings of circular muscles of a wall of members of the alimentary canal. The peristalsis of each member is a part of those wavy cuttings of contours of a shade. It is accepted to distinguish: 1) a rhythm, 2) duration of a separate peristaltic wave and 3) voltage of peristaltic cuttings.

The rhythm of a peristalsis is the time term superjacent between two separate waves. It can be normal, time-lagged and accelerated. Duration of a peristaltic wave is meant as the time proceeding from appearance of a wave in an initial part of a concrete segment of the alimentary canal before achievement by it of its distant extremity. So, for example, appearance of a wave in the arch of a stomach before achievement by same wave of the gatekeeper. The normal peristalsis considers such when well discernible waves on both contours are visible, propagated to a distant part with the physiological rhythm inherent in this member GT.

Indications of a normal peristalsis of a stomach:

1. Appearance separate rhythmic cuttings in top of the skew field, going on a direction to the gatekeeper.

2. Peristaltic waves follow one by one with intervals on the average 21 second. Closure and discovering of the gatekeeper is stipulated by reflex activity.

Direct prolongation pylorus the canal is duodenum. It divides on 3 parts: upper horizontal, degressive and inferior horizontal. Upper: a bulbus, in it of 4 walls - front, back, medial, lateral. Contours of a bulbus legible, smooth, are more often it than the triangular form with the establishment, versed to a stomach. The degressive department ranges to the right of a column, goes collaterally to its edge and, bending the head of a pancreas, forms small camber lateral. The inferior department duodenum has an oblique direction on the right from below, to the left upwards, and then passes in placing behind of a stomach. Ilexura duodeno-jejunalis, were on a level of the upper edge 3 lumbar spondyles. A breadth duodenum 4 - 6 cm, and, in distant departments it is wider. The mucosa of a bulbus is prolongation of a mucosa of a stomach and is introduced to the tucks having a lengthwise direction, concurrent to fastigium of a bulbus.

Motorial function of duodenum. It is unequally expressed in its various departments. The bulbus routinely bodily contracts and thus as though squeezes out contrast cloud in a distant direction. However shallow peristaltic motion of walls are quite often visible also. In range of a degressive department wavy cuttings, and sometimes and more expressed segmentations escorting with a tonic contraction of walls.

Radiology indications of diseases of a stomach and duodenum.

Gastritis chronic. In diagnostics of a gastritis outcomes of study of a microrelief of a mucosa have crucial importance: square and a drawing of areas gastrica. They can be revealed only on the aiming snapshots of a stomach effected at pressure on a front abdominal wall. At patients with a surface gastritis the tender even drawing - areas the improper spherical or polygonal form, on the average 2-3 mm in a diameter, borders from each other is determined by very fine grooves of barium. To a penetrating gastritis the even acinose drawing high spherical or oval areas, from 2-3 up to 5 mm in a diameter is peculiar. At an atrophic gastritis the rasping irregular drawing of areas gastrica of the miscellaneous form and magnitude (a maximal diameter of alveoluses more than 5 mm) is taped. Except for them, to become thicker tucks mucous. Ultrasonic at an erosive gastritis taps irregularities of a contour of a wall of a mucosa, a local thickening of a wall, a sign of "flaking" of a wall of a stomach that connect with exudative an inflammation of a wall.

Peptic ulcer of a stomach and duodenum. Direct radiological indications:

1. Nish. 2. A convergence of tucks of a mucosa. 3. Infiltrate the shaft around of a canker, is seen as protuberances on edges of a niche or as narrowing of an orifice in a niche. Nish - outcome of a ulceration of a wall of a member. Depth of a niche over 1-1,5 cm, and also trilaminar contents in a niche (the baric cloud, fluid and air) can serve indications of penetration of a canker (distribution on nearby members). In dependence on conditions of projections distinguish two types of a ulcerous niche: a niche on a contour and a niche on a land forms.

Nish on a contour it is discovered at hard stuffing a stomach and represents aboriginal augmentation of shades.

Nish on a land forms mucous looks like improperly spherical nonperishable stain conforming to a clump of the baric cloud in ulcerous defect. To reveal it routinely it is possible with the help of small amounts of contrast mass, i.e. at examination of a land forms mucous.

Infiltrative the shaft on a contour is seen or as protuberances on edges of a niche, or as narrowing of an orifice in a niche.

Infiltrative the shaft yields a clarification on a land forms (ring-shaped).

Convergence of tucks - an indication of a cicatrization.

Function signs: 1. A hypersecretion. 2. A hypertonia or an atony. 3. The peristalsis is amplified. 4. A restricted spastic stricture as penetrating on the major curvature, ulceration quite often conforming to a level on the counter side. 5. The evacuation is expedited or time-lapse. 6. Local pain sensitivity.

Carcinoma of the stomach. Radiological indications:

1) An infiltration, rectification and a rigidity of tucks of a mucosa;

- 2) Breakage (destruction) of tucks of the mucosa substituted in tumoral masses;
- 3) Rectification and an irregularity of a contour of a shade of a member;
- 4) A strain and narrowing of a lumen of a member;
- 5) Defect of stuffing, a niche;
- 6) Lack of a peristalsis and a rigidity of a contour in zone lesions.

Irregular decrease of a shade of a contrast agent in a lumen of an investigated member is an indication of presence on the given field of a padding tissue.

Defect of stuffing can be boundary (at a boundary locating of an interrupting for diffusion of contrast mass) or central.

In the latter case it is necessary to conduct multiaxial X-raying to reveal, on what wall, front or back, defect is posed.

Performance of defect of stuffing:

- 1) A locating (boundary, central, during the whole department of a stomach);
- 2) The form, connection with a wall (it is connected on all stretch, on the broad establishment, on a leg);
- 3) Contours (sleek, sinuous, wavy).

It is typical of a malignant swelling:

- 1) A boundary locating of defect of stuffing;
- 2) Broad connection with a wall;
- 3) Contours hilly or worm-eaten;
- 4) Mucous around has an atypical land forms.

Polyps - the benign tumor, described it is central posed defects of stuffing, with sleek contours; can be on a leg and on the broad establishment. Tucks mucous are not modified.

Thus CT and ultrasonic have following possibilities:

- Map an intramural growth;
- Visualize exterior an ingredient of stomach;
- Show recruitment phenomenon in process of other members and lymph nodes.

Radiology examination of an intestine.

Observations to radiology examination of an intestine:

1. Chronic enteritises and colitises;
2. The long-lived constipations, a diarrhea;
3. A coliform bleeding;
4. An obstruction of an intestine;
5. Tumors;
6. Diverticulums.

Thin gut. The thin gut is more convenient for studying through 40 - 60 minutes after research of a stomach and duodenum., after the patient will have breakfast. For this time all thin gut in most cases happens is filled with contrast substance. It is paid attention to position, the form of intestinal loops, the sizes (width), a status tucks of mucous, peristaltics and evacuation of contents.

Loops of a jejunum range on the average a department of a belly lumen, and an ileal intestine - in inferior and dextral a departments, and also in a small pelvis. The form of loops of an intestine happens with shallow hacks on contours and is stipulated cross-section by tucks. These tucks in a phase of a land forms yield a specific plumose drawing. The breadth of loops varies in limens 2 cm. In a small bowel distinguish double locomotions: peristaltic and similar as pendulum; first are stipulated by function of a circular musculation, second - function of a longitudinal musculation. The evacuation of contents from the upper department of a thin intestine descends through 2 - 3 hours, and from the inferior department - in 6 clocks.

In 1 hour loops of a jejunum are carried out, in 3 hours - all contrast mass - in an ileal

intestine and in part starts to transfer in blind, and through 7 - 8 clocks the small bowel is completely bled.

The most precise research technique of a small bowel – a X-ray inspection after injection of barium directly in a small bowel through a coliform probe with the purpose of a maximal distention of an intestine. Allows to probe its each loop separately with a compression. Under an aboriginal anaesthesia into a jejunum through naze introduce the express probe supplied with a balloon for an avoidance revertive arrival of barium in a duodenum and a stomach. Through a probe into an intestine introduce divorced barium, and for a double contrast study - then and air.

Radiology indications of diseases of a small bowel.

Enteritises. The hypertonia and a hyperkinesia of a small bowel is characteristic for patients with heavy enteritises. Owing to the reinforced exudate, fermentations and breaking of processes of an adsorption in a small bowel occur gas and small fluid levels. The nonperishable strain of a land forms of a mucosa is marked: tucks nonuniformly dwarfed, high, flattened, quite often change the direction. A valuable indication of a chronic enteritis - simple small spots spherical formations on a land forms of a mucosa (a nodous land forms), testifying to a focal edema of a mucosa, an occlusion and a swelling of separate segments, a hypertrophy of solitary follicles.

Regional enteritis (Crohn,s disease). Meets in two forms. First - a surface not sclerosing ileitis. The hyperplasia of a lymphoid means, similar polyps modifications of a mucosa is discovered in children and teenagers at whom arise an edema of a wall of an intestine. It shows formation of a faveolate, honeycomb drawing of a land forms of a mucosa and an irregularity of contours of an intestine. Narrowings of an intestine are not marked.

The second form is characterized by a sharp inflammatory infiltration, an edema of all layers of a wall of an intestine and formation of cankers on a mucosa. Diffusion of process and on a colon is possible. Are discovered at a X-ray inspection: rough narrowing and obstruction as well as enteroenteric fistulas and enterocutaneous fistulas. The land forms of a mucosa becomes acinose, polypiform, cankers stipulate originating a sign of a niche.

Ultrasonic and CT allow in addition to a X-ray inspection at diseases of a small bowel:

- To visualize a dwarfed wall of an intestine;
- To spot an expansion extraintestinal lesions;
- To reveal complications: fistulas, abscesses.

Cancer of a small bowel. X-ray inspection defect of stuffing ungeometrical with rough contours, narrowing of a lumen is determined. The strain of a land forms of a mucosa in region swellings, breakage of tucks of a mucosa is discovered. The peristalsis in a place of a swelling is not determined. At CT the thickening of a wall of an intestine and metastasises in lymph nodes are visualized.

Radiological examination of a colon.

The basic research technique of a colon should be an irrigoscopy - examination of a colon with preliminary injection of contrast cloud through a rectum.

Examination of a colon after reception of the baric cloud per os should be applied only to study of a function status of its (bleeding), and also at targeted examination of a terminal department of a small bowel together with blind (an ileocecal angle). Data received at this examination should be supplemented and acknowledged by an irrigoscopy.

Beforehand the proctosigmoidoscope should be lead.

Preparing of patients. Before examination after a dinner, at 18 o'clock to the patient yield 30 g of a castor oil, the patient has not a supper; put 2 cleansing enemas from water alone with an interval at 1 o'clock in the evening. In the morning in day of examination to the patient 2 hours prior to it put two cleansing enemas with an interval in 30 min.

Contrast agents. Cloud of barium is plotted at the rate of 1 part of fixed white on 4 parts of

water with adding Tanninum of 4,0 g on 1 litre a contrast agent. For filling direct and colonic intestines routinely there is a sufficient 600-800 ml of a contrast agent.

Procedure of examination. The enema with barium is introduced gradually under monitoring of the screen while the contrast mass will not reach a caecum and will not fill in it. Under the screen research the dimensions, positions of loops, a status of contours, progression of contrast mass. Suspicious fields (modifications) should be fixed on aiming X-ray film and all colon one survey snapshot on a film 30 × 40 cm is made, and the first investigation phase is considered concluded.

The second stage - examination of a land forms mucous will be carried out after bleeding an intestine. Under monitoring of the screen by a dosed compression tucks mucous each department of a colon (aiming snapshots of suspicious fields are obligatory) are studied. Terminating methodical reception is examination by a double contrast study that is rather important at suspicion on a neoplasm. Under monitoring of the screen will carry out an inflate of a colon; modified and suspicious fields are subject to radiography (aiming snapshots), and last diagnostic reception is the survey snapshot on a film 30 × 40 cm of all loops of an intestine in a status of a double contrast study.

Now the opaque enema with a double contrast study without hard stuffing is recommended.

Contraindications to an irrigoscopy:

- Toxic dilating an intestine;
- Suspicion on perforation;
- The penetrating biopsy effected within last week before examination (the surface biopsy of a mucosa is not contraindication).

Padding contraindications to an opaque enema with a double contrast study:

- A coliform obstruction;
- A heavy acute colitis;
- Engineering difficulties (slow-moving the patient).

Singularity of a shadow pattern of a colonic haustra. The vertical mucosal fold of the colon are the haustra.

In a rectum contours, as a rule, smooth. The breadth of a lumen is more on the right. On a pattern of a haustration judge tone of a colon. At boosted tone haustra high, fine-bored and often. At the under tone the intestine is represented more broad, rounded, the haustration feebly marked, hardly appreciable.

Radiology indications of diseases of a colon.

The cancer of a colon shows: defect of stuffing (boundary or central), abnormal rearrangement of a land forms of a mucosa and defect on a land forms, narrowing of an intestine, an irregularity of contours (alike applecore), dilating of an intestine is higher and fragment below the tumor swelling. Ultrasonic and CT play the leading part in derivation of a cancer of a colon from infestation of it from the outside at a cancer of bile and urinary bladder, a prostate gland and female generative organs.

Diverticulosis of a colon - local augmentation of a shade of the spherical form. Routinely multiple. Can be complicated an inflammation, a bleeding, perforation. By means of ultrasonic the dwarfed wall of an intestine, abscesses, fistulas are visualized. CT visualizes a thickening of a wall (more often, than ultrasonic), an infiltration surrounding the diverticulosis of grease, perienteric abscesses, fistulas.

Nonspecific ulcerous colitis. More often the rectum, the left-hand half of colon is striked and sometimes there is a total lesion.

Principal radiological indications: tucks dwarfed, have an improper direction, an illegibility of contours of an intestine, a honeycomb drawing of a mucosa, alternating of able-bodied fields of a land forms with ulceration, creating a pattern of " a testa of a turtle ".

Tuberculosis of a colon. Favourite localization is the ileocecal range. Arises for the second time as a result of lymphogenous and hematogenous diffusion at a pulmonary tuberculosis. Localization in a terminal department of an ileal intestine and in proximal departments of a colon is characteristic. Breaking of tone as atonic and spasmodic modifications, abnormal a land forms mucous on the considerable stretch that distinguishes it from tumoral abnormal a malignant land forms. Key factors of difference of this process from tumoral is his its typical localization with recruitment phenomenon of a terminal department of an ileal intestine, presence of a pulmonary tuberculosis.

X-ray inspections at acute belly catastrophes.

Radiological indications of a perforated stomach ulcer:

- A clump of gas in a belly lumen (pnevmoperitoneum – chest and abdominal films shows air beneath the diafragm);
- High stand of the left-hand calotte of a diaphragm and limitation of its motility;
- In some clocks indications paralytic bowel obstruction, the bound with begin peritonitis: appearances of the expressed meteorism, and sometimes and presence of separate gas bladders with horizontal fluid levels.

Acute coliform obstruction: on a survey snapshot of an abdomen the great many of gas bladders with horizontal fluid level is discovered. More distantly places of obstruction of a loop of an intestine are in a slept status and do not contain some gas and fluid. This indication allows to distinguish a mechanical obstruction of an intestine from dynamic. At a dynamic obstruction the peristalsis of an intestine also is not watched.

Radologycal examination of a liver and bile ducts

Primary method of visualization - ultrasonic.

Ultrasonic investigation of a liver and bile ducts

Observations to ultrasonic of a liver:

1. A hepatomegalia - with the purpose of definition of the dimension, the form, frame of a parenchyma, a status of intrahepatic pots and clearing up of the cause of this pathology.
2. Chronic diffuse diseases - with the purpose of clearing up of volume of a lesion, and also identification of species of disease.
3. Suspicion on a tumor of a liver - demonstrating of breaking of the form of a liver and it structure, definition of precise localization of a tumor for carrying out of a puncture is possible.
4. Suspicion on a cyst – non-ehoes formation with fine sleek walls, hyper-ehoes a track, definition of precise localization of a cyst.
5. Jaundice - clearing up of the nature of disease, visualization of amplate bile ducts, bile bladder, a determination of pathological modifications in a pancreas, in a parenchyma of a liver is possible.
6. The trauma and posttraumatic statuses - is possible visualization of a place of a clump of a blood; a rating of a status of posttraumatic cicatrice, and also volume of damage of a liver.
7. Non-compensate the heart diseases producing an overload of its dextral departments - with the purpose of clearing up of an extent of injury of a parenchyma and a rating of a status of hepatic veins.
8. An acute and chronic cholecystitis.
9. A cloelithiasis (the stones into bile ducts).
10. A cancer of bile bladder and bile ducts.

As a whole, clinical indications of a possible lesion of a liver and bile ducts are the observation to ultrasonic.

Preparing for carrying out of ultrasonic of a liver: a three-day diet and reception of the pharmaceuticals moderating a meteorism. If at the patient constipations one day prior to

examination it is necessary to give in the evening purging or to make a cleansing enema.

Ultrasonic criteria of a normality of a liver are:

1. A legible contour of borders of a liver.
2. A homogeneous parenchyma with low amplitude sonar echoes.
3. Visualization of a portal vein with its branchings II and III of the order, hepatic veins and their lockin in inferior vena cava.
4. In norm intrahepatic bile ducts are not visible, as well as intrahepatic branches of a hepatic arteria.

The height of a dextral hepatic lobe by 5 years - 4 cm, by 12 years - is doubled, by 15 years - 10 cm.

Ultrasonic of bile bladder determines: 1) a position; 2) the form; 3) a status of walls; 4) contents; 5) function of bile bladder. Bile bladder in norm contents, wall thickness has of 2-3 mm, the average dimensions: a length - 7-10 cm (it is less than 13 cm), a diameter - 3 cm (it is less than 4 cm). On an empty stomach bile bladder rarely exceeds the dimensions 4×10 cm.

Visualization of shallow bile ducts inside a liver is an indication of pathological process. At 95 % of patients the diameter of a normal common bile duct compounds 0,4 cm and less.

Computer tomography of a abdomen and retroperitoneal space.

Observations:

I.1. A trauma of an abdomen with suspicion on damage of an internals (a liver, a lien, a kidney).

2. Focal and diffuse diseases of a liver:

- a) Cysts of a liver (inborn and parasitogenic);
- b) Primary tumors of a liver;
- c) Metastasises;
- d) Abscesses of a liver (a various etiology);
- e) A cirrhosis of a liver;
- f) Fatty a dystrophia.

II. 4. Diseases of bile bladder:

- a) An acute cholecystitis (an empyema of bile bladder);
- b) Suspicion on a chronic calculous cholecystitis at the dead bile bladder and doubtful data of ultrasonic and a cholecystography;
- c) A cancer of bile bladder;
- d) A choledocholithiasis;
- e) A hemobilia.

III. 5. A mechanical icterus.

6. Diseases of a lien:

- a) tumors of a lien;
- b) Cysts of a lien;
- c) Infarcts of a lien;
- d) An abscess of a lien;
- e) A metastasis in a lien.

IV.7. Diseases of a pancreas:

- a) An acute pancreatitis (pancreatonecrosis);
- b) A cyst of a pancreas;
- b) A chronic pancreatitis;
- r) Tumors of a pancreas.

In norm the liver has smooth legible contours on a tomogram. Its lobes separate among themselves by cuttings well differ. Frame of a parenchyma homogeneous. Visibility of intrahepatic vessels depends on an interrelation of their denseness to space vehicle of a liver: at normal values of space vehicle of a liver they clearly are traced as the oval and prolated formations.

Bile bladder is in most cases well seen on tomograms as spherical or oval a field (space vehicle = $+ 10 \pm 10$ unities) with the smooth and legible contours, posed inside the plotting of a dextral hepatic lobe or near to it. The breadth of bile bladder changes from 3 up to 5 cm.

Intrahepatic bile ducts a diameter of 1-2 mm with the help of this method to fix it is not possible. A common bile duct without injection of contrast tools are visible changeably, after application of contrast agents are determined.

Bile ducts on a tomogram in norm are not visible; amplate ducts owing to low density clearly are differentiated on sections without usage staining. CT allows to judge not only the dimensions and the form of a liver, but also about a locating of the next members, that in some cases it is necessary for correct interpreting the data received at usage of other methods.

Cholecystography. Bile ducts on routine snapshots do not yield the plotting. Apply synthetic staining bile. The contrast agent accept inside in an amount of 3-6 g. Use Bilitrastum etc. A drug accept fractional portions during 20 mines and wash down with alkaline water or sweet it is expected. Further going completely it is excluded, but the drinking of mineral water and sweet tea is authorized. The fluoroscopy and radiography in 13-14 clocks after reception contrast tools will be carried out. Bile bladder to the right of centerline of a gaste: length 5-8 cm, and a diameter 2,5-3,5 cm. Contours legible, arched, the shade is intensive and homogeneous. At presence of a shade: yield 2-3 egg yolks in milk and in 1,5 hours make a repetitive snapshot. In norm bleeding of bile bladder through 5-15 min. $\approx 48\%$, in 1,5 hours $\approx 68\%$.

Observations: a cloelithiasis, a dyskinesia of bile bladder. Contraindications: an idiosyncrasy to iodide drugs, a thyrotoxicosis, a cardiovascular decompensation, renal and hepatic failure.

Cholegraphy. Hepatotropic iodine consist a contrast agent introduce intravenously. Use Bilignostum, Biligrafinum and . Directly ahead of examination introduce intravenously 1 - 2 ml of Bilignostum. At lack of a response within 2-3 minutes there and then, not taking out a needle from a vein, very sluggishly introduce all required amount of a drug 30-40 ml of 20 % of solution of Bilignostum. In 10-15 minutes after injection bile ducts (a common bile duct, hepatic and gallbladder ducts and their branchings) are contrasted. Through 50 - 60 minutes the shade of bile ducts becomes less intensive, and then peters. At the same time the shade of bile bladder gradually will increase and reaches maximal intensity in 1,5-2 hours after injection of Bilignostum. Observations: a peaking of a chronic cholecystitis, a cloelithiasis, a status after a cholecystectomy, negative takes of a cholecystography.

Contraindications: an idiosyncrasy to iodine, heavy diseases of a liver, kidney, a thyroid gland; a decompensation of cardiac activity.

The role of a cholecystography and cholegraphy was essentially moderated in connection with development of other methods of visualization, first of all - ultrasonic. A cholecystography and a cholegraphy will carry out only when outcomes ultrasonic are doubtful.

Endoscope pancreatic-cholangiography(EPC) - fulfill by catheter major papilla of duodenum with the subsequent injection in bile ducts of the water-soluble with iodine a contrast agent. The procedure allows to estimate a status of a duodenal papilla, and also to execute staining bile ducts and a pancreat duct and its branches. Observations: the differential diagnosis of mechanical and hepatic icteruses. Contraindication: an intolerance of iodide drugs, breaking of a coagulating system of a blood, an acute pancreatitis, an acute cholangitis and a cholecystitis, a common heavy status of the patient, contraindication to injection of an endoscope.

Percutaneous transhepatic cholangiography (PTC) - indications: the differential diagnosis of mechanical and hepatic icteruses, an improvement of localization, the nature and character of occlusion of bile ducts.

Contraindications: an intolerance of iodide drugs, a hemorrhagic diathesis, sharp breaking of a coagulating system of a blood, spread echinococcus or a polycystosis of a liver. As a contrast agent apply 50 % solution of Hypaque. Complications: bleedings, the outflow of bile in a abdominal

cavity, a shock.

PTC it is necessary to do only at a possibility of realization of an urgent laparotomy.

Operational cholangiography - at this method a contrast agent introduce directly into bile ducts during operation. Indications: stones in bile ducts or suspicion on them, dilating bile ducts, augmentation of the head of a pancreas. Contraindications: absolute is not present, relative - an acute cholangitis.

On cholegraphy a breadth of a shade of a normal common bile duct no more than 0,7 cm, on cholangiograms a normal common bile duct can reach 1,5 cm.

Angiography. For study of a blood-groove and a status of the blood vessels stocking a liver, the greatest diffusion the selective catheterization of a truncus coeliacus (arteriography). Thus analysis the image of arteriography is grounded on study of three serial phases: arterial, parenchymatous and venous. Under received data diagnostics of a lesion of a vascular system of a liver and breaking of its hemodynamics can be lead, and also malformations of a liver are recognized and character of focal lesions is improved.

Radionuclid methods of visualization of a liver. The study of a function status of polygonal cells of a liver is possible at a *dynamic scintigraphy*. At dynamic scintigraphy with usage of the hepatotropic derivants imidodiacetic acid - marked ^{99m}Tc . It is provided definition of the parameters describing secretory and excretory functions of a liver, permeability of bile ducts, accumulative and motorial functions of gallbladder, the basic anatomical parameters (a position, the form, the dimensions) a liver, gallbladder and intestines.

Indicated imidodiacetic acid - marked ^{99m}Tc contact proteins of plasma, and in subsequent are absorbed by hepatocytes where are liberated from connection with protein, are transported to a bile pole of a hepatocyte and are output with bile. Orderly and legible temporal connection of all parameters of migration imidodiacetic acid - marked ^{99m}Tc in an organism allows to count parameters of their accumulation in a liver and deduction by criteria of a rating of function of hepatocytes and statuses of permeability of bile ducts.

A series of scintigrams allows to estimate visually absorption and excretory functions of a liver, time and a degree staining gallbladder, motorial function of gallbladder, permeability of bile ducts, some anatomy-topographical singularities of a liver and gallbladder. Noted information replicate on the display of the computer and from a common pattern excrete four zones of interest: heart, a liver, gallbladder, a small bowel. After a choice of these zones effect an integration of the information and plotting activity - time from the chosen zones of interest.

The mechanical icterus invokes substantial growth of time of maximal accumulation of a drug in a liver, the clearance of a blood does not vary almost, the drug practically is not output in a small bowel.

The parenchymatous icterus is escorted by sharp breaking of a function status of a liver with the most typical drop of parameters of a clearance of a blood and retardation of clearing of a liver from an injected drug.

Concentration function of gallbladder is calculated under the attitude of a velocity of the account in zone gallbladder to a velocity of the account in zone a liver.

Static scintigraphy of a liver. The basic diagnostic problems of a static scintigraphy of a liver are:

- Anatomical singularities of a member (the dimension, the form, a position concerning other anatomical frames);
- Character of a lesion (diffuse, focal);
- Gravity of a lesion and presence of a set of symptoms of a portal hypertension (an acute and chronic hepatitis, a cirrhosis of a liver, etc.)
- A prevalence of a focal lesion of a liver.

Adequate solutions of the indicated problems are carried out methods of a scintigraphy with

usage of the radioactive colloidal drugs marked ^{198}Au , $^{99\text{m}}\text{Tc}$, $^{113\text{m}}\text{In}$ in which, framing high concentration in a liver.

Colloid particles a long time are delayed in a system of mononuclear phagocytes of a liver therefore it is possible to conduct repetitive examination in various regimes and projections. At a cirrhosis of a liver examination with radiocolloids is yielded with padding informations about a status of a lien.

Principle of analysis of the received information at a static scintigraphy of a liver. Estimate a position, the form, the dimensions of the plotting of a liver and a lien, staining and a degree of accumulation colloid, character of contours and presence of typical cuttings, character of allocation colloid, presence of the locuses of lack of allocation of the radiogauge, a degree extra liver accumulations of radioactive nuclide.

Scintigraphy image of a liver. The plotting of a liver in a front projection looks like a delta circuit, versed the establishment to a lumen of a gaste. Contours of a member legible also are traced on all stretch, the box of bile bladder, edge of a rib arc, a right kidney (in a back projection) can be determined hollow a contour of a liver in range of heart, a coronal sheaf of a liver.

Use relative metrical magnitudes. Among them the attitude of maximal heights of the left-hand and dextral lobes (in norm no more than 20 %). It is necessary to underline, that the edge of the plotting of a liver can be visualized on half-clavicle lines on 0,5-2 cm, on a line of a xiphoid process on 2-4 cm of below labeled rib arc. The plotting of a lien in a direct projection is always taped on a scintigram. Accumulation of radiocolloid by a lien at gauging in a front projection does not exceed 4-5 % concerning a common radioactivity of a liver and a lien. The osteal brain in norm is not visualized.

The scintigraphy of a liver yields to other methods of visualization in diagnostics of focal lesions of a liver (the locuses of a lesion in the dimension not less than 3 cm are taped).

Indications of a local drop or lack of accumulation of radiocolloid are characteristic. In some cases more informatively, than other methods of visualization (for example, malignant lymphatic system diseases).

Thus, radionuclid examination liver and bile ducts yields very important diagnostic information on a function and anatomical-topographical status of a liver, intrahepatic bile ducts, bile bladder, common bile duct.

MRI. Possibilities MRI are similar with CT, but at MRI receive the plotting in all planes, it is possible to receive the plotting of vessels of a liver (MR - an angiography), bile ducts and pancreatic ducts (MR - a cholangiography).

Radiological indications of diseases of a liver.

Hepatitis. Typically for heavy events of acute hepatitis a drop echo signal a liver, elements of a portal vein on this background are visible more brightly, the hepatomegalia is determined. At chronic hepatitis echo it boosted more often.

As a rule, at diffuse lesions of a liver more than diagnostic possibilities, in comparison with other methods of visualization, at radionuclid technologies. At acute hepatitis and sometimes a unique indication the hepatomegalia wearing even character is basic.

The chronic hepatitis - allocation of radiocolloid at 50-60 % of patients has irregular character, one of which indications is shift of range of maximal accumulation radiocolloid from the center of a dextral lobe. At 50-60 % of patients the dimensions of a lien increase, will increase accumulation in it of radiocolloid (10-15 %), and at a chronic fissile hepatitis in 30 % of events accumulation radiocolloid exceeds 15 %.

Irrespective of the causes of breaking of a circulation and build-up of pressure in a system of a portal vein scintigraphy exhibiting of it undirectionals enough and characterized by a jumboizing of a lien with a raise of seizure of a lien more than 15 %. The role of visualization (ultrasonic and radionuclid methods) at diffuse lesions of a liver is routinely limited to acknowledgement of a

hepatomegalia or shrinkage of a member. At hepatitises of them use in the differential - diagnostic purposes, for a discernment of complications, for more objective rating of dynamics of the dimensions of a liver at an acute fulminating hepatitis (it is important for the prognosis); in diagnostics of a cirrhosis of a liver - for an improvement of a splenomegaly and indications of a portal hypertension.

Cirrhosis of a liver. Ultrasonic taps a modification of the dimensions of a liver at a cirrhosis, an irregularity of contours of a member, a raise and a heterogeneity echoes a liver, augmentation of a lien, dilating of a portal vein (norm - less than 1,5 cm), a splenic vein (norm - less than 1,0 cm), an ascites. It is necessary to mark high performance of ultrasonic at diagnostics of an ascites. A minimum quantity of fluid which is possible to spot ultrasonic - 50 mm. In this respect ultrasonic yields laparoscopies only a little.

At a static scintigraphy in the beginning modifications a little than differ from a chronic hepatitis. In process of a drop of a blood-groove the image contrast drops, there is a heterogeneity of allocation radiocolloid. Extra-liver seizure radiocolloid shows high accumulation by its lien (up to 40-50 %) and an osteal brain. CT and MRI tap the locuses of neogenesis and a cirrhosis in a liver, dilating of portal and splenic veins, an exudate in An abdominal cavity. The X-ray inspection of an esophagus detecting a varicose phlebectasia of an esophagus.

The cancer of a liver is diagnosticated on the establishment of filing of a modification echoes hepatic parenchyma, the form and the dimensions. Tumoral clusters can be solitary or multiple. At CT the drop of a denseness in the cancer of a liver registers, at MRI-a modification of intensity of the MR-signal. As a rule, irrespective of a growth form dilating intrahepatic bile ducts is watched. These data receive at ultrasonic, CT and MRI.

Metastatic lesions of a liver at ultrasonic examination can be various echoes, diffuse and focal. Equal echoes metastasises are taped to oblique indications (a strain of a vascular drawing, local protrusions of a contour), reaching the dimensions more than 1-2 cm. General sensitivity of the modern ultrasonic at detection of focal modifications of a liver (60-75 %) justifies application of other methods at negative outcomes. At native CT the locuses in the dimension less than 1 cm, a considerable proportion in their dimension of 1-2 cm, and also larger locuses, equal density a hepatic tissue are not taped. Standard CT infrequently supplements the lead ultrasonic on sensitivity and specificity is skilled. CT taps at metastasises spherical or ungeometrical fields with a low denseness on a background of a parenchyma. Space vehicle of metastasises is various in dependence by nature swellings.

Diffuse lesions of a liver are more difficultly diagnosticated with help CT, than local. In some cases at such modifications has advantage radionuclid diagnostics.

Possibilities of the modern MRI at diagnostics of metastasises in a liver are comparable with CT.

Cysts of a liver. At ultrasonic of a cyst are discovered as spherical non-echoes formations. They have legible, sleek contours and high intensifying echoes behind a cyst. CT and MRI determine a cyst as fluid formation with legible contours.

Abscess of a liver. At ultrasonic the abscess of a liver shows low- or non-echoes zone with rough contours, ultrasonic intensifying behind an abscess is changeably discovered. The liver around of an abscess can be low-echoes. CT shows a smaller drop of a denseness at an abscess in comparison with a cyst.

Radiological indications of diseases of gallbladder and bile ducts

Tactics of visualization at illnesses of gallbladder and bile ducts

Acute cholecystitis. Ultrasound indications of an acute cholecystitis:

- An irregular thickening of a wall of bladder (more than 3 mm) with its inhomogeneity, lamination and sometimes indistinct restrict from a liver due to an edema and an infiltration of perivesical cellulose;

- Precise correspondence of the morbidity invoked by pressure of the sensor, to the location of bladder (Murphy sign).

However these data of ultrasonic are insufficiently specific.

CT it is shown at complications, if ultrasonic insufficiently informatively. Better, than on radiography or at ultrasonic, blisters of gas in a lumen and in a wall of gallbladder are determined at a cholecystitis and perivesical modifications.

Chronic cholecystitis. Ultrasound indications of a chronic cholecystitis:

- The thickening of a wall non-specificly also can be interpreted for the benefit of a chronic cholecystitis only in light of anamnestic indicatings.
- Shrinkage of bladder, rasping cicatrical modifications.
- Breaking bleeding bile bladder.

Cloelithiasis. The chronic cholecystitis non-stone meets rarely, much more often there is a calculous cholecystitis.

Primary method of visualization - ultrasonic. One of advantages of ultrasonic - a possibility to variate a position of the patient that promotes a discernment of stones. Sensitivity of ultrasonic - 95-99 %. The stone on a sonogram looks as high-echoes formation with a ultrasonic shade behind it (a ultrasonic track).

The causes of false-negative outcomes of ultrasonic:

- Shallow stones in nick of bladder;
- A penetrating locating of a stone behind a rib arc;

The CT can help with these events.

At not informative ultrasonic, apostatises of its outcomes with clinical data and at scheduled nonsurgical treatment it is shown CT. Expediently to use CT at stones of gallbladder as a sampling procedure of patients for nonsurgical treatment. The last is excluded in events of a continuous calcification of stones. Their oxygen solubility is better at a ring-shaped or composite calcification.

Cancer of gallbladder. A tentative method of ultrasonic. If the cancer is suspected, is shown CT. A pattern of early forms of a cancer non-specificly. The tumoral thickening of a wall of gallbladder is difficult for differentiating from a cholecystitis. The major tumors substituting gallbladder and burgeoning in portal fissures and in its tissue (50 % of tumors of bladder) will better be recognized. It is similar can to look and other malignant tumors of this region.

Cholangiocarcinoma. A routine radiological indication of a cholangiocarcinoma is dilating bile ducts above a level of a tumoral lesion, bile bladder increases, the mechanical icterus educes. That is determined at ultrasonic, CT, MRI.

Visualization plays the leading part in diagnostics of a mechanical icterus. Its problems - to establish presence of obstruction, a level of an expansion and the cause. A primary method - ultrasonic, defining dilating of bile ducts as distinctive feature of a mechanical icterus. In the acute term dilating of ducts has not time to be advanced (if parameters of a bilirubin force to suspect a mechanical icterus, repetitive ultrasonic, a cholangiography). CT with intensifying allows to recognize better, than on ultrasonic, dilating of intrahepatic ducts, and the intrapancreatic part common bile duct is better visualized. CT exceeds ultrasonic at distant obstruction common bile duct. Limitation CT: gallstones are not visualized identical on a denseness with bile. A CT-cholangiography - a method providing the plotting (on the basis of spiral CT) all staining a bile arbor as opposed to fragmented on separate layers at routine KT. Comes nearer by the possibilities to percutaneous transhepatic cholangiography (PTC), endoscope pancreatic cholangiography (EPC), allowing to visualize the majority of stones in bile ducts and, as a rule, to acknowledge or exclude obstruction of bile duct.

The greatest attention attracts MR imaging of bile ducts and pancreatic duct, providing the excellent plotting of all bile arbor and in 80-90 % of events - a pancreatic duct and its leading

branches without injection contrast agents. MR imaging of bile ducts and pancreatic duct will take a place between ultrasonic and a direct cholangiography. Advantage before a direct cholangiography - visualization of ducts on both sides from a place of obstruction.

Alternating, or incomplete obstruction of ducts (cholelithiasis), will better be recognized at a direct cholangiography and at dynamic scintigraphy with ^{99m}Tc -labeled imidodiacetic acid. .

The best methods of a discernment of narrowings of bile ducts is a direct cholangiography: endoscope pancreatic-cholangiography (EPC) and percutaneous transhepatic cholangiography (PTC).

Observations to a direct cholangiography:

- acritical data of ultrasonic and CT; however as against these methods modifications outside of a lumen of ducts are not visualized;
- differential diagnostics of obstructions with steep breakage of a duct and not visualized at ultrasonic and CT a tumor or a stone.

Radiology examinations of a pancreas. Examinations of a pancreas routinely start with ultrasonic, however CT has advantage. The angiography is applied in events if are negative or doubtful CT outcomes for an improvement of character of an operative measure, differential diagnostics of tumors of a pancreas. The radiography and fluoroscopy are applied rarely since there are more informative methods of radial diagnostics. Radionuclid methods of visualization are poorly informative. MRI at examination of a pancreas has restricted application, its role is improved.

Ultrasonic of a pancreas. Examination will be carried out by morning (morning less than the swallowed gas, accordingly, less and gas in an intestine, hindering ultrasonic). The tissue of a pancreas has homogeneous echoes. Echoes as in a liver or is a little bit higher. A duct of pancreas in norm a breadth no more than 1,5-3 mm. Average depth of a pancreas at adults (the front-back dimension) - the head of 2,5-3,5 cm; skew fields - 1,75-2,5 cm; a tail 1,5-3,0 cm. At children depth: in 3 years of the head of-8 mm; skew fields - 5 mm; a tail - 5 mm; in 13 years: the head of-2 cm; a skew field - 1,5 cm; a tail - 1,5 cm.

The regional permission of ultrasonic at focal lesions of a pancreas - 1 cm.

CT. Advantage CT before ultrasonic in the best resolving power - 3-4 mm. Besides CT can, as against ultrasonic, visualize a pancreas at a meteorism. CT also visualizes frames enviroing a pancreas better.

Endoscope pancreatic-cholangiography (EPC). The procedure allows to estimate a status of a pancreatic duct and its branches. Observations: a solution of a problem on a possibility of an operative measure at a cancer of a pancreas, connection of pancreatic ducts with cyst like formations.

Radiology indications of diseases of a pancreas.

Acute pancreatitis. In mild events at ultrasonic the pancreas can look normal. In heavier events the edema of a member and the bound with it a jumboizing and a drop echoes is determined. The duct of pancreas can be amplate. Will be defined fluid at originating an abscess, a necrosis, express edexudative.

CT it is carry out patients from not informative ultrasonic because of an inflation of an intestine, which frequently escorts with an acute pancreatitis (up to 1/4 patients), the patient with a clinical pattern, suspicious on the necrotic or complicated pancreatitis.

Before carrying out CT with staining it is necessary to remove a dehydration to prevent damage of nephroses by a contrast agent.

Advantage CT with staining before ultrasonic:

- the necrotic form from hydropic is more precisely differentiated: fields of a necrosis do not strengthen as against a hydropic tissue of pancreas;
- exceeds ultrasonic in a rating tissues around pancreas with diffusions inflammatory hydropic and derivation of clumps of fluid from the phlegmonous infiltrate consisting from hydropic

and necrotic tissues of pancreas and retroperitoneal space;

- massive hemorrhages will more precisely be recognized at anabroses of walls of pots.

In 1/3 events of an acute pancreatitis (the hydropic form) at CT modifications the small jumboizing of a pancreas is not discovered or taped only.

CT with intravenous staining can acknowledge suspected on a clinical pattern or under data of ultrasonic an abscess, demonstrating the ring of contrast intensifying environing it. But is the most exact to infect and to abscess it is positioned by means of a puncture with an aspiration under monitoring of ultrasonic or CT.

MRI also it is exact in a discernment of a pancreatonecrosis and can serve alternative CT with staining.

Chronic pancreatitis. The calcareous infiltration of a pancreas is frequently discovered at radiography. At ultrasonic in incipient states of disease the pancreas can be not modified or enlarged, low echoes with dilating a duct. At the fibrous form of a chronic pancreatitis the dimensions are moderated, there is the reinforced and inhomogeneous echoes of tissues of a pancreas. The pancreatic duct can have fields of dilatings and narrowings because of stenoses. Concrements the giving locuses with high echoes with distant ultrasonic weakening are discovered. CT improves morphology lesions, especially one of the most important signs - calcifications in pancreas.

Cancer of a pancreas. Ultrasonic allows to recognize the majority of swellings of the head and environmental departments of a skew field of pancreas and their action on pancreatic and common bile ducts; less informatively at a cancer of a tail and a caudal department of a skew field and it is not enough for definition of surgical treatment. The most often indication of a cancer of a pancreas - augmentation of its departments. In 70 % of events the tumor is localized in range of the head of a pancreas. Routinely the cancer shows heterogenous echoes. The pancreatic duct extends. The common bile duct extends also at a cancer in range of the head of a pancreas.

Possibilities CT in diagnostics of a cancer of pancreas:

- native CT it is insufficiently sensitive to small tumors;
- a method of a choice - CT with intravenous staining, providing more precise, than ultrasonic, a cancer detection and more reliable rating of its local diffusion;
- diagnostics of a cancer in earlier phase (the resection is possible) has improved dynamic CT with staining at which false-negative outcomes compound only 1-3 %. The image received the different contrast between the intensified parenchyma and low intensified tumor, because it is less blood vessels into a tumor, allow to tap tumor in the dimension up to 1-2 cm and to improve their borders, the pancreatic duct is better visualized.

With CT the modern competes dynamic MRI with staining.