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Local guidelines on topic:

Diagnostic and minimally invasive interventions on endosurgical biliary tract.

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Endoscopic retrograde cholangiopancreatography (ERCPG), though rather widely used for diagnosing diseases of the biliary and pancreatic systems, is a complicated and dangerous enough intervention. During the diagnostic stage of examination (introduction of a contrast substance), in patients with biliary or pancreatic block the conditions for the outflow of the bile and the secret of the pancreatic gland worsen, which can facilitate the development of serious complications (acute pancreatitis, purulent cholangitis, abscessing of pseudocyst etc.).

1. What is endoscopic retrograde cholangiopancreatography?

2. What are the indications for endoscopic retrograde cholangiopancreatography?

In this connection, as a rule, the second stage of intervention is the liquidation of block, the restoration of the adequate outflow of the bile and secrete of the pancreatic gland, draining the ductal system.

So, the simple contrasting of the biliary and pancreatic ducts, in the absence of conditions for the subsequent performance of the endoscopic operation measure, is inacceptable as of today. At the modern stage, they much more often use the isolated contrast investigation of the biliary system, that is endoscopic retrograde cholangiography (ERCG). In the connection with the high risk of the development of serious complications, endoscopic retrograde cholangiopancreatography (ERCPG) and endoscopic retrograde pancreatography (ERPG) are used extremely rarely.

The indications for ERCPG:

1) obturative jaundice (hyperbilirubinemia);

2) increase of the activeness of the enzymes cholestasis: alkaline phosphatase and gamma-glutamiltransferase;

3) increase of the activeness of transminases and, first of all, ALAT(alanineaminotransferase) **,** in combination with at least one of the indications mentioned in pp. 1,2,4,5,6,7,8,9;

4) extension of hepaticocholedochus by more than 8 mm (intraoperationally, or after the results of USI);

5) biliary calculi;

6) biliary pancreatitis;

7) papillostenosis;

8) acute cholangitis;

9) suspicion for iatrogenic injury, cicatricial or tumorous injury of the bile ducts for defining the area and length of injury, as well as the state of the upper parts.

Taking into account the invasiveness of investigation, the possibility of development, though of not a large number, but rather serious complications, the definition of the clear infications for the performance of contrasting the duct system influence significantly the results of intervention. Analysing the complication of ERCPG, the absolute majority of researches name the absence or

unclearness of indications as the main reason for failures. In dubious evidence and the absence of clinical necessity, the situation must be resolved in favour of refusal from the urgent performance of ERCPG, dynamic observation and application of other methods of the patient's examination.

Contraindications for ERCPG present a rather complicated question, and the experts' opinions are very controversial. In the opinion of most researches, there must be an individual approach. The main thing to be remembered is that the risk of performing this investigation must be dictated by a clinical situation and not exceed its diagnostic value.

To the general contraindications they refer cardiac and breathing (pulmonary) failure. Taking into account the possibility of a prolonged intervention with the application of HF (high frequency currents), a contraindication is also the presence of a cardiostimulator in the patient.

It is necessary to focus on the possibility of the application of ERCPG in acute pancreatitis in which this investigation was earlier considered to be a contraindication.

First, it is not always at all that one manages to conduct differentiation diagnostics between biliary and non-biliary pancreatitis on the basis of clinico-laboratory and instrumental methods of investigation.

Second, ERCPG possesses wide therapeutic capacities, in particular, in acute pancreatitis conditioned by choledocholithiasis or papillostenosis.

Third, with the help of the deep cannulation of the common biliary duct one appears to be able to close the site of the entering of the wirsung duct and prevent the getting of the contrast substance to the pancreas. However, it has been stated that inevitable in a number of cases the x-ray preparation's getting to the wirsung duct does not lead to so dangerous consequences as it had been supposed before.

3. What kind of difficulties appear in operation on patients, who underwent the resection of the stomach, after Bilrot II?

One should carefully use ERCPG in the patients with pseudocysts of the pancreas, as there is the danger of their infecting in the introduction of the contrast substance.

Certain technical difficulties can appear in the patients who underwent the resection of the stomach after Bilrot-II. A lung loop which adducts does not always allow to overcome the distance from the site of anostomosis to the greater papilla of the duodenum (the length of the apparatus is not sufficient).This loop can leave under an acute angle which also complicates the advancement of the apparatuses. Difficulties also appear in connection with the fact that in the patients who underwent the operation, the duodenal papilla during examination approaches from the back and the visual pattern seems to become transparent. That is why one only manages to perform ERCPG in 50% of the patients who underwent the resection of the stomach

after Bilrot-II. The investigation can be made more difficult by the large juxtapapillary diverticula of the duodenum which are revealed in 10-26%vo the patients.

Alongside the enumerated, the reasons for failures of ERCPG can be: the anatomical changes of the duodenum and greater papilla of the duodenum (in 9% of patients), the impossibility of putting the greater papilla in a convenient position (in 3-4%), the insufficient preparation of patients (in 4-5%). Generally, one does not manage to cannulate and contrast hepaticocholedochus in 4-22% of patients. The decisive significance in the increase of the effectiveness of ERCPG can have the thorough training of doctors and accumulating experience by them.

4. Describe the technique of duedenoscopy.

Preparation and premedication.

The performance of ERCPG must be considered as the stage of an endoscopic transpapillary operation that is why preparation and premedication must provide psychoemotional comfort, adequate anesthesia, moderate sedation, selective relaxation of the sphincters of the greater papilla of the duodenum, temporary inhibition of peristalsis and secretion, prophylaxis of possible complications.

First of all, the ability to tolerate preparations of iodine. It is also necessary to test the tolerance to preparations containing iodine: on the eve of investigation a drop of a preparation containing iodine is put under the patient's tongue (Lugol's solutions and other ones). If , despite this, there are still doubts about the tolerance to preparations of iodine, one should introduce corticosteroids, antihistamine preparations before intervention.

To prevent postoperative acute pancreatitis, on the eve and on the day of the operation, a complex of infusive therapy is added by spasmolytics, 5-fluoruracid, antibiotics (cephalosporins of the 3rd generation or phtorchinolones) in combination with derivatives of nitroimidazole (metronidazole, ornidazole), as well as gastrocepine, duspatalin or dicetel, eglonil (sulpiride). Also reasonable is the application of octrestatin, ucretide, sandostatin (ocreotide).

20-30 minutes before intervention they introduce intramuscularly promedol, atropine, sibason, dimedrol. Before the introduction of an endoscope it is reasonable to inject 0.5-1 ml of 1% of bezohexonium. If the cannulation of the papilla is difficult during endoscopic intervention a take of nitroglycerine under the tongue. As of now abroad, they widely use propofole in performing endoscopic transpapillary inteventions, which provides more comfortable conditions for the patient and necessary for the doctor. After completing surgical aid during the first 24 hours (minimum), they prescribe starvation, continue spasmolitic, antibacterial, antisecretory and infusive therapy.

Methods of duedenoscopy. Every transpapillary intervention contains the stage of conducting the apparatus to the area of the greater papilla of the duodenum (duodenoscopy), putting the papilla in a convenient for cannulation position, the cannulation of the needed duct system, contrasting, the evaluation of results and defining the subsequent tactics.

The position of the patient on the table in conducting the duodenoscope to the duodenum – on the left side with the left arm behind the back, analogously to the position in performing fibroesophagogastroduodenoscopy. In revealing the papillary area and before cannulation, it is more convenient to turn the patient on the stomach.

The endoscope with lateral location of optics has a rounded distal end, that is why its conducting through the upper esophageal sphincter does not usually cause difficulties. However, conducting such an instrument through the pharynx and upper parts of the esophagus is performed practically blindly. It is important to introduce the apparatus not only along the medial line of the oral cavity and pharynx, one shouldn't press too strongly, it is enough to press softly during a swalling move (the method of blind introduction in fibroesophagogastroduodenoscopy) .

If there are difficulties, it is necessary to take the instrument and perform the examination with the apparatus with a butt-end location of optics. Ideal is the performance of an ordinary diagnostic fibroesophagogastroduodenoscopy before the performance of duodenoscopy. Such an approach allows to diagnose in beforehand the pathology of the upper parts of the gastric channel, to get rid the patient and the doctor of complications, and even to refuse from the performance of duodenoscopy in the presence, for example, of diverticula, stenoses, the big hernia of the esophageal opening of the diaphragm.

Complications

The frequency of complications after ERCG after the compiled data of the literature makes 0.6-2.6%, while mortality achieves 0.1-1%. The specific complications are acute pancreatitis, acute cholecystitis, acute purulent cholangitis, sepsis. After our data, the factors of the risk of acute pancreatitis are (after significance):

1. Traumatic multiple cannulation of the greater papilla of the duodenum connected with the presence of technical difficulties in papilla stenosis and the stenosis of the terminal part of the choledochus.
2. Acinarization.
3. Absence of the aspiration of the contrast substance after ERCG in the delay of evacuation.
4. The time of cannulation over 15 min.
5. The time of endoscopic surgical transpapillary intervention over 15 min.
6. Chronic recurrent pancreatitis.

7. Absence or insufficient volume of the pre- or postoperative medicamentous therapy.
8. Flat or convex form of the greater papilla of the duodenum.
9. Absence of aspiration before the introduction of contrast and dissolution.
10. Atypical papillotomy.
11. Low placement of the greater papilla of the duodenum.
12. Parapapillary.
13. Tumours of the duodenopancreatobiliary area.

The traumatic multiple cannulation of the mouth of the papilla leads to the edema of the mucous membrane, which creates technical difficulties for the performance of subsequent cannulating papillotomy.

Contrasting fine ramifications of wirsung duct (acinarization, parenchymography) testifies to the great number of the introduced contrast substance, more frequently – about the high pressure in its uncontrolled introduction. The mucous membrane of the ducts of the pancreas is not indifferent to the contents and pressure. To avoid parenchymography, the introduction of the contrast substance must be slow, x-ray-controlled, with the volume of nor more than 2 ml.

The absence of aspiration before the introduction of contrast and dissection (aspirational test) creates the danger of the injury of the pancreas and adjacent anatomical structures.

For all the patients, the decisive factor of the risk of acute pancreatitis after endoscopic surgical transpapillary intervention has been acknowledged the absence of clear indications for transpapillary intervention.

The age of the patients under 50 was acknowledged a factor of risk of the development of acute pancreatitis only in combination with the female sex and II-III degree of obesity. At a relatively young age there increases the risk of the development of acute pancreatitis after endoscopic surgical transpapillary intervention. At the early age there decreases the number of acute pancreatitis, which, probably.us connected with the weakening of the exocrine function of the pancreas.

After our data, already in the examination of papillomas and by the peculiarities arising during intervention, one cam often assume the presence or probability of the development of pancreatitis. Thus, wedged concrement, the stenosis of the mouth of the vater papilla, phenomena of papillitis which were obtained during aspiration from the pancreatic duct of turbid viscous secret, in particular with hemorrhagic admixture, testify to the presence of pancreatitis.

It is inacceptable to introduce the contrast substance blindly, under pressure. In the delay of evacuation from the main pancreatic duct over 10 minutes they indicate the aspiration of the

contrast substance out of it and performance of endoscopic papillosphincterotomy with the revision of the mouth of the wirsung duct.

5. What are the risk factors of the development of acute pancreatitis after endoscopic retrograde cholangiopancreatography?

The deep or multiple cannulation of the wirsung duct, pain during intervention, the application of a needle-shaped papillotomy for the preliminary dissection of the mouth of the papilla, the duration of the operation over 40 minutes must be the pretext for prescribing at the early postoperative period of adequate medicamentous therapy aimed at the creation of the complete functional rest of the pancreas.

The factors of the risk of the arising of purulent cholingitis and acute cholecystitis after ERCG (after significance):

1) absence of aspiration after ERCG in the delay of evacuation;
2) absence or insufficient volume of pre- or postoperation medicamentous therapy;
3) multiple and/or large concrements;
4) purulent cholingitis;
5) absence of aspiration before the introduction of contrast and dissolution;
6) the time of endoscopic surgical transpapillary intrervention over 40 minutes;
7) narrow terminal part of the cholechodochus.

The absence of aspiration after ERCG in a delay of evacuation as well as the absence of aspiration from the duct before conducting, creates the conditions for the spreading of the purulent process on the pars of the biliary tree which are located above, and the progressing of cholangitis.

The insufficient volume of medicamentous therapy, the absence of attention to bacteriograms and anaerobic flora also facilitates the progressing of purulent cholangitis.

During the removal of multiple rather large concrements from the choledochus one may not notice fine stones located in the diverticulum-like folds of the mucous membrane of the external biliary ducts**.** Such stones slip out in the revision of the duct and are difficult to reveal in roentgenograms, but are the cause of the violation of the bile which facilitates the progressing of cholangitis.

6. What is the development of acute cholecystitis during endoscopic retrograde cholangiopancreatography conditioned by?

7. What must prophylactic measures consider to prevent the development of acute cholecystitis?

The development of acute cholecystitisis most likely conditioned by the displacement of fine concrements in the lumen of the gallbladder in its contrasting during ERCG, disturbance of

the hydrodynamcis of the bile after endoscopic retrograde cholangiography, development of the obturation of the duct of the bladder after or the cervix of the gallbladder with the concrement with the subsequent acitivization of pathogenic microflora. Besides, the development of acute cholecystitis after ERCG facilitate the increase of pressure in the gallbladder, hyperosmolar influence of the contrast substance on its mucous membrane.

Prophylactic measures must consider technical peculiarities of intervention, contain early sonographic monitoring and complex medicamentous therapy after operation: antisecretory preparations, cytostatics, antibacterial preparations of a wide spectrum of action, in particular, those which inhibit anaerobic flora, selective papillodilatators, antiedematous and antiinflammatory preparations. Disregarding of the general state, after intervetions, the patients must be watched by the surgeon on duty or an endoscopist analogously to the patients who underwent a serious operation on the organs of the abdominal cavity.

ENDOSCOPIC PAPILLOSPHINCEROTOMY AND PAPILLODILATATION

Endoscopic papillosphincterotomy is performed with the help of a standard duodenoscope with lateral optics, appropriate ***papillotomes*** and an electrosurgical high-frequency apparatus. The majority of experts give priority to the standard apparatus of electrosurgical high-frequency which admits the application of the regime of cutting (CUT), coagulation (COAG) and mixed (BLEND) regime of high frequency current. It is necessary to perform regular technical service of the aelectrosurgical high frequency apparatus and its aids.

Indications. As of today, one can formulate the following indications for the performance of endoscopic papillosphincterotomy:

1. Stones of extrahepatic biliary ducts.
2. Papilla stenosis.
3. Acute and chronic biliary pancreatitis with duct hypertension against the background of papillitis, the stenosis of the mouth of the papilla **or impaction of the concrement. into the ampulla of the greater papilla of the duodenum?**
4. 'The syndrome of a blind sac' after choledochodeudeno- or choledochojejunostomy.
5. Tumours of duodenopancreatobiliary area with duct obstruction.

Contraindications for endoscopic papillosphincterotomy are divided into general and local. To the general contrarindications they refer long-lasting (over 7-10X24 hours) high hyperbilirubinemia (over 150 mc mol/l), which is dangerous because of coagulopathic hemorrhage during dissection. In such situations, at the first stage of treatment priority should be given to the external (percutanously) draining of the biliary system under the control of ultrasound.

Besides, to the general cotraindications belong:

- clinical situations in which the risk of performing an endoscopic operation exceeds the risk of the progressing of disease and the development of complications;
- somatic diseases and critical states in which intervention can be fatal.

Nonetheless, under appropriate material and technical insurance, the full value pre-operational preparation of patients, the choice should be made in favour of the endoscopic method of treatment.

To the local counterindications of the endoscopic papillosphincterotomy operation belong:

- the prolonged narrow terminal part of the common biliary duct;
- the short (under 0.5 cm) intramural part of the biliary duct;
- different technical problems: the absence of the needed construction; doubts about its position in cannulation, the unclearness of x-ray data etc.

Pre-operation preparation is analogous to preparation to the performance of ERCG. After the completion of operative aid during (minimum) the first 24 hours they prescribe strarvation, continue spasmolytic, antibacterial, antisecretory therapy.

8. Describe the initial stage of cannulation in performing endoscopic retrograde cholangiopancreatography ?

The technique of operation. There exists the cannulating (typical) way of endoscopic papillosphincteroctomy and the non-cannulatingl (non-typical) ways of endoscopic papillosphincterotomy.

The typical (cannulating) way of performing operation is possible in the free cannulation of the mouth of the choledochus by a standard papillotomy of Demlin's type and the direction of its cutting string at 10-11 hours of an imaginary dial-plate.

After the installation of the **papillotome** it is necessary to perform the aspiration of the contents of the duct (an aspiration probe) and to make sure roentgenologically in the right location of the **papillotome** (The coloured supplementary sheet). Its installation in the needed duct system and at the sufficient depth is the basis for the success of operation. If the position of the **papillotome** is doubtful, do not start the dissection of the greater papilla of the duodenum. Changing the angles of the curve of the endoscope, the direction and configuration of the papillotomy, it is desirable to selectively cannulate the choledochus and, only having convinced in this, start dissection.

Before switching on the high frequency stream it is necessary to tighten d moderately the cutting string of the **papillotome** for the correction of the direction of the supposed incision and the evaluation of the greater papilla of the duodenum tissue. If it is impossible to create the distance over 3 mm between the tightened string and the catheter of the **papillotome** , one should think papilla stenosis (an oblique endoscopic sign).

The dissection of the greater papilla of the duodenum and the longitudinal fold by the typical way is performed by doses and portions avoiding drastic and uncontrolled incisions of the intramural part of the biliary duct. A tart of the electrode of the **papillotome** should be visible , the dissection of the tissues of the terminal part of the choledochus is recommended to perform distally with one third of the cutting string. The high frequency current should be delivered by short impulses of 2-3 seconds each.

The majority of experts perform papillotomy in the regime of 'cutting' of the electrosurgical block, others recommend a balanced 'blended' regime. Serious complications can be caused by the application of the 'coagulating' regime of the high frequency current. In considerable inflammatory or cicatricial changes as well as intraampular adenoma one has to use the continuous impact of the current.

The application of the coagulating regime leads to the expressed warming of tissues with the subsequent possible necrosis and development of the delayed perforation , destruction of the pancreas, the phlegmon of the parapancreatic and retroperitoneal cellular tissue. Besides, the application of the regime of the high frequency current can cause 'the welding'of the mouths of the ducts. On the one hand, after this there appear difficulties with repeated cannulation. On the other hand, duct hypertension strengthens which can result in the development of obturative pancreatitis, cholangitis and he strengthening of jaundice.

The effectiveness and safety of papillotomy depend to a greater extent on the length of the area of the cutting string which contacts the tissue (density of the current) than on the parameters of the work of the electrosurgical block. A common mistake is the papillosphincteromy with the proximal part of he string and the creation of a too large curve as well as the tension of the cutting string. As a result, the dissection does not take place, but there appears weak coagulation which enhances the risk of post-operative pancreatitis.

An effort to increase the power and pressure**,** leads to a sudden quick disruption ('zipper cut') of the area which is coagulating with the danger of the appearance of serious bleeding. The reduction of the length of the area of the cutting string contacting with the mucous membrane leads to the increase of the current density and dissolution.

The instantaneous dissolution of the **ampulla** of the greater papilla of the duodenum with a large uncontrolled incision can lead to the perforation of the wall of the duodenum or hemorrhage from the branch of the upper posterior pancreatoduodenal artery which is located in the proximal part of the longitudinal fold. In this connection, endoscopic papillosphincterotomy is more reasonable to perform within several stages. In this, the final stage, for the sake of the prophylaxis of bleeding is performed not in the cutting but in the blended regime of the high frequency current.

Defining the maximal length of the incision and its upper border, they are oriented , first of all, by the length of the longitudinal fold, the first transversal fold of duodenum above the papilla, the x-ray data of he interaction of the terminal part of the choledochus and duodenum. They consider the aims of the operation, the size of the stones, the presence of papilla stenosis, parapapillary diverticula , peri- and intraampular tumours.

9. What algorithm of actions is used in performing typical cannulating papillotomy?

During the performance of typical cannulating papillotomy they use the following algorithm of actions:

1. Primary cannulation, in an unpredictable dissection, is performed with a papillotome.
2. If one fails to create the distance over 3 cm between the tightened string and the catheter of the **papillotome**, one should think of papilla stenosis.
3. They perform an aspiration test the aspiration of the contents of the duct before the performance of contrasting and dissection. The presence of the bile in the catheter or papilloma is a convincing sign of the possibility of the subsequent performance of intervention.
4. Cannulation and contrasting are performed selectively, under the x-ray control; if it is impossible to catheterize the duct selectively, contrasting is performed from the ampule of the papilla, slowly, without pressure; in this the volume of the solution which is being introduced, should not be over 2 ml.
5. After the assessment of the x-ray data, the typical endoscopic papillosphincterotomy is performed.
6. The dissection of the greater papilla of the duodenum and the longitudinal fold is performed with the distal third of the string **of the papillotome**, by doses , with short impulses in the regime of 'cutting'. In patients with the high degree of the risk of bleeding **,** the final stage of dissection is performed in the blended regime of the work of the electrosurgical block.
7. The upper border of dissection is defined by the proximal point of the longitudinal fold and the first transversal fold of duodenum as well as by the aims of operation.