

Module №2 Fundamentals of diagnosis, treatment and prevention of major diseases of the digestive system

Topic number 7

Gallstone disease (GD), chronic cholecystitis (CC) and functional biliary disorders

The incidence of biliary tract diseases, including GD and chronic cholecystitis is high around the world. GD has not only medical, but also socio-economic importance. The number of patients with biliary tract diseases is almost twice higher than the number of patients with peptic ulcer. The disease occurs 2-3 times more frequently in women than in men. The incidence of gallstone formation in children is less than 5%, whereas in elderlies of 60-70 years old it is equal to 30-40%. 80-90% of patients with GD reside in Europe and North America and typically have cholesterol stones, while the population of Asia and Africa tend to have pigment stones.

Learning Objectives:

- To teach students to recognize the major symptoms and syndromes of GD;
- Physical methods of GD investigation;
- Lab and instrumental tests for diagnosis of DG;
- To teach students to interpret the results of additional methods of investigation;
- To teach students to recognize and diagnose GD complications;
- To teach students to prescribe treatment for GD.

What should a student know?

- GD etiological factors;
- GD pathogenesis;
- Main clinical syndromes of GD;
- Clinical signs of GD;
- Methods of physical examination of patients with GD;
- GD diagnosis, evaluation of duodenal intubation (DI) data, including microscopic, bacteriological, biochemical analysis of bile;
- Diagnostic capabilities of endoscopy, plain radiography of the abdomen, endoscopic retrograde cholangiopancreatography,

ultrasound of the abdomen, CT, intravenous cholangio-cholecystography, scintigraphy; indications, contraindications for their use;

- Complications of GD;
- GD treatment (lifestyle modification, diet, pharmacological therapy & surgery).

What should a student be able to do?

- To recognize the main clinical and physical syndromes of GD;
- To explain the results of clinical, biochemical and immune-enzyme assays;
- To interpret the data of the following investigations: endoscopy, plain radiography of the abdomen, endoscopic retrograde cholangiopancreatography, ultrasound of the abdomen, endoscopic ultrasound of biliary tract, CT, intravenous cholangio-cholecystography. Indications & contraindications for the use of these methods.
- To interpret the data of microscopic, bacteriological and biochemical studies of bile;
- To be able to identify types of functional biliary tract disorders;
- To prescribe treatment for patients with GD.

The list of practical skills that students should master:

- Examination of skin and mucous membranes;
- Determination of malabsorption syndrome;
- Examination of the abdomen;
- Superficial palpation of the abdomen;
- Profound methodical sliding palpation of the abdomen after Obraztsov-Strazhesko;
- Determination of pain points and areas specific for GD;

Topic contents:

Gallstone disease.

Gallstone disease is a disease of hepatobiliary system, caused by disorders of cholesterol and/or bilirubin metabolism, characterized by creation of stones in gallbladder and/or bile ducts.

Risk factors for cholesterol gallstones include female sex, obesity, increased age, a Western diet, rapid weight loss, family history,

hypertriglyceridemia, medications (estrogen, clofibrate, ceftriaxone, sandostatin), gallbladder hypomotility (pregnancy, diabetes, postvagotomy).

Most disorders of the biliary tract result from gallstones.

Pathophysiology.

Biliary sludge is often a precursor of gallstones. It consists of Ca bilirubinate (a polymer of bilirubin), cholesterol microcrystals, and mucin. Sludge develops during gallbladder stasis, as occurs during pregnancy. Most sludge is asymptomatic and disappears when the primary condition resolves. Alternatively, sludge can evolve into gallstones or migrate into the biliary tract, obstructing the ducts and leading to biliary colic, cholangitis, or pancreatitis.

There are several types of gallstones.

Cholesterol stones account for > 85% of gallstones in the Western world. For cholesterol gallstones to form, the following is required:

- Bile must be supersaturated with cholesterol. Normally, water-insoluble cholesterol is made water soluble by combining with bile salts and lecithin to form mixed micelles. Supersaturation of bile with cholesterol most commonly results from excessive cholesterol secretion (as occurs in obesity or diabetes) but may result from a decrease in bile salt secretion (eg, in cystic fibrosis because of bile salt malabsorption) or in lecithin secretion (eg, in a rare genetic disorder that causes a form of progressive intrahepatic familial cholestasis).
- The excess cholesterol must precipitate from solution as solid microcrystals. Such precipitation in the gallbladder is accelerated by mucin, a glycoprotein, or other proteins in bile.
- The microcrystals must aggregate and grow. This process is facilitated by the binding effect of mucin forming a scaffold and by retention of microcrystals in the gallbladder with impaired contractility due to excess cholesterol in bile.

Black pigment stones are small, hard gallstones composed of Ca bilirubinate and inorganic Ca salts (eg, Ca carbonate, Ca phosphate). Factors that accelerate stone development include alcoholic liver disease, chronic hemolysis, and older age.

Brown pigment stones are soft and greasy, consisting of bilirubinate and fatty acids (Ca palmitate or stearate). They form during infection, inflammation, and parasitic infestation (eg, liver flukes in Asia).

Gallstones grow at about 1 to 2 mm/year, taking 5 to 20 years before becoming large enough to cause problems. Most gallstones form within

the gallbladder, but brown pigment stones form in the ducts. Gallstones may migrate to the bile duct after cholecystectomy or, particularly in the case of brown pigment stones, develop behind strictures as a result of stasis and infection.

Symptoms and Signs.

About 80% of people with gallstones are asymptomatic. The remainder have symptoms ranging from a characteristic type of pain (biliary colic) to cholecystitis to life-threatening cholangitis. Biliary colic is the most common symptom.

Stones occasionally traverse the cystic duct without causing symptoms. However, most gallstone migration leads to cystic duct obstruction, which, even if transient, causes biliary colic. Biliary colic characteristically begins in the right upper quadrant but may occur elsewhere in the abdomen. It is often poorly localized, particularly in diabetics and the elderly. The pain may radiate into the back or down the arm. Episodes begin suddenly, become intense within 15 min to 1 h, remain at a steady intensity (not colicky) for up to 12 h (usually < 6 h), and then gradually disappear over 30 to 90 min, leaving a dull ache. The pain is usually severe enough to send patients to the emergency department for relief. Nausea and some vomiting are common, but fever and chills do not occur unless cholecystitis has developed. Mild right upper quadrant or epigastric tenderness may be present; peritoneal findings are absent. Between episodes, patients feel well.

Although biliary colic can follow a heavy meal, fatty food is not a specific precipitating factor. Nonspecific GI symptoms, such as gas, bloating, and nausea, have been inaccurately ascribed to gallbladder disease. These symptoms are common, having about equal prevalence in cholelithiasis, peptic ulcer disease, and functional GI disorders.

Little correlation exists between the severity and frequency of biliary colic and pathologic changes in the gallbladder. Biliary colic can occur in the absence of cholecystitis. If colic lasts > 12 h, particularly if it is accompanied by vomiting or fever, acute cholecystitis or pancreatitis is likely.

Diagnosis.

Ultrasonography. Gallstones are suspected in patients with biliary colic. Abdominal ultrasonography is the method of choice for detecting gallbladder stones; sensitivity and specificity are 95%. Ultrasonography also accurately detects sludge. Criteria for ultrasonographic gallstone identification:

- Acoustic shadowing of opacities that are within the gallbladder lumen
- Opacities change with the patient's position

CT, MRI can help determine the type of gallstone, identify pathological dilation of the extrahepatic bile ducts.

Oral cholecystography (rarely available now, although quite accurate) may be used to assess the patency of the cystic duct and gallbladder emptying function. Can also delineate the size and number of gallstones and determine whether they are calcified.

Endoscopic ultrasonography accurately detects small gallstones (< 3 mm) and may be needed if other tests are equivocal.

Laboratory tests usually are not helpful; typically, results are normal unless complications develop.

Asymptomatic gallstones and biliary sludge are often detected incidentally when imaging, usually ultrasonography, is done for other reasons. About 10 to 15% of gallstones are calcified and visible on plain x-rays.

Prognosis.

Patients with asymptomatic gallstones become symptomatic at a rate of about 2%/yr. The symptom that develops most commonly is biliary colic rather than a major biliary complication. Once biliary symptoms begin, they are likely to recur; pain returns in 20 to 40% of patients/year, and about 1 to 2% of patients/year develop complications such as cholecystitis, choledocholithiasis, cholangitis, and gallstone pancreatitis.

Treatment.

- For symptomatic stones: Laparoscopic cholecystectomy or sometimes stone dissolution using ursodeoxycholic acid.
- For asymptomatic stones: Expectant management

Most asymptomatic patients decide that the discomfort, expense, and risk of elective surgery are not worth removing an organ that may never cause clinical illness. However, if symptoms occur, gallbladder removal (cholecystectomy) is indicated because pain is likely to recur and serious complications can develop.

Surgery.

Surgery can be done with an open or a laparoscopic technique.

Open cholecystectomy, which involves a large abdominal incision and direct exploration, is safe and effective. Its overall mortality rate is about 0.1% when done electively during a period free of complications.

Laparoscopic cholecystectomy is the treatment of choice. Using video endoscopy and instrumentation through small abdominal incisions, the

procedure is less invasive than open cholecystectomy. The result is a much shorter convalescence, decreased postoperative discomfort, improved cosmetic results, yet no increase in morbidity or mortality. Laparoscopic cholecystectomy is converted to an open procedure in 2 to 5% of patients, usually because biliary anatomy cannot be identified or a complication cannot be managed. Older age typically increases the risks of any type of surgery.

Cholecystectomy effectively prevents future biliary colic but is less effective for preventing atypical symptoms such as dyspepsia. Cholecystectomy does not result in nutritional problems or a need for dietary limitations. Some patients develop diarrhea, often because bile salt malabsorption in the ileum is unmasked. Prophylactic cholecystectomy is warranted in asymptomatic patients with cholelithiasis only if they have large gallstones (>3 cm) or a calcified gallbladder (porcelain gallbladder); these conditions increase the risk of gallbladder carcinoma.

Stone dissolution.

For patients who decline surgery or who are at high surgical risk (eg, because of concomitant medical disorders or advanced age), gallbladder stones can sometimes be dissolved by ingesting bile acids orally for many months. The best candidates for this treatment are those with small, radiolucent stones (more likely to be composed of cholesterol) in a functioning nonobstructed gallbladder (indicated by normal filling detected during cholescintigraphy or oral cholecystography or by absence of stones in the neck).

Ursodeoxycholic acid (UDCA) 4 to 5 mg/kg per os 2 times a day or 3 mg/kg per os 3 times a day (8 to 10 mg/kg/day) dissolves 80% of tiny stones <0.5 cm in diameter within 6 months. For larger stones (the majority), the success rate is much lower, even with higher doses of ursodeoxycholic acid. Further, after successful dissolution, stones recur in 50% within 5 years. Most patients are thus not candidates and prefer laparoscopic cholecystectomy. However, ursodeoxycholic acid 300 mg per os 2 times a day can help prevent stone formation in morbidly obese patients who are losing weight rapidly after bariatric surgery or while on a very low calorie diet.

Stone fragmentation (extracorporeal shock wave lithotripsy) uses a focused ultrasound beam, and thus can fragment larger stones. The fragmented stones can be passed through the cystic duct and expelled into the common bile duct. The fragments that remain behind in the gallbladder should be treated with UDCA for dissolution.

Indications: radiolucent, solitary stone < 2 cm in well-contrasting gallbladder.

Topical dissolution therapy: involves insertion of a catheter into the gallbladder under ultrasound guidance; stones are dissolved using methyl tertbutyl ether.

Chronic cholecystitis

Chronic cholecystitis (CC) refers to inflammation of a gallbladder of bacterial origin mainly, that occurs under presence of biliary dyskinesia, gallstones, parasite infections.

Etiology:

1. Main causes for CC development:

Opportunistic pathogenic infections (E.coli, coccal flora), sometimes – other microbial causes (Proteus, Pseudomonas aeruginosa, etc.). Bacteria can get to gallbladder by contact path from the small intestine, or by hematogenic and lymphogenic path from any site of chronic inflammation.

2. Additional causes:

Hypotonic and atonic biliary dyskinesias with stagnation of bile, hypodynamia + unbalanced diet, pancreatic reflux, genetic factors, parasite infections

Pathogenesis:

Development of CC is gradual.

Entry of microbial flora against a background of GB hypotonia causes catarrhal inflammation of mucosa. Inflammation progresses to submucosa and muscular layer of GB, where it causes infiltration and activation of connective tissue. These processes lead to deformation of GB and pericholecystitis development.

In case of different unfavourable circumstances CC may get exacerbated up to acute cholecystitis.

Clinical presentation:

Pain in RUQ and epigastrium, can last for hours, increases after fatty, fried, spicy food, eggs, wine, beer. Pain radiates to right scapula or shoulder.

Upper abdominal tenderness may be present, but usually fever is not. Fever suggests acute cholecystitis. However, subfebrile body temperature may be present. Once episodes begin, they are likely to recur.

Bitter taste in mouth in the morning. Nausea, belching, bloating.

Bowel movement disorders – alternation of constipations and diarrheas

Diagnosis:

1. Ultrasonography.

Ultrasonographic criteria of inflammation in GB:

- Thickness of wall of GB > 4 mm in the absence of liver and kidney pathology, and congestive heart failure;
- Increase of GB size over 5 cm above the normal for the corresponding age;
- Presence of sonographic Murphy's sign;
- Presence of paracystic hypoechogenic limbus (edema of GB wall).

2. *Cholecystography.*

The following symptoms are characteristic for patients with CC:

- Absence of GB shadow;
- Derangements of concentration ability and motility of GB (delayed emptying);
- Deformation of GB wall.

3. *Duodenal intubation* – can be conducted only if gallstones are absent! Helps to access motor function of GB. Provides 3 portions of bile for further studying of bile characteristics:

- Microscopy – signs of inflammation and lithogenicity of bile;
- Culture – determination of bacterial flora;
- Biochemical analysis – determination of cholesterol, bile acids, phospholipids in bile.

Treatment: phase of exacerbation.

Antibiotics. Indications for antibiotic therapy: presence of clinical and laboratory signs of inflammation, positive results of bile culture, cholangitis.

- Ciprofloxacin 500 mg 2/d per os, course 5 days
- Cefotaxime 1 g 2/d i/m
- Doxycycline 100 mg 2/d per os, course 5 days
- Amoxicillin 500 mg 3-4/d
- Tinidazole 4 pills per os once (if *Lamblia* is a causative agent)

Symptomatic therapy:

1. Prokinetic agents – domperidone 10 mg 3/d 30 min prior to meals

2. Spasmolytics:

- mebeverine 200 mg 2/d, course 3-4 weeks
- drotaverine (No-Spa) 40 mg 3/d before meals
- papaverine hydrochloride 2% - 2,0 i/m

3. Bile-expelling medications (cholagogues):

- Preparations that stimulate cholepoietic function of liver (choleretics):

- Preparations of bile acids: cholenzym, liobilum
 - Synthetic preparations: oxaphenamide, cyclovalone
 - Preparations of herbal origin: strawflower extract, peppermint extract, corn stigmas
 - Preparations that improve secretion of bile by increasing of its aqueous component (hydrocholeretics) – mineral waters
 - Preparations that stimulate biliary excretion:
 - Cholekinetics (increase tonus of GB and decrease tonus of bile ducts): xylite, sorbite, magnesium sulfate
 - Cholespasmolytics: anticholinergic drugs, aminophylline.
 - 4. UDCA – 8-10 mg/kg/day (if microlites and/or stagnation of bile are present);
 - 5. Herbal hepatoprotectors with bile-expelling properties.
- Treatment:** phase of remission. Diet – meals 5-6 times a day, exclude fatty, fried, spicy, smoked food, pickles, alcohol. Phytotherapy. Mineral water. Physiotherapy. Exercise therapy.

Functional biliary disorders

Biliary dyskinesia is a symptomatic functional disorder of the gallbladder whose precise etiology is unknown. It may be due to metabolic disorders that affect the motility of the GI tract, including the gallbladder, or to a primary alteration in the motility of the gallbladder itself.

Biliary dyskinesia presents with a ***symptom complex*** that is similar to those with biliary colic:

- Episodes of right upper quadrant pain
- Severe pain that limits activities of daily living
- Nausea associated with episodes of pain

The presumed mechanism for biliary pain is obstruction leading to distension and inflammation. This might result from incoordination between the gall bladder and either the cystic duct or the sphincter Oddi due to increased resistance or tone. Central projections from visceral nociceptors to the thalamus and cortex might lead to a more excitable state with hyperalgesia (severe pain evoked by mildly painful stimuli). Persistent central excitability might then result in allodynia where innocuous stimuli produce pain.

Diagnosis. In order to diagnose biliary dyskinesia, the patient should have right upper quadrant pains similar to biliary colic but have a normal ultrasound examination of the gallbladder (no stones, sludge, microlithiasis, gallbladder wall thickening or common bile duct dilation).

For patients who are suspected to have biliary dyskinesia, the ***Rome III diagnostic criteria*** for functional gallbladder disorders should be considered.

These include:

- Pain episodes that last longer than 30 minutes;
- Recurrent symptoms that occur at variable intervals;
- Pain that is severe enough to interrupt daily activity or lead to emergency room visits;
- Pain that builds up to a steady level;
- Pain that is not relieved by bowel movements, postural changes, or antacids;
- Exclusion of other structural diseases that could explain the symptoms;
- Other supportive criteria include: association of pain with nausea and vomiting, radiation of the pain to the infrascapular region, and pain that wakes the patient in the middle of the night;
- Normal liver enzymes, conjugated bilirubin, and amylase/lipase.

CLINICAL EVALUATION

Screening tests

Laboratory

Tests of liver biochemistries and pancreatic enzymes must be normal.

The following tests are necessary to eliminate calculous biliary disease, which can produce similar symptoms.

Ultrasonography

Transabdominal ultrasonography of the upper abdomen is mandatory. The biliary tract and pancreas should be normal and gallstones or sludge absent. Ultrasonography readily detects stones equal to or greater than 3–5 mm in diameter or biliary sludge within the gall bladder, but it has a low sensitivity for smaller stones or biliary microcrystals. It also has a low yield for stones within the common bile duct. Endoscopic ultrasonography seems to be more sensitive than traditional transabdominal ultrasonography in detecting microlithiasis (tiny stones <3 mm) and sludge within the biliary tract, but the recommendation for its inclusion in standard workups requires further evaluation.

Microscopic bile examination

This procedure is necessary to exclude microlithiasis as a cause. Gall bladder bile can be obtained directly at the time of endoscopic retrograde cholangiopancreatography (ERCP) or by aspiration from the duodenum

following stimulation (e.g., cholecystokinin (CCK)-8 5 ng/kg i.v. over 10 minutes, or 50 ml MgSO₄ instilled into the duodenum). Two types of deposits may be evident: (1) cholesterol microcrystals, which are birefringent and rhomboid shaped, best visualized by polarizing microscopy. Their presence provides a high diagnostic accuracy for microlithiasis; and (2) bilirubinate granules, which appear as red-brown deposits under conventional light microscopy.

Endoscopy

In the presence of normal laboratory and ultrasonographic findings, endoscopy is usually indicated to exclude upper gastrointestinal diseases.

Tests for gall bladder dysfunction

CCK–cholescintigraphy assessment of gall bladder emptying

This study continuously monitors the hepatic excretion of a radiopharmaceutical into the gall bladder and duodenum, using computer assistance to quantitate changes in radioactivity over the gall bladder. Filling of the gall bladder with radionuclide indicates patency of the cystic duct. Gall bladder emptying is expressed as the gall bladder ejection fraction, the percentage decrease in net gall bladder counts following CCK infusion (CCK-8 slowly infused at 20 ng/kg over 30 minutes). Reduced emptying, which defines gall bladder dysfunction, can arise from either depressed gall bladder contraction or increased resistance such as elevated tone in the sphincter Oddi. Furthermore, several other conditions that do not necessarily present with biliary colic can be associated with reduced gall bladder emptying. These range from intrinsic gall bladder disease (stones, cholecystitis) to neural and metabolic disorders, drugs, and even the irritable bowel syndrome. Although biliary-type pain is rarely elicited, the test appears to be a marker of this biliary disorder, based on evidence of the beneficial effect of cholecystectomy.

Transabdominal ultrasonography

This test measures gall bladder volume, which if followed serially after a stimulus (meal or CCK), reflects emptying. The technique is operator dependent and the results may not be reproducible in different centers. Ultrasonographic assessment of gall bladder emptying is currently not the standard for gall bladder dysfunction.

Pain provocation test

Stimulation tests with CCK to duplicate biliary pain have been used historically as a diagnostic investigation. Such tests have low sensitivity and specificity in selecting patients with gall bladder dysfunction who respond to therapy. This may relate to problems in the subjective

assessment of pain and the use of bolus injections of CCK, which can induce intestinal contractions.

Diagnostic workup

Biliary tract symptoms should be evaluated by liver biochemistry, pancreatic enzymes, and ultrasound examination of the abdomen. As a general recommendation we suggest that invasive investigations should be withheld in those patients in whom episodes are infrequent and not accompanied by increased liver function tests.

- If no abnormal findings are detected, CCK–cholescintigraphy should be used to assess gall bladder emptying. Abnormal gall bladder emptying (<40% ejection) indicates gall bladder dysfunction.
- If there is no obvious cause for impaired emptying, cholecystectomy is appropriate treatment.
- If gall bladder emptying is normal, bile for microscopic examination to detect cholesterol microcrystals and bilirubinate can be obtained by duodenal drainage, at the time of gastrointestinal endoscopy or during ERCP. Magnetic resonance cholangiography or endoscopic ultrasound, where available, can be performed to detect lithiasis.
- If gall bladder emptying is normal, ERCP should be considered. In the absence of common bile duct stones or other abnormalities, SO manometry should be considered if clinically indicated. Evidence of SO dysfunction is an indication for treatment, which may include sphincterotomy.

Treatment strategies.

Medical therapy remains theoretical. It might take the form of:

1. Altering gall bladder motor function (use of motility agents which enhance gall bladder contractility or ursodeoxycholic acid which worsens motility yet lessens the likelihood of biliary pain);
2. Reducing visceral hyperalgesia or inflammation (non-steroidal anti-inflammatory drugs)
3. Cholecystectomy. Laparoscopic cholecystectomy retains a role in the treatment of gall bladder dysfunction, although favorable outcomes may deteriorate with time.

Control of initial level of knowledge on the topic: "Gallstone disease (GD), chronic cholecystitis (CC) and functional biliary disorders".

1. The main components of bile typically DON'T include:

- A. Water
- B. Bile salts
- C. Cholesterol
- D. Phospholipids
- E. Organic matrix

2. The incidence of gallstones in the population of developed countries is:

- A. 5-10%
- B. 10-15%
- C. 15-20%
- D. 20-25%
- E. 40-60%

3. Cholesterol stones occur in patients:

- A. with cirrhosis
- B. with bile supersaturated with cholesterol
- C. elderlies
- D. with infection of biliary tract
- E. with pancreatitis

4. Black pigment stones occur in patients:

- A. with hemolytic disease
- B. with hypertriglyceridemia
- C. after surgical interventions on biliary tract
- D. with the accumulation of insoluble bilirubin in the bile
- E. with bleeding

5. Brown pigment stones occur in patients with:

- A. bile supersaturated with cholesterol
- B. the accumulation of insoluble bilirubin in the bile
- C. hemolytic diseases
- D. hypertriglyceridemia
- E. infection of biliary tract

6. List the etiological factors for chronic cholecystitis:

- A. obesity;
- B. impaired lipid metabolism;
- C. gallbladder dyskinesia;
- D. dysfunction of the autonomic nervous system;
- E. everything mentioned above.

7. Which of the etiologic factors is the most common for the formation of chronic cholecystitis?

- A. bacteria;
- B. virus;
- C. lamblia;
- D aseptic;
- E. impaired lipid metabolism.

8. What are the clinical symptoms typical for cholecystitis?

- A. pain syndrome;
- B. premenstrual tension;
- C. dyspeptic;
- D solar;
- E. everything mentioned above

9. Which of the following is NOT a specific cause of biliary colic?

- A. hormone therapy;
- B. family history;
- C. intake of fatty foods;
- D Caucasian ethnicity;

10. Which of the following is recommended for patients with large symptomatic gallstones?

- A. cholecystectomy;
- B. expectant management;
- C. stone fragmentation using extracorporeal shock wave lithotripsy;
- D. stone dissolution using UDCA;
- E. topical dissolution therapy.

Control of final level of knowledge on the topic: "Gallstone disease (GD), chronic cholecystitis (CC) and functional biliary disorders"

1. The 'solar syndrome' in chronic cholecystitis is:

- A. pain in the right upper quadrant;
- B. pain in the left upper quadrant;
- C. cardialgia;
- D. pain in right shoulder;
- E. pain under xiphoid process.

2. Which of the following symptoms does the dyspeptic syndrome in chronic cholecystitis include?

- A. heartburn, nausea;
- B. bitter taste in mouth;
- C. single vomiting, bringing relief;
- D. repeated vomiting, no relief;
- E. excessive stool.

3. What causes steady dull pain in the right upper quadrant in chronic cholecystitis?

- A. gallbladder dyskinesia, hypertonic type;
- B. gallbladder dyskinesia, hypotonic type;
- C. presence of gallstones;
- D. concomitant chronic pancreatitis;
- E. accompanying gastroduodenitis.

4. What is the character of pain in gallbladder dyskinesia, hypertonic type?

- A. steady, dull;
- B. spastic;
- C. burning
- D. mild aching;
- E. dull, oppressive.

5. What stimulant is used for cholescintigraphy assessment of gall bladder emptying?

- A. histamine;
- B. cholecystokinin;
- C. magnesium sulfate;
- D. aminophylline;

E. caffeine.

6. In addition to older age, female sex, and obesity, which of the following is a risk factor for gallstones?

- A. rapid weight loss
- B. high fiber diet;
- C. low fat diet;
- D. pancreatitis;

7. What factors contribute to formation of cholesterol stones in the gall bladder?

- A. hereditary predisposition;
- B. impaired lipid metabolism
- C. obesity;
- D. chronic cholecystitis;
- E. everything listed above

8. In a patient with suspected gallstones, which of the following is the most reliable diagnostic tool?

- A. plain Xray of abdomen
- B. ultrasonography
- C. elimination diet
- D. lipid profile

9. The cause of obstructive jaundice in GD is one of the following:

- A. stone blocking the neck area of gallbladder
- B. cystic duct blockage
- C. blockage of the common bile duct
- D. pancreatic duct blockage
- E. hepatic duct blockage

10. Most of the gallstones comprise of the following:

- A. calcium carbonate
- B. calcium stearate
- C. bile
- D. cholesterol
- E. mucus

Case-based questions.

1. The patient of 44 years old complains of periodic pain in epigastric area that radiates to the right shoulder; periodic jaundice with fever, bitter taste in mouth. These complaints typically occur after overeating. Objective examination: the patient is overweight, the scleras are icteric, local tenderness in the right upper quadrant, positive Ker's and Ortner's symptoms. The content of direct bilirubin in blood is increased. What is the most likely diagnosis?

- A. Dyskinesia of the gall bladder;
- B. Gallstone disease;
- C. Chronic pancreatitis;
- D. Peptic ulcer;
- E. Hiatal hernia

2. A woman of 58 years old was delivered to the emergency room with intense pain in the upper abdomen that occurred suddenly after eating french fries. Pain was accompanied by nausea and vomiting. Pain lasted about an hour before the arrival to the emergency room and passed away without assistance. Patient has previous history of cholecystitis. Objective examination: pulse rate - 92 for 1 min; moderate to intense pain upon palpation in the right upper quadrant. What is the most likely cause of abdominal pain?

- A. Myocardial infarction;
- B. Acute cholangitis;
- C. Acute pancreatitis;
- D. Biliary colic;
- E. Peptic ulcer perforation

3. Male, 55, complains of pain in the right upper quadrant radiating to the right shoulder, related to the intake of fatty foods; nausea, poor sleep. Patient has had previous history of chronic cholecystitis during past 12 years. Objective examination: moderate flatulence, pain at the point of gallbladder projection, positive Ortner's symptom. Body temperature - 37.7°C . CBC: $\text{L} - 12.7 \times 10^9 / \text{L}$, neutrophils - 16%, ESR - 27 mm / h. The microscopic examination of second portion of duodenal contents revealed a lot of mucus, epithelial cells, and leukocytes. What antibiotic would be the best choice for this patient?

- A. Ampicillin;
- B. Penicillin;

- C. Nitroxoline;
- D. Rystomycin;
- E. Chloramphenicol

4. Female, 29 years, complains of constant nagging pain, feeling of heaviness in the right upper quadrant, sometimes sharp pain radiating to the back, nausea, bitter taste in the mouth, heartburn, which tends to worsen in the late afternoon. She is 28 weeks pregnant. Objective examination: tenderness during palpation in epigastric area and right upper quadrant, especially in projection of gallbladder. Previous ultrasonography detected opacities in gallbladder lumen. What is the most likely diagnosis?

- A. Acute pancreatitis;
- B. Gallstone disease;
- C. Acute gastritis;
- D. Dyskinesia of biliary tract;
- E. Peptic ulcer

5. Female, 46, complains of a dull pain in the right upper quadrant, fatigue, skin itch, recurrent fever during 3 years. Paroxysmal pain is sometimes accompanied by fever and increased itching. Objective examination: yellow scleras, body temperature - 37.5° C, tenderness in the right upper quadrant, the liver extends over the edge of costal arch by 3 cm, and it is dense and painful. The spleen is not palpable. CBC: Hb - 121 g / L, L - 11×10^9 / L, neutrophils - 14%, ESR - 30 mm / h. What is the most likely diagnosis?

- A. Hemolytic anemia;
- B. Chronic cholecystitis;
- C. Chronic cholangitis;
- D. Chronic hepatitis;
- E. Cirrhosis

6. The patient, 34 years old, complains of aching pain in the right upper quadrant, which increases after eating fatty and fried foods, bitter taste in mouth. He has been ill for 9 years. Objective examination: overweight, normal skin color, moderate pain in the right upper quadrant, tenderness upon palpation in the right upper quadrant. Liver is not enlarged. Results of duodenal intubation: 85 ml of bile were obtained from the gall bladder during 55 minutes, the microscopic examination of bile revealed leukocytes. What is the most likely diagnosis?

- A. Chronic cholecystitis with gallbladder dyskinesia;
- B. Gallstone disease;
- C. Gallbladder dyskinesia;
- D. Chronic cholecystitis;
- E. Cancer of the gallbladder

7. The patient, 35 years old, woke up at night due to the sudden, sharp pain in the right upper quadrant that irradiated to the right scapula. Pain was accompanied by nausea and repeated vomiting. Kehr's and Murphy's symptoms are positive. Which of the following is the most effective drug to stop pain attack?

- A. Benzocaine;
- B. Morphine;
- C. Atropine.;
- D. Metoclopramide;
- E. Promedol

8. Male, 48, has visited doctor due to complaints of paroxysmal pain in the right upper quadrant and nausea. On the next day jaundice has appeared. Such attacks of recurrent jaundice repeated twice during 1.5 years. Objective examination: yellow scleras, dry tongue, meteorism, tenderness upon palpation in the RUQ, positive Ortner's symptom. CBC: $L 10.0 \times 10^9 / L$, neutrophils - 16%, ESR - 25 mm / h. What additional research would be the most informative for making the diagnosis?

- A. Laparoscopy
- B. Abdominal ultrasound.
- C. Duodenal intubation
- D. Oral cholecystography
- E. Plain abdominal X-ray

9. Woman, 34 years old, was delivered to the hospital with paroxysmal pain in the right upper quadrant, which developed after a stressful situation. These repeated attacks have continued throughout the year. Objective examination: satisfactory general condition, abdomen is soft, slightly painful in the region of the gallbladder. Examination of lungs and heart revealed no pathologic signs. Abdominal ultrasound and CBC data were normal. The preliminary diagnosis is gallbladder dyskinesia. Duodenal intubation is planned. What changes in the duodenal intubation report can confirm the preliminary diagnosis?

- A. Reduced Phase III;
- B. Reduced time of the second phase;
- C. Extended Phase II;
- D. Increase volume of bile in the portion III;
- E. Incomplete emptying of the gallbladder

10. A 60-year-old man undergoes a CT scan to evaluate his abdominal aorta. The images show a normal aorta, but his gallbladder contains several stones, and intramural calcification of the gallbladder wall also is noted. No other abnormal findings are seen. The patient has not had any symptoms and has normal liver chemistries. What is the most appropriate therapy for this patient?

- A. Cholecystectomy
- B. Cholecystojejunostomy
- C. Endoscopic retrograde cholangiopancreatography to evaluate the biliary tree
- D. Endoscopic ultrasound of the gallbladder and biliary tree
- E. Observation

The correct answers to test questions on the topic:

"Gallstone disease (GD), chronic cholecystitis (CC) and functional biliary disorders"

Initial level of knowledge:

1. E, 2. B, 3. B, 4. A, 5. B, 6. E, 7. D, 8. B, 9. C, 10. A

The final level of knowledge:

1. E, 2. D, 3. B, 4. B, 5. C, 6. A, 7. B, 8. B, 9. C, 10. D

Case-based questions:

1. B, 2. D, 3. A, 4. B, 5. C, 6. A, 7. E, 8. B, 9. C, 10. A

Control questions:

1. Provide the definition of GD, CC, and biliary dyskinesia.
2. The main clinical syndromes of biliary tract diseases.
3. Physical findings upon examination of the patient with GD.
4. Diagnostic criteria of chronic cholecystitis.
5. The types of biliary dyskinesias.
6. Pathogenesis of GD.
7. Diagnostic workup in gallbladder dyskinesia.
8. The complications of GD and CC.
9. List the possible causes for CC, GD and peculiarities of the disease, depending on the etiological factor.
10. Describe the pathogenesis of CC.
11. Principles of treatment of GD, CC and biliary dyskinesias.
12. Pharmacological therapy of GD and CC.
13. Indications for surgical treatment of GD, CC and biliary dyskinesias.
14. Prevention of GD and CC

Practical tasks.

1. To perform physical examination of patient with biliary tract diseases.
2. To interpret the received data of laboratory tests.
3. To interpret the received data of instrumental tests.
4. To write recipes for the treatment of GD.

Clinical examination of the patient

Name of the patient_____

Age____profession_____

Complaints_____

Anamnesis morbi

Anamnesis vitae

The results of physical examination of the patient:

Preliminary diagnosis:

The results of additional research methods:

Substantiation of clinical diagnosis:

Clinical diagnosis:

Main

diagnosis _____

Concomitant pathology

Complications

Treatment:

1. _____
2. Diet _____
3. _____
4. _____
5. _____

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