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# GALLSTONE DISEASE: MODERN APPROACHES TO DIAGNOSIS AND TREATMENT.
**(review article)**

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**Abstract:**

Gallstone disease (GSD), or cholelithiasis, is a chronic condition in which stones form in the gallbladder or bile ducts.

This review article focuses on the new classification, existing treatment methods, and early diagnosis of the disease.

**Keywords:**

Gallstone disease, classification, laparoscopy, chronic, cholecystectomy, cholelithiasis, gallbladder, choledocholithiasis, cholecystitis.

**Materials and Methods:** The authors of this scientific study reviewed and conducted literature reviews of scientific works published in the last 5–10 years using search engines eLIBRARY and GOOGLE ACADEMY, using the keywords listed above.

**Objective:** To examine current aspects of the etiology, clinical course, diagnosis, and treatment of gallstone disease, as well as to evaluate the effectiveness of existing therapeutic methods.

**Introduction:**

Gallstone disease (GSD, cholelithiasis) is the presence of calculi in the gallbladder (cholecystolithiasis) and/or bile ducts (cholangolithiasis, choledocholithiasis) due to metabolic disorders, accompanied by specific clinical symptoms and serious complications[1].

Inflammation plays a role in the pathogenesis of GSD; on the other hand, in the overwhelming majority of cases, acute cholecystitis is calculous in nature, and its onset is caused by obstruction of the cystic duct

by a gallstone. All complications characteristic of GSD can also be observed in acute cholecystitis. In a certain sense, the term "chronic calculous cholecystitis" serves as a synonym for GSD[1].

**Main Section**

According to epidemiological studies, gallstone disease affects approximately 10–25% of the population in developed countries, with a steady upward trend in incidence. Among the risk factors for gallstone formation, age- and gender-specific characteristics are identified: in women The relative risk is 4.62 in cases of multiple pregnancies and 4.57 for a body mass index greater than 26. Complicated forms of gallstone disease develop in 35–50% of patients and include acute cholecystitis, cholangitis, obstructive jaundice, and biliary pancreatitis[2].

Gallstone disease develops gradually and, if not treated in a timely manner, can progress through four stages.

Stages of gallstone disease development:

Stage I: Initial, or pre-stone. There are no stones yet, but the conditions for their formation are present. The bile is thick and heterogeneous, and a sediment—biliary sludge—forms within it;

Stage II: formation of gallstones;

Stage III: stage of chronic recurrent calculous cholecystitis;

Stage IV: stage of complications [10].

Gallstone disease may be asymptomatic. Gallstones in the gallbladder are often discovered incidentally during examinations of patients for other conditions, during abdominal surgery, or at autopsy. Most often, gallstone disease manifests as hepatic (biliary) colic. The causes of a pain attack include a stone becoming lodged in the neck of the gallbladder or the cystic duct, or increased pressure in the gallbladder or ducts due to impaired bile flow. Pain most often occurs after dietary indiscretions (fatty, spicy foods), during physical exertion, psychological stress, or a bumpy ride; it is intense, cutting, stabbing, The pain is often tearing in nature, less commonly paroxysmal, and is localized in the right upper quadrant and epigastric region. The pain often radiates to the lumbar region, the right shoulder blade, and the right forearm (irritation of the branches of the right phrenic nerve); less commonly, it radiates to the cardiac region, mimicking an angina attack (Botkin's symptom, cholecystocoronary symptom). An attack of hepatic colic is often accompanied by nausea and repeated vomiting mixed with bile, which does not bring relief to the patient. The colic can last from a few minutes to several hours. Patients are restless during this time, frequently changing their posture in an attempt to find a comfortable position that reduces the intensity of the pain. Body temperature remains normal during the attack. On examination, moderate tachycardia is noted—up to 100 beats per minute. The tongue is moist and coated with a whitish film. Some abdominal distension is noticeable, and the right half of the abdominal wall sometimes lags behind during respiration. Percussion and palpation of the abdomen reveal sharp tenderness in the right hypochondrium, especially at the site of the gallbladder [3].

In gallstone disease and chronic calculous cholecystitis, blood and urine tests are normal; there may be mild leukocytosis, and the ESR is elevated [4].

In gallstone disease and choledocholithiasis, ultrasound shows a diffusely altered liver, dilation of the intrahepatic ducts, and stones in the common bile duct. ERCP (endoscopic retrograde cholangiopancreatography) allows visualization of the external and internal hepatic ducts, as well as the pancreatic ducts. ERCP can determine hepatoduodenal region. Magnetic resonance cholangiopancreatography (MRCP) is a specialized type of magnetic resonance imaging that produces detailed images of the hepatobiliary and pancreatic systems, which include the liver, gallbladder, bile ducts, the pancreas, and its duct. Magnetic resonance imaging (MRI) is a non-invasive examination that helps doctors diagnose diseases and treat them. MRI involves the use of powerful magnetic fields, high-frequency pulses, and a computer system that allows for the creation of detailed images of organs: soft tissues, bones, and virtually all structures inside the human body. The resulting images can be viewed on a computer monitor, transmitted electronically, printed, or copied to storage media. Ionizing (X-ray) radiation is not used in MRI[5].

First and foremost, the treatment for this condition involves a DIET, specifically Pevzner's Diet No. 5

(Therapeutic Diet No. 5)

In brief:

This diet was developed by Manuil Pevzner specifically for diseases of the liver and biliary tract, including gallstone disease.

Key principles: limiting fatty and fried foods; excluding foods that cause gallbladder spasms; eating small, frequent meals (5–6 times a day); and gentle food preparation (boiling, stewing, baking).

In recent years, conservative methods for treating gallstone disease have been developed (litholytic therapy, extracorporeal, lithotripsy). Despite being minimally invasive and safe, these methods are ineffective and non-radical; consequently, they cannot replace cholecystectomy. Surgical treatment—cholecystectomy—remains the "gold standard" for treating gallstone disease. Interest in the treatment of gallstone disease in recent years has been limited to a narrow range of issues, primarily concerning the development and refinement of various surgical and conservative treatment methods. This, however, has not altered the certain dissatisfaction among surgeons and gastroenterologists with the outcomes of surgeries and conservative treatment methods for gallstone disease. Consequently, in recent years, the study of gallstone disease has primarily involved a critical assessment of the long-term outcomes of surgical interventions and non-surgical treatment methods that have proven to be ineffective or of limited efficacy[6].

Therapy for the conservative management of patients with GSD, taking into account its pathogenetic features, should be determined along the following lines:

• measures aimed at lifestyle changes, dietary management, and normalization of body weight;

• pharmacological litholysis using chenodeoxycholic (CDCH) and/or ursodeoxycholic (UDCH; Ursophalk) acids;

• normalization of bile flow, motility, and digestion in the intestine.

In terms of its mechanism of action, UDCA differs somewhat from CHOL. While the former causes the dissolution of gallstones by forming liquid crystals (non-micellar dissolution of cholesterol), the latter does so by direct involvement in the synthesis of bile acid-phospholipid micelles. UDCA slows the absorption of cholesterol from the intestine and thereby reduces its pool in the body. In addition, when UDCA is administered, the amount of cholesterol used for secretion into bile is significantly reduced.

The litholytic effect of UDCA (Ursosan) is associated with a reduction in the lithogenicity of bile due to the formation of liquid crystals with cholesterol molecules, preventing the formation and dissolution of cholesterol stones. UDCA increases the proportion of bile acids in bile, reducing cholesterol supersaturation, and dissolves stones; it also reduces cholesterol absorption in the intestine. Furthermore, UDCA promotes micellar solubilization through the formation of a liquid crystalline phase[8].

Duspatalin can be effectively used in complex therapy aimed at normalizing motor-tonic disorders of the biliary tract and reducing the lithogenic properties of bile in patients with gallstone disease and other biliary tract diseases requiring correction of biliary dysfunction[7].

New technical developments enabling the transmission of high-resolution color images from the abdominal cavity via a laparoscope to a monitor screen have ushered in the "era" of laparoscopic surgery. Laparoscopic cholecystectomy was first performed by the German surgeon E. Mühe in 1985 using a device he invented

called the "Galloscope."

Today, an advanced piece of equipment called a laparoscope is used; it consists of a thin tube with a video camera that transmits the image to a screen. During the procedure, four small incisions are made in the anterior abdominal wall, through which the laparoscope and other instruments are inserted. Gas is also introduced into the abdominal cavity to lift the peritoneal walls, facilitating access to the organs. Next, the gallbladder is separated from the surrounding tissues, clips are placed on the cystic duct and arteries, and then the organ is excised. A plastic bag is inserted into the abdominal cavity, into which the gallbladder is placed, after which it is removed through the umbilical port. The gas is then removed, and the incisions are sutured[9].

**Conclusion**: Gallstone disease remains a significant medical and social problem due to its high prevalence and the risk of severe complications. Despite the advances in modern medicine, including the introduction of minimally invasive surgical techniques (laparoscopic cholecystectomy), the issue of early diagnosis and timely treatment remains significant.

A comprehensive approach, including early diagnosis, rational pharmacotherapy, and appropriate surgical intervention, allows for a significant improvement in the prognosis of the disease. Prospects for further research are linked to the development of personalized methods of treatment and prevention aimed at reducing morbidity and improving patients' quality of life.

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