

Prevention, diagnosis and treatment in cholelithiasis

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Abstract:

Cholelithiasis is one of the most common diseases treated in the General Surgery Departments. It is estimated that it is diagnosed in approximately 20% of adults, which makes it the most frequent disease of the gastrointestinal tract. The increase in the prevalence of cholelithiasis is due to the increased public exposure to risk factors: obesity, low physical activity, diabetes, low HDL cholesterol and hypertriglyceridemia. Cholelithiasis is more common in women than in men. It is also an increasingly common disease in children. Etiology of cholelithiasis is bad eating habits and a high-fat diet. In the face of the obesity epidemic one should expect a steady increase in the incidence of cholelithiasis. Gallstones found in the gall bladder can be divided into two types: cholesterol and pigment. The first ones are much more common. In the case of treatment of cholelithiasis, the location of deposits is more important than their construction. The main diagnostic method of urolithiasis is the ultrasound with 95% sensitivity in the detection of stones in the gall bladder and bile ducts .. The development of surgery has led to the fact that cholecystectomy has now become one of the main procedures performed in the wards and completely cures the disease.

Keywords: Cholelithiasis, gallstones, diet, physical activity

Introduction:

Cholelithiasis is a serious health problem in Europe and other highly developed countries. It is estimated that it concerns 20% of the population (1,2). This is the most common disease of the digestive tract resulting in hospitalization of patients. Interdisciplinary care of patients with cholelithiasis has evolved considerably over recent years thanks to the increasing insight into pathophysiology, mechanisms and unusual technical changes in endoscopy and surgical procedures. In contrast to primary prevention because this common disease is still in its infancy. (1) It results in serious financial burdens for health protection due to its prevalence. According to the data, expenditures related to stone in the US cost more than 10 billion dollars (2). There are two main types of gallstones: cholesterol - more frequent, accounting for 90% of all deposits and pigmentation. Tab. 1 (3). The formation of stones is associated with an increased concentration of cholesterol and bilirubin in bile (3).

Table 1 | **Location and composition of gallstones**

Location	Type	Main chemical composition	Morphology
Gallbladder	Pure cholesterol stones	>95% cholesterol by weight	Light yellow, hard and spherical with a smooth or morular surface
	Black pigment stones	Polymerized calcium bilirubinate	Black, soft and fragile, and small sphere with a smooth surface
Common bile duct	Mixed cholesterol stones	>50% cholesterol by weight plus calcium bilirubinate	Light yellow to brown, hard and spherical with a smooth surface
Intrahepatic bile duct	Brown pigment stones	Monomeric calcium bilirubinate	Brown, soft, fragile to hard and spherical with a multifaceted surface

Diet:

The main risk factor for cholelithiasis is metabolic disorders and poor diet resulting in obesity. (4). In obese patients, type II diabetes is associated with an increase in insulin resistance. Hyperinsulinemia is associated with an increased uptake of cholesterol in the liver (5), its secretion into the bile (6), and thus a reduction in the amount of fatty acids, which is directly related to the formation of gallstones (7). An additional factor is the high-fat diet. Obesity may also result in increased cholestasis in the gallbladder and dyslipidemia.

Therefore, it is sensible to introduce and follow a diet that could prevent the development of cholelithiasis. Consuming smaller amounts of saturated fatty acids will lower cholesterol levels in the blood and thus decrease its content in bile. A healthy diet full of vegetables and fruits can also be treated as a diet that potentially reduces the risk of developing cholelithiasis, however, there is no conclusive research on this subject (8). Frequent consumption of nuts containing unsaturated fats greatly reduces the risk of cholelithiasis (9). Coffee as one of the most frequently consumed beverages is not important in raising the risk or prevention of cholelithiasis.

Sport activity:

Physical effort is the main method to reduce body fat and reduce BMI. It is believed that regular physical activity reduces the risk of developing cholelithiasis. About 30 minutes of intensive training per day or 60 minutes of moderate activity can significantly reduce the risk of developing gallstones. For people whose work requires daily physical exertion, intensive training is not required as excessive exercise can result in bile thickening if the diet is not properly taken. Increased physical activity reduces insulin resistance, normalizes triglycerides, and increases HDL cholesterol in the blood. HDL lipoproteins are responsible for the return of cholesterol to the liver and increase the concentration of bile acids in the bile, which is necessary to inhibit the formation of deposits (reduces the lithogenicity of bile).

Too fast weight loss > 1.5 kg / week and thus a low-calorie diet. As well as the state after bariatric surgery, it increases the incidence of cholelithiasis by about 30%. (10,11).

Pregnancy:

Pregnant women who are often diagnosed with cholelithiasis de novo constitute a separate group of patients. Interesting is the fact that 60% of the stones after childbirth disappear which gives a certificate of transience of cholelithiasis during pregnancy. (12).

Drugs:

Some medications quite often used by patients in various chronic diseases may also predispose to the occurrence of cholelithiasis. We include somatostatin, estrogens and progesterone here. The effects of estrogen are mainly focused on increasing cholesterol secretion to bile, while progesterone significantly reduces the contractility of the gallbladder.

Pharmacological prevention:

There are currently no drugs that would reduce the risk of cholelithiasis. High hopes are associated with ursodeoxycholic acid (UDCA), in which the small deposits are often decomposed. The use of statins also changes the composition of bile and thus prevents the development of urolithiasis. Unfortunately, discontinuation of UDCA in a short time leads to relapse (13,14). Such patients will require surgical intervention in a short period of time.

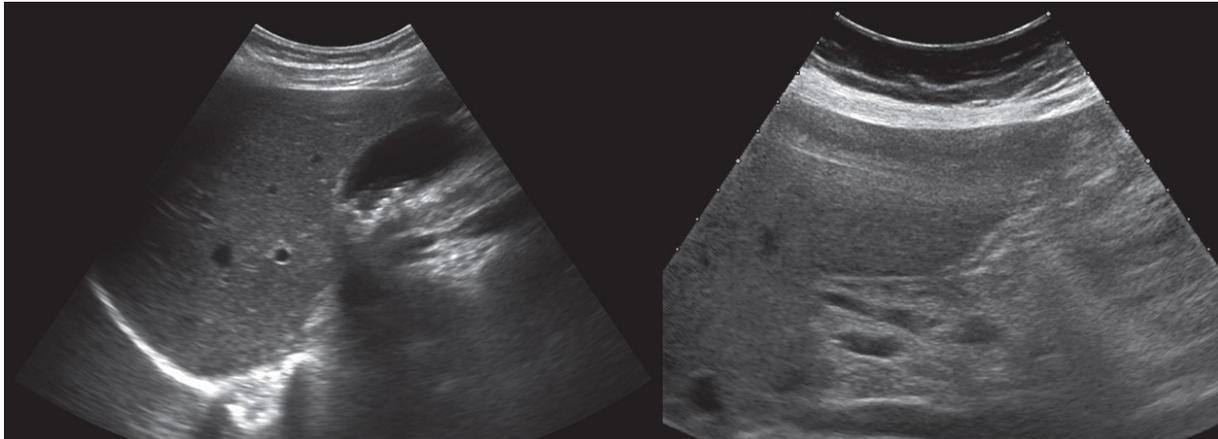
Clinical manifestation:

Cholelithiasis may be asymptomatic, which affects more than 50% of people who have deposits in the gall bladder. The main symptom is colic pain located under the right pod, which radiates to the right shoulder. Most often, patients associate the emergence of ailments with dietary error. In addition, nausea, vomiting and diarrhea may occur. The occurrence of fever may indicate inflammation of the gall bladder. Jaundice is most often associated with the escape of deposits outside the gallbladder to the bile ducts. Typical symptoms of cholecystitis are the so-called Charcot triad: pain, fever, jaundice. In a physical examination, a positive Chełmoński's symptom (shaking the area of the right shoulder causes severe pain) and Murphy's sign (with a deep inhale the pressure of the hand examining the bladder area causes pain and interrupts the inspiration also proves inflammation of the gallbladder) (15).

Diagnosis:

The basic method of detecting stones in the gallbladder is ultrasound (USG). The test in a quick and non-invasive way allows the assessment of the gallbladder and its contents. A characteristic feature of deposits is acoustic shadow. Ryc. 1. This makes it easier to differentiate with polyps or bile ducts that do not give this effect. The fast and cheap method,

additionally safe in pregnancy, has 95% sensitivity in the diagnosis of cholelithiasis. It also allows the assessment of bile ducts and thus the finding of ductal stones. In the case of inflammation, ultrasound finds some limitations. They are associated with inflammatory infiltration and the possibility of liquid reservoirs. In this case, computed tomography (CT) is used, but it is not recommended as routine diagnostic abdominal pain. In the case of suspected urolithiasis and lack of deposits in ultrasound, the diagnosis may be facilitated by endosonography (EUS) or magnetic resonance cholangiopancreatography (MRCP). However, these are studies requiring better qualifications of the staff and often unattainable in smaller hospitals. (16,17,18) Ryc.1.



Ryc. 1. Abdominal transcutaneous ultrasonography. a | Multiple gallbladder stones with hypoechoic shadows (echoes are weakened by dense stones, resulting in darker regions behind the stones). **b** | Visualization of a gallstone in the common bile duct.(3)

Treatment:

For relieving pain non steroidal anti-inflammatory drugs (NSAIDs) and opioids provide the most effective analgesia. The first line treatment should be started with an Diclophenac sodium, Indomethacin, Ibuprofen. The second line is hydromorphone, pentazocine, tramadol. The third line is spasmolytics.¹² Both the categories of drugs are equally effective. The main drawback of NSAIDs are potential gastrointestinal and renal side effects, while opioid cause nausea, vomiting.⁽¹⁹⁾ The routine use of UDCA and extracorporeal shock wave lithotripsy (ESWL) is not recommended due to the fact that patients require cholecystectomy in any case within the next three years ⁽²⁰⁾.

All symptomatic cholelithiasis require surgical treatment. The golden standard of treatment of cholelithiasis is currently considered to be laparoscopic cholecystectomy. This is the basic procedure performed in the General Surgery wards. The frequency of the disease has led surgeons to master this procedure at a very high level. The conversion to the open operation is about 4-8%. ^(21,22) Laparoscopic cholecystectomy is such a safe procedure that it can be performed in patients with hepatic insufficiency in Child-Pugh positions A or B. In class C, general anesthesia carries a high risk of complications and development of hepatic encephalopathy ^(23, 24). Classical surgery is recommended in case of suspected advanced inflammatory changes, however, it is associated with a significantly greater perioperative trauma and prolongs the patient's hospitalization. In addition, the wound after laparotomy is a potential place for the development of a postoperative hernia.

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