

**THE SIGNIFICANCE OF MICROCHOLECYSTOSTOMY UNDER  
ULTRASOUND GUIDED IN THE TREATMENT OF PATIENTS  
WITH ACUTE CHOLECYSTITIS**

**(Review of literature)**

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**Abstract:** *A review of the literature is presented, revealing the clinical features of complicated forms of gallstone disease, the essence of the problem of acute destructive cholecystitis and the high therapeutic and diagnostic effectiveness of diapedic decompression techniques. It was noted that there is no consensus on the indications for use and the method of minimally invasive decompression intervention for acute cholecystitis in patients with high operational and anesthetic risk.*

**Key words:** *Acute cholecystitis, navigational surgery, percutaneous transhepatic microcholecystostomy.*

One of the most common and reliable methods for diagnosing gallbladder diseases is ultrasound. The operating principle of diagnostic ultrasonic devices is as follows: an object is exposed to a directed ultrasonic beam and echo signals reflected from the boundary of two media with different acoustic densities are recorded [14]. Simplicity, safety, and the ability to examine a patient an unlimited number of times, regardless of the severity of his condition, make ultrasound indispensable in the diagnosis of acute cholecystitis [10,12]. Echosemiotics of acute cholecystitis in gallstone disease is well developed and is based on identifying changes in the structure of the gallbladder wall, its size, internal environment, paravesical tissues, and identifying the reaction of the lymphatic system in the form of local lymphadenitis.

The advantage of the ultrasound method is its non-invasiveness, simplicity and lack of contraindications. The use of ultrasound in the clinic of acute cholecystitis has brought the diagnosis of this disease to a qualitatively new level, making it possible not only to ascertain the presence of cholecolithiasis, but also to assess the nature of pathological changes in the gallbladder and pancreatobiliary zone. A number of authors estimate the reliability of ultrasound in the diagnosis of acute cholecystitis at 95.4-99.6% [3,14].

The most typical ultrasound signs of acute cholecystitis include: an increase in the size of the gallbladder (more than 10 cm in length and 4 cm in width), thickening of the walls (over 3 mm), doubling and blurring of the contours of its walls, the presence of a hyperechoic suspension in the lumen and fixed in the neck stones, signs of acute transvesical changes (in the liver and surrounding tissues) [5]. The development of methods for diagnosing forms of inflammation of the gallbladder and reliable criteria for the preoperative assessment of morphological changes in the

wall of the gallbladder, surrounding tissues and bile ducts have become decisive in the problem of choosing therapeutic tactics and surgical techniques [4,7,14].

Sonography of the organs of the pancreato-biliary zone in acute cholecystitis is a necessary and sufficient method for the objective diagnosis of this pathology. At the same time, a factor that significantly complicates the interpretation of detected echosymptoms is the lack of a generally accepted ultrasound classification of acute cholecystitis, which negatively affects the making of treatment and tactical decisions [5,9].

When analyzing the literature, two trends in the description of ultrasound semiotics of AC are revealed. The first is an attempt to directly correlate the identified ultrasound signs with a specific morphological form of inflammation of the gallbladder. For example, it is indicated that a “double contour” of the gallbladder wall is a symptom characteristic of phlegmonous cholecystitis [3]; “hepatization” of its lumen is considered a sign of empyema [5]. A reliable symptom of destruction is considered to be doubling of the contours of the gallbladder wall and its thickening. When this symptom is detected, gangrenous cholecystitis is detected in 38% [8]. It is also traditional to differentiate the morphological forms of AC by the sonographically measured thickness of the gallbladder wall. Many authors believe that with a wall thickness of 6 mm, a destructive form of cholecystitis occurs. At the same time, the informative value of ultrasound in determining various forms of acute cholecystitis is estimated at 93.1-98.4% [15]. Recently, close attention has been paid to identifying signs of acute inflammation directly in the wall of the gallbladder, an indicator of which is considered to be hypervascularization of the wall, as well as an increase in the speed of blood flow through its vessels recorded using color and spectral Dopplerography. However, data on the effectiveness of this technique require further study.

The second trend is an attempt to move away from the specification of morphology towards syndromic diagnosis, which is more important clinically, since it involves specific, clearly defined treatment measures and their duration.

Many researchers highly appreciate the classification of V.M. Buyanova et al. [5], proposing the identification of 4 echo syndromes (classes) of acute cholecystitis:

1. Acute cholecystitis without wall destruction.
2. Acute destructive cholecystitis without extravascular complications.
3. Acute destructive cholecystitis with perivesical infiltrate, abscess.
4. Acute destructive cholecystitis with peritonitis.

This classification sufficiently reflects the clinical significance of echo symptoms of AC and makes it possible to create reasonable tactical schemes and algorithms for treating patients [5]. To some extent, the classification of V.M. Buyanova corresponds to the clinical classification of B.A. Koroleva and D.L. Pikovsky [10]. Thus, class I AC without destruction of the gallbladder wall corresponds to acute simple cholecystitis, and classes II and III correspond to acute obstructive cholecystitis with variants of dropsy and/or empyema. Guided by the above classification by S.V. Ivanov et al. [5] adopted active management tactics for patients over 60 years of age. The authors performed percutaneous transhepatic microcholecystostomy under sonographic guidance in all patients with AC over 60 years of age.

A resolving factor that eliminates intravesical hypertension and the substrate of purulent inflammation itself can be puncture with subsequent aspiration of the contents and drainage of the gallbladder in acute obstructive cholecystitis [1,2,8,12].

Minimally invasive manipulations under ultrasound control are referred to in the literature as ultrasound diagnostics or navigation surgery. Ultrasound-guided navigational puncture surgery is a new direction in minimally invasive surgery that makes it possible to cure some diseases of the abdominal organs without dissecting the integument. In acute cholecystitis, decompressive

interventions are used under ultrasound guidance or laparoscopy. For the first time, the successful use of sonographic-guided percutaneous transhepatic microcholecystostomy (PTMS) was reported by M. Makuuchi et al. in 1998, the works of Sh.I. became classic in our country. Karimov and his school [6,11,13].

The methods used for percutaneous puncture of the gallbladder (GB) are based on compliance with two rules [5,9]: 1) the puncture channel must pass through the liver tissue; 2) puncture of the gallbladder wall should be performed in its extraperitoneal part from the side of the gallbladder bed. Compliance with these conditions is necessary to prevent leakage of bile from the hole in the wall of the gallbladder.

Ultrasound-guided microcholecystostomy has become a more effective and less dangerous intervention compared to gallbladder puncture under laparoscopy control. The advantages of microcholecystostomy over a single sanitation puncture of the gallbladder are as follows:

1. Constantly functioning drainage of the gallbladder allows the acute inflammatory process to subside even in cases where a single puncture, including intracavitary administration of antibiotics, is ineffective.

2. The presence of a catheter in the gallbladder allows you to monitor the contents of the gallbladder at various times after the intervention, thereby assessing the dynamics of the phenomena of acute inflammation of the gallbladder.

3. The introduction of a contrast agent through the microcholecystostomy and subsequent x-ray examination allows us to identify the presence of cholelithiasis and, if necessary, determine the cause of obstructive jaundice.

4. Microcholecystostomy can be used to introduce litholytic drugs into the cavity of the gallbladder with subsequent removal of gallstone dissolution products through drainage [9].

At the same time, ultrasound manipulations are much easier to tolerate for seriously ill patients, are less traumatic and require less time to perform, which in some cases allows them to be used in non-transportable patients directly in the ward [12].

V.G. Ivshin et al. [6] believe that the diagnostic value of this operation is extremely high and makes it possible to build a further program of examination and treatment of the patient without fear of the progression of the inflammatory process in the gallbladder and/or the increase in jaundice (if any), because microcholecystostomy allows long-term and adequate decompression of the gallbladder and through it the entire biliary tract.

Currently, many clinics perform various types of diapaetic operations. So, R.B. Mumladze [2] reports that more than 700 such operations are performed annually, which have become the method of choice in the treatment of a number of emergency diseases of the abdominal organs.

For the purpose of decompression of the gallbladder, three methods are used: one-stage puncture sanitation, catheterization using the Seldinger technique and PPMC using the stylet-catheter technique. Today, in decompressive operations, preference is given to percutaneous transhepatic microcholecystostomy under ultrasound guidance. Given the relative simplicity and low invasiveness of PPCI, inflammatory and destructive changes in the gallbladder can be quickly stopped in 94% of patients.

There are methods for using special puncture sensors and attachments that allow you to virtually simulate the direction and depth of the intended percutaneous puncture; but there are also methods of navigation interventions using the “free hand” method. Some surgeons claim that performing manipulations using the “free hand” method is the most mobile and allows you to change the trajectory of the needle in the required direction at any stage [5].

Sanitation techniques used under echosonographic control make it possible to eliminate the need for emergency surgery and gain the opportunity for preoperative preparation. Breaking the

pathogenetic link of extravesical complications, progression of destruction of the gallbladder wall and the development of peritonitis through microcholecystostomy creates the possibility of correcting concomitant pathology. All this contributes to performing cholecystectomy as planned. Thus, many surgeons consider it appropriate to include navigation diapaetic techniques in the algorithm of staged surgical treatment of patients with AC.

Considering the high therapeutic and diagnostic effectiveness, as well as the obvious advantages of diapaetic decompressive techniques, the prospects for their use in patients of older age groups become obvious. However, there is currently no clear consensus on the indications for use, as well as the method of minimally invasive decompression intervention. Thus, a number of authors consider it sufficient to use puncture methods; Various techniques for obliteration of the gallbladder are proposed. There is also a skeptical attitude of surgeons towards these techniques, indicating a high frequency of disease relapses and a decrease in the quality of life of patients. Thus, the role and place of navigational surgery for AC in patients with high operational and anesthetic risk are not sufficiently covered in the literature and require further study.

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