American Journal Of Biomedical Science & Pharmaceutical Innovation

VOLUME Vol.06 Issue01 2026
PAGE NO. 25-29
DOI 10.37547/ajbspi/Volume06Issue01-06

Current State Of The Problem Of Surgical Treatment Of Cholelithiasis (Literature Review)

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Received: 29 November 2025; **Accepted:** 21 December 2025; **Published:** 25 January 2026

Abstract: Cholelithiasis (ChL), occupying the third place in the general structure of diseases after cardiovascular diseases and diabetes mellitus, is still one of the important medical and social problems that has a significant impact on the life of the population and is often overshadowed by the development of life-threatening complications, as well as an increase in the frequency of surgical interventions.

The analysis of the literature data showed that the issues related to the tactical and technical features of performing operations from low-traumatic accesses, as well as the differentiated assessment of the possibilities of using LChE and ChE from mini-access in cholelithiasis remain unexplored and debatable. Such uncertainty prompted us to analyze the results of ChCCh in a comparative aspect, as well as to determine the role and place of each method of surgery in the surgical treatment of this category of patients.

Keywords: Cholelithiasis, laparoscopic cholecystectomy, mini-access.

Introduction: According to the world literature of recent decades, cholelithiasis continues to affect 15-20% of the world's population, of which women make up a fifth, and men a tenth [2; 6; 8]. Surgical treatment of cholelithiasis and its complications continues to occupy one of the leading positions in the structure of morbidity [1; 3; 5].

Surgical treatment of chronic calculous cholecystitis (ChCCh) today requires an assessment of its effectiveness, which is the second most common surgical intervention after appendectomy. Within the framework of the above, the incidence of ChCCh has a general medical, socio-economic significance [4; 7; 9].

Human health is influenced by genetic factors in 15-20%, conditions and lifestyle -50-55%, the work of health care institutions - up to 10-15%, the environment - 20-25% [10; 11].

Cholelithiasis (cholelithiasis) – epidemiology, medical and social aspects of the problem. According to Pak M., Lindseth G. (2016), more than 700 thousand HE are performed in America per year, which has a significant financial burden on the health care system, which annually costs the health care budget $6.5 billion [12; 15; 17]. This is the reason for high financial costs in the health care system [13; 14; 18].

Nikitin I.G. et al. (2020), as well as Di Ciaula A., Portincasa P. (2018), as well as a number of researchers [19; 23; 25], the main causes of stones in the stomach are:

1) impaired motility of the stomach;

2) hypersecretion and accumulation of mucin in the lumen of the gallbladder with inflammation, rapid transition of cholesterol from the hepatic bile and its precipitation in the form of cholesterol crystals [20; 21; 22].

The main pathogenetic factors in the formation of cholesterol stones are also genetic background, hypersecretion of cholesterol and oversaturated bile [23; 26; 28].

Based on the data of 43141 twin pairs, the influence of genetic factors in 25% of cases among twins was proven [24; 27;].

Female sex, gene polymorphism, H. pylori infection, and consumption of high-calorie foods are also factors of stone formation [29; 31].

It is known that the matrix of stone formation is bile proteins, cholesterol or bilirubin crystals. Thickening of bile and an increase in its viscosity leads to a decrease in the solubility of various stones in it, which contributes to the precipitation of cholesterol crystals [30; 32].

Of particular interest are the studies to determine the role of Helicobacter pylori (H. pylori) infection in cholelithiasis [25].

Cen L. et al. (2018) cite the data of a meta-analysis to determine the association of H. pylori infection with chronic cholecystitis and cholelithiasis [11;].

The presence of representatives of the intestinal microbiota in lithogenic bile may be a sign of increased intestinal permeability in biliary obstruction, which contributes to the development of an inflammatory response and the formation of stones [11; 13].

A number of studies have demonstrated a close relationship between the presence of calculi in the stomach, dyslipidemia, MS, and cardiovascular diseases [16; 21; 25].

Researchers have also proven that the leading risk factors for ChCCh are gender, age, multiple pregnancies, menopause, obesity, burdened heredity, dietary habits, certain genes, and insufficient physical activity [15; 26; 31].

According to the meta-analysis, large-scale epidemiological studies have established that the main factors for the development of CHC are heredity, overweight, hyperlipidemia, and predisposition to the female sex [22; 30].

Diagnosis and differential diagnosis of cholelithiasis is often difficult due to its polyetiological nature [4; 6; 10; 20; 32].

The use of modern equipment does not exclude diagnostic errors [11; 18].

Instrumental methods used for this purpose can be conventionally divided into non-invasive and invasive [17; 20; 31].

Methods of surgical treatment of cholelithiasis. When food enters the duodenum from the stomach, the stomach contracts and 40-60 ml of bile is injected into the intestine. It mixes with food, taking part in digestion. However, the pathologically altered stomach does not function, but, on the contrary, causes pain, maintenance of a chronic reservoir of infection, dysfunction of both the biliary (biliary) system and the pancreas. Therefore, cholecystectomy (ChE), performed according to indications, improves the patient's condition and does not significantly affect the function of digestion [14; 24].

Planned surgical treatment is carried out after appropriate preoperative preparation, relief (suspension) of complications of cholelithiasis with the help of conservative therapy. The purpose of the preparation is to adapt the patient's body to the upcoming operation. In this case, the removal of the gallbladder will take place with minimal consequences for the patient. When deciding on planned surgical treatment, a gastroenterologist conducts a stage of preoperative preparation. Preparation minimizes the risks of complications and facilitates the course of surgical intervention that is traumatic for the body. ChE is one of the most popular surgical interventions today, despite the development of non-surgical methods of treating cholelithiasis. Now surgeons are trying to make this operation less invasive, replacing the abdominal approach with laparoscopic, thereby reducing the rehabilitation period and hospitalization time. It is impossible not to mention the aesthetic aspect [3; 11; 24; 32].

Currently, traditional cholecystectomy (TChE), ChE from a mini-access, and laparoscopic cholecystectomy (LChE) are used to remove the stomach. Robot-assisted operations and endoscopic interventions through natural orifices have also begun to be used in clinical practice, which are limited in use due to the high cost and availability of equipment [7; 8].

Traditional cholecystectomy (TChE) proposed by S. Langenbuch in 1882 remained the only effective method of treating cholelithiasis until the 80s of the last century. However, despite the rapid development of medical technologies and the accumulation of vast experience, in everyday clinical practice, surgeons, in certain situations, continue to perform TChE. This concept is adhered to by the majority of domestic and foreign surgeons [15].

Only a wide laparotomy made it possible to perform the necessary amount of surgical intervention. However, when performing the traditional approach, it is accompanied by pronounced trauma, which is due to the intersection of muscular-aponeurotic layers, large blood vessels and nerves, which often contribute to wound suppuration and the occurrence of postoperative complications (eventrations and incisional hernias), which increases the rehabilitation time of patients [12].

LCE was first performed by the German surgeon Mühe E. in 1985, and 2 years later, in 1987, the French surgeon Mouret F. performed the first four-port laparoscopic cholecystectomy (LChE) in the city of Lyon

[16; 18].

At present, in chronic CCh, the vast majority of the gallbladder is removed laparoscopically. LChE has deservedly become the "gold standard" in the surgical treatment of cholelithiasis [12; 13; 17].

Single-port laparoscopic surgery is designed to reduce the invasiveness of traditional laparoscopy [13; 15; 17; 18].

However, it is not always possible to perform LChE, which is mainly due to problems of pneumoperitoneum in patients with diseases of the cardiovascular and respiratory systems [109]. At the same time, there are still disagreements in the definition of indications and contraindications [1; 14].

When performing LChE, a number of surgeons note the presence of many contraindications and note the high cost of equipment and the constant need for consumables [16; 14].

In recent years, as the surgical technique has improved, the previously accepted contraindications to LChE have been canceled. In particular, LChE is not contraindicated in the elderly, class A and B cirrhosis of the liver (but not in decompensation, obesity, pregnancy). Conversion is performed in 5-25% of cases. According to the meta-analysis, the mortality rate in LChE-8-16 per 10000 patients. Bile duct injuries accounted for 36–74 cases per 10,000 patients and 19–29 cases per 10,000 in traditional CACs [17].

The total complications of the postoperative period after LChE are 3.6-13.3% of cases, with mortality - 0.08-1.2%. In addition, carboxyperitoneum is a serious problem of laparoscopic operations in patients with concomitant diseases of the cardiovascular system [12; 17; 27].

The prevalence of cholelithiasis among the working-age population ranges from 10 to 20% [20; 127]. In the United States, cholecystitis is found in 15-20% of the population over the age of 40, and in 50% after 40 years [15]. The high prevalence of ChCCh, the current trend towards rejuvenation of this disease, the identification of new links in the etiopathogenesis, and significant financial costs in the surgical treatment of this disease determine the excessive urgency of the problem [18; 32]. Within the framework of the above, the incidence of ChCCh has a general medical, socio-economic significance [1].

Cholecystectomy (ChE) for complications of ChC ranks first in frequency among surgical interventions in emergency and elective surgery [31].

About 2.5 million operations on the biliary tract (mainly cholecystectomy) are performed annually in the world. Of these, 110 thousand are in Russia, 700 thousand in the USA, 45 thousand in the UK, and 70 thousand in France [22; 30].

Laparoscopic cholecystectomy (LChE) is widely considered the best option for ChE, but it is not done in concomitant pathology from cardiovascular and pulmonary pathology. As a rule, surgeons in such patients are forced to remove the gallbladder (BG) using the traditional technique. And it is very difficult to tolerate due to a large incision on the abdomen. That is why surgeons in recent years have begun to use an "intermediate" version of the operation more often - the so-called ChE from a mini-access. However, along with the widespread use of LChE, specific complications have appeared, the main of which is damage to the bile ducts (bile ducts). For example, in the published meta-analyses, the incidence of LV injury averages 0.5-0.6%, which is five times higher than for open ChE (0.1-0.2%), which significantly affects the quality and duration of life [19; 20; 23].

Simultaneously with the development of NOTES, there was a lively interest in the methods of laparoscopic surgery performed through a single incision (single port) of the abdominal wall [12].

Single-port LChE is considered feasible and safe. It is another step in the development of less invasive surgical interventions [14].

At present, the advantages and disadvantages of a single-port LChE are being actively discussed. For example, according to Allemann P. et al. [20], the conversion rate was no more than 2%. The overall complication rate was 5.4%. Wound complications ranged from 2% to 10%. The authors concluded that single-port LChE is feasible, but further research is needed for standardization. Unjustified widespread use of the technique is fraught with iatrogenic injuries.

In another publication, Antoniou S.A. et.al. [25] The rate of successful single-port LChE was 90.7% and the complication rate was 6.1%. The authors concluded that special caution is required when performing single-port LChE in patients over 60 years of age and diagnosing complicated forms of calculous cholecystitis. Rawlings A. et.al. agreed with the conclusions of the above-mentioned researchers [20].

Performing cholecystectomy through a single port attracts the attention of surgeons with the least traumatic and cosmetic advantages, but the indications and contraindications for this technique remain not fully understood [10; 11; 19].

One of the major trends in abdominal surgery over the past few years has been the development of the concept of transluminal endoscopic surgery through the natural openings of the human body – NOTES. This

means that when diagnosing abdominal pathology, surgical intervention is performed with modern laparoscopes, through natural openings, without violating the integrity of the abdominal wall [22].

At present, transgastric, transvaginal and transcolonic approaches are used for pathology of the abdominal cavity. The author of the first report on transvaginal cholecystectomy was the Argentinian gynecologist Tsin D.A. from the Mont Sinai Clinic in New York (USA). In Russia, the first transvaginal cholecystectomy was successfully performed in 2008 by Prof. K.V. Puchkov [16].

Thus, to this day, all clinics in the world widely use ChE from mini-accesses and LChE, where the latter are reasonably considered the "gold standard". Nevertheless, surgeons in certain clinical situations continue to perform ChE using the traditional approach. In our opinion, many surgeons undeservedly limit the use of ChE from mini-access due to the lack of experience. Analysis of literature data has shown that each of the methods in certain clinical situations has its own advantages. In this regard, the present study is devoted to determining the role and place of ChE from the mini-access in the surgical treatment of chronic calculous cholecystitis.

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