



## Current Views on Laparoscopic Cholecystectomy

### 1. Karim Umarovich Gaziev

Received 22<sup>nd</sup> Apr 2022,  
Accepted 23<sup>rd</sup> May 2022,  
Online 30<sup>th</sup> Jun 2022

<sup>1</sup> Associate Professor of Department of  
Faculty and Hospital Surgery and Urology  
Bukhara State Medical University

**Annotation:** Cholecystectomy is currently one of the most popular surgical interventions despite the development of nonsurgical methods of cholelithiasis treatment. As there are no known effective medications that can dissolve the stones that have already formed, the main treatment for calculous or gallstone-free cholecystitis remains gallbladder removal. The first steps in treating cholelithiasis with surgery date back to the 19th century but the technique has improved since then. Surgeons are now trying to make the operation less invasive by replacing the cavity access to the gallbladder with a laparoscopic or transluminal one, thus reducing the rehabilitation period and the length of hospital stay. The aesthetic aspect of these minimally invasive techniques must also be mentioned, as the postoperative scar can be as little as 4 cm, such as in a mini-access cholecystectomy. Robot-assisted surgery is also gaining in popularity. The main advantages of this technology are miniaturisation and precision.

**Keywords:** cholecystectomy, cholelithiasis, gallbladder.

**Introduction.** Gallstone disease (GBS) remains one of the most common diseases among surgical pathologies of the abdominal cavity. The incidence of cholelithiasis in general population is steadily increasing and currently ranges between 10-20% [14]. However, the true incidence is extremely difficult to characterise, as it is latent in a significant number of people for a long time [5, 15]. Removal of the gallbladder is thought to be the pathogenetic justification for the clinical manifestations of cholelithiasis. In addition, it should be noted that cholecystectomy significantly improves the quality of life of patients with clinically manifest cholelithiasis. The need for cholecystectomy may arise when acute stoneless cholecystitis develops. Most often it is caused by haemodynamic disturbances causing ischaemia of the gallbladder wall, which can occur in patients after cardiac surgery, severe traumatic injuries, burns, etc. [2, 7]. The most common methods of gallbladder removal are conventional (laparotomy) cholecystectomy, laparoscopic cholecystectomy and minilaparotomy cholecystectomy. In modern surgery there are several other methods of gallbladder removal, such as cholecystectomy from a single laparoscopic access, robot-assisted laparoscopic cholecystectomy, and endoscopic surgery through natural openings (transgastric, transvaginal cholecystectomy). According to foreign and domestic literature, cholecystectomy completely cures the symptoms that were present before the operation in 90-95% of patients.

People who have had their gallbladder removed are subject to certain food restrictions (diet) for the first 2-4 months, while the body adapts to the changes in the functioning of the biliary system. During this period, it is possible (but not obligatory) for the stool to become loose or more frequent, up to 2-3 times a day. Four to six months after surgery you can lead a normal life, almost without restrictions. However, in some patients with a long duration of disease and complications of accompanying organs (chronic pancreatitis, cholangitis etc.) some symptoms may not be resolved by cholecystectomy and require further treatment. This is another argument in favour of timely surgical treatment of gallbladder disease.

#### *Indications for laparoscopic cholecystectomy*

The main indications for removal of the gallbladder are complicated cholelithiasis and certain other diseases of the gallbladder:

#### *Acute cholecystitis*

Lethality in acute cholecystitis reaches 1-6%, with progression of the disease without adequate treatment serious complications may develop: necrosis and perforation of gallbladder wall; purulent inflammation of peritoneum (peritonitis); formation of intra-abdominal abscesses; sepsis. Acute cholecystitis with cholelithiasis most often requires urgent surgery.

#### *Choledocholithiasis*

Choledocholithiasis occurs in 5-15% of patients with cholelithiasis, it leads to development of severe complications: mechanical jaundice (blockage of bile ducts with bile outflow disturbance); cholangitis (inflammation of bile ducts); biliary pancreatitis. Concomitant choledocholithiasis in cholelithiasis requires more surgical intervention: bile ducts sanation (either endoscopically or intraoperatively), with possible leaving of bile duct drainage for a long time.

#### *Asymptomatic cholelithiasis*

The presence of painful attacks of biliary colic against a background of cholelithiasis is an absolute indication for surgical treatment. This is because 69% of patients have a recurrent attack within 2 years and 6.5% of patients develop severe complications within 10 years of the first attack.

Biliary colic with so-called 'minor' symptoms (feeling of heaviness in the subcostal region after eating, bitterness in the mouth, and occasional nagging pain in the right subcostal region) is also an indication for surgical treatment. Surgical emergencies occur in 6-8% of these patients per year and serious complications in 1-3% of patients per year. Biliary calculi or asymptomatic gallstone disease is much more common than thought 30-40 years ago, largely due to improved diagnosis, but also to the diet and lifestyle of modern people. Some time ago it was thought that asymptomatic cholelithiasis was an indication for cholecystectomy, but in most countries (except Chile) the risk of gallbladder cancer is low, and not considered to be an important factor. 1-2% of patients a year develop a symptomatic course, and 1-2% a year develop serious complications. Most patients with asymptomatic stones live 15-20 years without treatment. Currently the indications for surgical treatment of asymptomatic gallstones are: haemolytic anaemia; stones larger than 2.5-3 cm (because of the risk of gall bladder wall sores), concomitant operation in obesity surgery (because of the risk of worsening the course of the disease with rapid weight loss); life expectancy of patients over 20 years (because of cumulative complication rate).

Cholecystectomy is contraindicated in asymptomatic stones in patients with diabetes mellitus, cirrhosis; in patients during and after organ transplantation (due to the increased risk of complications).

*Gallbladder cholesterosis*

Gallbladder cholesterosis is the deposition of cholesterol in the wall of the organ. Cholesterosis with gallstone disease is an indication for surgical treatment, non-calculous cholesterosis without gallbladder dysfunction is subject to conservative drug treatment, with dysfunction - cholecystectomy.

A separate nosology that is an absolute indication for surgery is calcinosis (calcification) of the gallbladder wall, or "porcelain gallbladder". This is due to a high risk of cancer (25%).

*Gallbladder polyps*

Polyps of the gallbladder up to 10 mm in size detected by an ultrasound scan must be monitored dynamically, with ultrasound screening once every 6 months. The indications for the operation are polyps with cholelithiasis, polyps larger than 10 mm or with a vascular stem (incidence of malignisation is 10-33%).

*Functional gallbladder disorder*

A common indication for cholecystectomy abroad (about 25% of all surgeries) is gallbladder dysfunction, which is the presence of painful symptoms in the absence of gallstones, biliary sludge or microlithiasis. According to international standards (Rome III consensus) change of gallbladder ejection fraction below 40% by continuous intravenous infusion of octapeptide cholecystokinin for 30 minutes and positive therapeutic response with absence of recurrence more than 12 months after cholecystectomy must be established. In our country, most gastroenterologists and surgeons are of the opinion that surgery is not advisable in these patients.

*Contraindications for laparoscopic cholecystectomy*

While open cholecystectomy can be performed for the vast majority of patients on vital signs, laparoscopic cholecystectomy has both absolute and relative indications. Absolute contraindications to laparoscopic cholecystectomy are terminal conditions of the patient, decompensation of the functions of vital organs and systems, and uncorrected blood clotting disorders.

Relative contraindications usually stem from the experience of the surgeon, the facilities of the clinic and the individual characteristics of the patients. These include acute cholecystitis with a disease duration of more than 72 hours, widespread peritonitis, pregnancy in the 1st and 3rd trimesters, Mirizzi syndrome, sclerotropic gallbladder, previous upper abdominal surgery, infectious diseases, large anterior abdominal wall hernias.

The question of contraindications for laparoscopic cholecystectomy is decided jointly by the surgeon and the anaesthetist.

*Comparative characteristics of cholecystectomy techniques.*

Cholecystectomy is currently available at our hospital in several different styles:

- Laparoscopic.
- Mini-invasive open
- Conventional open

Laparoscopic cholecystectomy is the gold standard in the treatment of chronic cholecystitis and the option of choice in the treatment of acute cholecystitis. It is performed using special instruments through 3-4 punctures in the abdominal wall with a diameter of 5-10 mm. Special tubes (trocar) are inserted into these punctures and carbon dioxide is injected into the abdominal cavity using an insufflator (pump) - the pneumoperitoneum is applied. The injected gas creates space for the

instruments to work. The anatomical elements of the gallbladder - the vesicular artery and vesicular duct - are extracted through the trocars using a video camera and special clips and electrodes, special metal staples (clips) are placed on them, and they are crossed. Modern video systems offer excellent image quality and visualisation of the structures, far superior to that of open surgery. The gallbladder is separated from the liver and removed through one of the punctures in the abdominal wall.

Advantages of laparoscopic cholecystectomy are minimal trauma to the abdominal wall, practically no pain syndrome, quick recovery period after the operation, short hospital stay (1-2 days), quick recuperation and return to daily activities and work.

Unfortunately, in 1-5% of cases cholecystectomy cannot be performed using laparoscopic access. Most often it is caused by anatomical anomalies of bile ducts, pronounced inflammatory or adhesive process, intraoperative complications. In such cases, a conversion to open surgery (conversion) is performed, most often minimally invasive, or, less frequently, traditional open surgery.

Mini-invasive open cholecystectomy has been used since the 1970s to minimise trauma to the abdominal wall. The gallbladder is removed through a 3-7 cm incision in the right subcostal space. Its advantages are significantly less trauma to the anterior abdominal wall than an open cholecystectomy, the possibility of the procedure in patients who have undergone abdominal surgery, direct visual monitoring, and the use of traditional surgical techniques of tissue dissection, which allows manipulation in conditions of marked infiltration in a relatively safe manner. Minimally invasive open cholecystectomy is indicated when pneumoperitoneum and hence laparoscopic surgery are contraindicated due to comorbidities.

At any miniaccess cholecystectomy the hospital stay is, as a rule, longer than for laparoscopy and equals 3-5 days. The post-operative rehabilitation period is also longer.

**Traditional open cholecystectomy** is performed from the upper median laparotomy or from oblique subcostal incisions of the Kocher and Fedorov approaches, which provide wide access to the gallbladder, extrahepatic bile ducts, liver, pancreas, and duodenum. All methods of intraoperative revision of extrahepatic bile ducts, including measuring of their width, probing of ducts, intraoperative cholangiography, intraoperative ultrasound investigation, choledochotomy with intraoperative choledochoscopy, etc. are possible by this access. At present cholecystectomy from wide laparotomy access is mostly fulfilled in patients with acute cholecystitis complicated by widespread peritonitis, or in complicated forms of bile duct pathology.

Its disadvantages are significant trauma of anterior abdominal wall structures, a considerable number of early and late wound complications (in particular, postoperative ventral hernia); an average severity of the operative trauma, leading to postoperative paralysis of intestine, disorders of external respiration function, limitation of physical activity; a considerable cosmetic defect; a long period of postoperative and postoperative rehabilitation and disability.

Basically, the only difference in all the techniques is the access. In all cholecystectomies the gallbladder duct and the vesicular artery are surgically isolated, crossed and ligated or clipped, the gallbladder is separated from the liver, the gallbladder bed is treated, the gallbladder is removed from the abdomen, and the abdominal cavity is drained if necessary.

The main question that patients ask, and the surgeon asks himself, is what technology to choose? There is no single answer, it is necessary to choose the best technology for each individual patient, depending on the characteristics of his disease, associated pathology, and his general state of health. The most general recommendations are: in chronic cholecystitis and gallbladder polyps laparoscopic cholecystectomy is the method of choice, in acute process - laparoscopic or minimally invasive open, in developing peritonitis (purulent inflammation of peritoneum) - open. In patients for whom

laparoscopy is contraindicated because of concomitant pathology or abdominal surgery - cholecystectomy from minidostomy is the method of choice. For biliary tract pathology, various cholecystectomy techniques may be used in combination with endoscopic bile duct sanitation.

The surgeon, anaesthetist and the patient must decide on the procedure together.

***Examinations needed for surgery.***

Before the operation, you must undergo a series of examinations to assess your body's readiness for the operation and to detect possible complications of cholelithiasis and concomitant diseases. The scope of the examinations includes:

1. General physical examination.
2. Determination of blood group and Rh factor.
3. Rapid tests for syphilis, hepatitis B and C.
4. General clinical blood and urine tests.
5. Blood glucose.
6. Biochemical blood tests (total protein, creatinine, bilirubin, liver tests - ALT, AST, GGTP).
7. Coagulogram.
8. Ultrasound of the liver, bile ducts and pancreas.
9. Electrocardiography.
10. Fluorography or chest X-ray.
11. Examination by a general practitioner and other relevant specialists (if indicated).
12. Esophagogastroduodenoscopy.
13. Colonoscopy when indicated.

Also, if indicated, can be more in-depth examination of the bile ducts: magnetic resonance cholangiography, endobutrasonography, endoscopic retrograde cholangiopancreatography.

Preparation for operation.

**Preparation for surgery includes:**

- 1) A light meal the day before the operation with the last meal before 7.00 pm.
- 2) A purging enema (Normacol can be used) the evening and the morning before the operation.
- 3) Espumisan 1 tablet 3 times a day two days before the surgery (if indicated).
- 4) Shower (in the morning before the surgery).

On the day of surgery, do not eat, drink. If it is necessary to take medication, you should consult your doctor.

In some cases, special pre-operative treatment of concomitant diseases is necessary.



**A brief description of the operation and its options.**

Laparoscopic cholecystectomy is performed under general anaesthesia: the patient falls asleep before the intervention and wakes up afterwards.

The duration of laparoscopic cholecystectomy varies from 20 minutes to 1.5-2 hours, depending on the complexity of the intervention, peculiarities of anatomy and pathological process, surgeon's experience. On average the operation lasts about 40 minutes.

First, carbon dioxide is injected into the abdominal cavity using a special instrument - a Veresch needle (carboxyperitoneum). This is done to raise the abdominal wall and create space inside the abdomen for the instruments to operate. The pressure in the abdomen is maintained by an insufflator, a device that pumps CO<sub>2</sub> into the abdomen and maintains a constant gas pressure, usually 12 mmHg. The trocars, or special tubes with valves, which pierce the abdominal wall and allow instruments to be inserted without losing gas, are then inserted. A laparoscope - an optical tube to which a video camera is attached - is inserted into the perineal area. The surgeon, his assistant and the entire surgical team see the entire operation on special monitors. The laparoscope provides a 40x magnification, so the visibility of the organs and structures and the surgical features is better during laparoscopic surgery than during open surgery. The remaining 3 trocars are used to introduce instruments for manipulation: clamps that hold the gallbladder and a special electrode that can be used to separate the gallbladder, the vesicular artery (that supplies it with blood) and the vesicular duct (that connects the gallbladder to the bile ducts) by electrocautery. Once all the anatomical structures are exposed and clearly identified, the bladder artery and duct are clipped (clipped with special titanium clips). The clips are a reliable and safe substitute for the threads used to tie these structures during open surgeries. After crossing the clipped structures, the gallbladder is separated from the liver, the possible bleeding is checked to make sure it has stopped, the subhepatic and suprahepatic spaces are flushed and the gallbladder is removed. The gallbladder is removed through the trocar entry point in the upper abdomen, under the xiphoid process, or in some cases through a periabdominal incision. In most cases an incision of 10-12 mm is sufficient to remove the gallbladder, but in some cases the incision must be enlarged to 20-30 mm. Most frequently, the stones are broken up into small particles in the gallbladder lumen, which is why the patient may not always see them after the operation (unlike open surgery).

The operation may be completed without draining the abdomen, but in many cases surgeons leave a PVC or silicone tube inserted through the lateral abdominal wall into the subhepatic space. The tube (drain) is used to drain away fluid that may accumulate in the abdomen after surgery as a result of surgical trauma.

**Post-operative period - hospital stay.**

After a conventional uncomplicated laparoscopic cholecystectomy the patient is transferred from the operating theatre to the intensive care unit, where he or she spends the next 2 hours of the postoperative period to monitor adequate recovery from anaesthesia. In the presence of comorbidities or peculiarities of the disease and surgery the length of stay in the ICU may be extended. The patient is then transferred to the ward, where he or she receives the prescribed postoperative treatment. For the first 4-6 hours after surgery the patient is not allowed to drink or get out of bed. You may drink normal water without gas in portions of 1-2 sips every 10-20 minutes up to 500 ml until the next morning. Four to six hours after the operation the patient can get up. You should get out of bed gradually, sitting for a while at first, and if there is no weakness or dizziness, you can get up and walk around the bed. For the first time, it is advisable to get up in the presence of medical personnel (after a long stay in a horizontal position and after the effects of medication, orthostatic collapse - fainting may occur).

The day after the operation the patient is free to move around the hospital, start taking liquid foods: kefir, oatmeal, diet soup and go on to the usual regime of fluid intake. During the first 7 days after

surgery it is strictly forbidden to drink any alcoholic drinks, coffee, strong tea, drinks with sugar, chocolate, sweets, fatty and fried food. The patient's diet in the first days after laparoscopic cholecystectomy may include dairy products: fat-free cottage cheese, kefir, yogurt, porridges in water (oatmeal, buckwheat), bananas, baked apples, mashed potatoes, And vegetable soups, boiled meat: lean beef or chicken breast.

In the normal postoperative period the abdominal drainage is removed the day after surgery. Removal of the drainage is painless, performed during dressing and takes a few seconds.

Younger patients, after surgery for chronic calculous cholecystitis may be released home the day after surgery, other patients are usually hospitalised for 2 days. On discharge you will be given a certificate of incapacity for work (if you need one) and an abstract from your in-patient chart setting out your diagnosis and details of the operation and recommendations for diet, exercise and medication. The certificate of incapacity for work is issued for the duration of your inpatient stay and for 3 days after discharge, after which the surgeon at your local health centre will decide on its extension.

### **The post-operative period is the first month after surgery.**

In the first month after surgery, the body recovers its functions and general condition. Careful observation of medical advice is essential for a full recovery. The main areas of rehabilitation are exercise regime, diet, medication, wound care.

Adherence to a regimen of physical activity. Any surgical intervention is accompanied by tissue trauma and anaesthesia, which requires recovery of the organism. Usual rehabilitation period after laparoscopic cholecystectomy ranges from 7 to 28 days (depending on the nature of the patient's activity). Although you will feel good 2 to 3 days after the operation and you will be able to walk, walk in the street and even drive a car, we recommend that you stay at home and do not work for at least 7 days after the operation, as the body needs to recover. During this time, the patient may feel weakness and fatigue.

After surgery, it is recommended to limit physical activity for 1 month (not to carry weights over 3-4 kilograms, exclude physical exercises that require abdominal muscles tension). This recommendation is due to the peculiarities of the formation of the scar tissue of the muscular-aponeurotic layer of the abdominal wall, which reaches sufficient strength within 28 days after surgery. There are no restrictions on physical activity 1 month after the operation.

### ***Diet***

A diet is required for up to 1 month after laparoscopic cholecystectomy. It is recommended that alcohol, easily digestible carbohydrates, fatty, spicy, fried and spicy food should be excluded, and the patient should have regular meals 4-6 times a day. New foods should be added to the diet gradually, 1 month after surgery dietary restrictions can be removed on the advice of a gastroenterologist.

### ***Medical treatment.***

Laparoscopic cholecystectomy usually requires minimal medical treatment. Postoperative pain is usually mild, but some patients require analgesics for 2 to 3 days. These are usually ketamine, paracetamol.

Some patients may be treated with antispasmodics (no-shpa or drotaverine, buscopan) for 7-10 days.

The administration of ursodeoxycholic acid (Ursofalk) improves the lithogenicity of the bile, eliminating possible microcholelithiasis.

The medication must be taken strictly according to the doctor's instructions and in individual dosage.

**Conclusions:** Thus, the surgical technique for gallbladder removal in laparotomy and minimally invasive interventions remains the same, only the access differs. The bile duct and artery are isolated, crossed and ligated or clipped, the gallbladder is separated from the surrounding tissue, the gallbladder bed is treated, the organ is extracted from the abdominal cavity and if necessary drained. However, minimally invasive operations have several advantages. These operations reduce the duration of the surgery, the level of postoperative pain, reduce the length of hospital stay, temporary incapacity for work and have a better cosmetic result.

**Literature:**

1. Mukhabbat Mukhiddinovna Saidova. (2021). Evaluation of carotid intima-media thickness as an early predictor of atherosclerosis in rheumatoid arthritis patients. *World Bulletin of Public Health*, 5, 45-47.
2. Khamdamov B.Z. Indicators of immunocytocine status in purulent-necrotic lesions of the lower extremities in patients with diabetes mellitus.//*American Journal of Medicine and Medical Sciences*, 2020 10(7) 473-478 DOI: 10.5923/j.ajmm.2020.- 1007.08
3. Hamdamov B.Z. Optimization of methods of local treatment of purulent-necrotic lesions of the foot in diabetes mellitus // *A new day in medicine*, 2018. № 4. C. 24.
4. M. I. Kamalova, N.K.Khaidarov, Sh.E.Islamov, Pathomorphological Features of hemorrhagic brain strokes, *Journal of Biomedicine and Practice* 2020, Special issue, pp. 101-105
5. Khodjiev D. T., Khaydarova D. K., Khaydarov N. K. Complex evaluation of clinical and instrumental data for justification of optimal treatment activities in patients with resistant forms of epilepsy. *American Journal of Research. USA*. № 11-12, 2018. C.186-193.
6. Khodjiev D. T., Khaydarova D. K. Clinical and neurophysiological characteristics of post-insular cognitive disorders and issues of therapy optimization. *Central Asian Journal of Pediatrics*. Dec.2019. P 82-86
7. Sadridin Sayfullaevich Pulatov. (2022). Efficacy of ipidacrine in the recovery period of ischaemic stroke. *World Bulletin of Public Health*, 7, 28-32.
8. Saidova M.M. "evaluation of carotid intima-media thickness as an early predictor of atherosclerosis in rheumatoid arthritis patients" *Journal of cardiorespiratory research*. 2022, vol 3, issue 1, pp.58-60
9. Tukhtarov B.E., Comparative assessment of the biological value of average daily diets in professional athletes of Uzbekistan. *Gig. Sanit.*, 2010, 2, 65–67.
10. Khamdamov B.Z. et al. Method of prevention of postoperative complications of surgical treatment of diabetic foot syndrome // *European science review*, 2018. № 9-10-2. C. 194-196.
11. Khamdamov B.Z. et al. The role and place laser photodynamic therapy in prevention postoperative complication at treatment of diabetic foot syndrome // *Applied Sciences: challenges and solutions*, 2015. C. 27-31.