

Surgical Approach in Complicated Forms of Acute Cholecystitis (Literature Review)

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Abstract The article provides an overview of modern approaches to the choice of surgical tactics in complicated forms of acute cholecystitis. The key clinical factors influencing the decision on the nature of the intervention are considered, including the severity of the inflammatory process, anatomical and functional features, the presence of concomitant pathology and the time from the onset of the disease. Indications for laparoscopic, open and subtotal cholecystectomy, as well as for the use of alternative techniques such as percutaneous cholecystostomy, are described. Literature data on morbidity, complication structure, and mortality rate are highlighted. The importance of an individualized and multidisciplinary approach in choosing optimal treatment tactics is emphasized. A differentiated approach makes it possible to increase the safety of surgical intervention, reduce the frequency of postoperative complications, and improve clinical outcomes in patients with complicated acute cholecystitis.

Keywords Acute cholecystitis, Complicated forms, Surgical tactics, Laparoscopic cholecystectomy, Peritonitis, Subtotal cholecystectomy, Cholecystostomy, Differentiated approach

1. Introduction

Acute cholecystitis occupies one of the leading places among urgent diseases of the abdominal cavity and accounts for up to 20% of all cases of acute surgical pathology. According to the World Health Organization, more than 2 million cases of hospitalization for acute cholecystitis are registered annually in the world, and the number of such patients continues to grow due to the increasing prevalence of gallstone disease, especially among the elderly and patients with metabolic syndrome [1,13,20].

Historically, the first descriptions of symptoms corresponding to the clinic of acute cholecystitis are found in the works of Hippocrates and Avicenna, however, as an independent nosological unit, the disease was isolated only at the end of the 19th century. The first successful case of cholecystectomy for acute inflammation of the gallbladder was performed in 1882 by Karl Langenbuch in Berlin. Throughout the 20th century, treatment methods have evolved from open cholecystectomy to minimally invasive interventions, especially since the late 1980s, when laparoscopic cholecystectomy was first performed [3,5,11,18,22].

According to statistics from the Ministry of Health of the Russian Federation and data from foreign centers (CDC, EASL), complicated forms of acute cholecystitis occur in 15-35% of hospitalized patients with this pathology. The proportion of purulent-destructive forms (phlegmon, gangrene, perforation) ranges from 10 to 15%, and empyema of the gallbladder is diagnosed in 5-10% of patients. In the elderly age group and in patients with severe concomitant pathology, the complication rate reaches 40% or more. Mortality in uncomplicated acute cholecystitis does not exceed 0.1–0.3%, whereas in gangrenous and perforated forms with the development of peritonitis, it can reach 10-15%, especially with late diagnosis and delayed surgical intervention. Early initiation of treatment, the choice of adequate tactics and the volume of surgical intervention can significantly reduce the level of postoperative complications, the frequency of which in complicated cholecystitis is 20-40%, including bleeding, infection, damage to the bile ducts and repeated interventions [4,10,21,25].

Acute cholecystitis remains one of the most common causes of emergency surgery in abdominal surgery. Given the widespread occurrence of cholelithiasis and the increasing number of elderly patients with concomitant pathology, the problem of choosing the optimal surgical tactics for complicated forms of acute cholecystitis is of particular clinical and practical importance. In recent years, there has been a tendency to expand indications for laparoscopic interventions, even in severe forms of cholecystitis. However,

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the final choice of tactics should be based on individual clinical and anatomical features, the severity of inflammation, the time from the onset of the disease, the general condition of the patient and the presence of concomitant pathology [1,2,4,6,8,10].

Acute cholecystitis occupies one of the leading places among the urgent diseases of the abdominal cavity, requiring emergency surgical intervention. According to various authors, it is diagnosed in 10-15% of patients admitted to surgical hospitals for emergency indications. Despite advances in early diagnosis, improved imaging techniques, and the development of laparoscopic surgery, complicated forms of acute cholecystitis continue to pose a serious clinical problem [7,19,25].

Complicated forms are understood as variants of the course of the disease in which the inflammatory process extends beyond the gallbladder wall, involving surrounding tissues and organs, and may be accompanied by destructive changes, a generalized inflammatory response, or sepsis. The most common complications are empyema, phlegmon and gangrene of the gallbladder, perforation with the development of peritonitis, paravesical abscess, cholangitis, choledocholithiasis and Mirizzi syndrome. Such forms require an immediate decision on the choice of surgical intervention tactics, since delay can lead to a worse prognosis, the development of multiple organ failure and death [3,11,18,22].

Of particular relevance are the issues of differentiated surgical tactics, in which the approach to treatment is built individually, taking into account all risk factors and clinical circumstances. This makes it possible to increase the safety and effectiveness of treatment, minimize the likelihood of intra- and postoperative complications, and reduce mortality in the most severe patients [1,3,7,15,23].

Classification of complicated forms of acute cholecystitis

Complicated forms of acute cholecystitis are characterized by a severe clinical course, a high probability of generalization of the inflammatory process and the development of organ dysfunction. The most common complications include:

- Phlegmonous and gangrenous cholecystitis;
- Empyema of the gallbladder;
- Perforation of the bladder wall with the development of limited or diffuse peritonitis;
- Choledocholithiasis and acute cholangitis;
- Paravesical abscesses and infiltrates;
- Mirizzi syndrome.

The presence of one or more complications requires a revision of the standard algorithm of patient management and the use of differentiated surgical tactics [4].

Factors determining the choice of surgical tactics

The key factors influencing the choice of the volume and method of surgical intervention are:

The severity of the inflammatory process and the stage of the disease. In case of gangrenous and perforated forms of cholecystitis, immediate surgical intervention is necessary

due to the risk of generalization of infection. The choice of method (open or laparoscopic cholecystectomy) depends on the prevalence of inflammation and anatomical changes.

The time from the onset of the disease. The first 72 hours are considered optimal for laparoscopic cholecystectomy. After that, there is an increase in tissue edema, infiltration and adhesions, which increases the risk of conversion and intraoperative complications.

The general condition of the patient and concomitant pathology. In patients with severe somatic diseases (cardiovascular insufficiency, CKD, decompensated diabetes), preference may be given to minimally invasive, gentle methods, including ultrasound-guided cholecystostomy, especially in the presence of signs of sepsis or shock.

Anatomical features and visualization of the Calo zone. In the presence of a pronounced inflammatory infiltrate, the inability to clearly visualize the anatomical structures of the hepatobiliary zone increases the risk of iatrogenic damage to the biliary tract. In these cases, the transition to subtotal cholecystectomy or open surgery is justified.

The presence of choledocholithiasis. When acute cholecystitis is combined with choledocholithiasis, staged treatment is possible: first, ERCP with papillosphincterotomy and choledochal sanitation, then cholecystectomy. However, if the patient is in stable condition, simultaneous laparoscopic cholecystectomy with intraoperative cholangiography and revision of the common bile duct is possible [6,8,19].

Surgical treatment methods

1. Laparoscopic cholecystectomy (LCE)

It is currently the "gold standard" treatment for acute cholecystitis. However, with a complicated course, the risk of complications increases, including conversions, bleeding, and damage to the biliary tract. The surgeon's experience and the use of modern imaging techniques (fluorescence angiography, intraoperative cholangiography) increase the safety of the intervention [5].

2. Open cholecystectomy

It is indicated for diffuse peritonitis, purulent forms, pronounced deformity of anatomical structures, massive infiltration, and the impossibility of laparoscopic access. It can be performed both initially open and after conversion [7].

3. Subtotal cholecystectomy

An alternative to total resection if it is impossible to isolate the neck of the gallbladder. It helps to avoid severe iatrogenic damage, especially in the presence of severe inflammation and adhesions. It is often combined with drainage of the bladder bed and sanitation of the abdominal cavity [24].

4. Percutaneous cholecystostomy

A minimally invasive method used in severe patients with high anesthetic risk. It is considered as a stage of stabilization of the condition before radical surgery. The method is especially relevant in patients with sepsis, shock, severe respiratory or heart failure [25].

2. Results and Forecast

The prognosis for complicated forms of acute cholecystitis directly depends on the timeliness of surgical intervention, the adequacy of tactics and the volume of surgery. The greatest risk of adverse outcomes is observed in elderly patients with late admission, purulent-destructive forms of cholecystitis, systemic inflammatory reaction and concomitant severe pathology. The use of a differentiated approach based on the assessment of severity, functional reserve, and anatomical and physiological features can reduce mortality and the frequency of postoperative complications [1,16,21].

Thus, the relevance of a differentiated approach to the choice of surgical tactics in complicated forms of acute cholecystitis is due to both the high prevalence of pathology and significant clinical and economic consequences, including the risks of disability and death. The need for a flexible, individualized treatment strategy is confirmed by modern clinical recommendations and scientific publications emphasizing the importance of a personalized choice of surgical tactics depending on the form of the disease, the stage of the inflammatory process, anatomical conditions and the general condition of the patient [17,21].

3. Conclusions

Complicated forms of acute cholecystitis require an individual approach to the choice of surgical tactics. There is no universal strategy - each clinical case must be considered taking into account a set of factors, including the clinical picture, anatomical features, concomitant diseases and the technical capabilities of the institution. The modern paradigm of treatment of complicated cholecystitis is based on the principle of a rational combination of minimally invasive and open interventions, the use of flexible algorithms and timely interventional support. A differentiated approach to the treatment of this pathology ensures safer management of patients, shorter hospital stays and a reduction in the frequency of postoperative complications.

REFERENCES

- [1] Aimagambetov, M. Z., et al. Features of Diagnosis and Surgical Treatment of Acute Destructive Calculous Cholecystitis in Patients with Overweight and Obesity: Literature Review. *Nauka i Zdravoohranenie [Science and Healthcare]*, 2019, No. 3, pp. 54-67. [in Russian]
- [2] Antonyuk, O. S., et al. Modern Approaches to Surgical Treatment of Choledocholithiasis (Literature Review). *Vestnik Neotlozhnoi i Vosstanovitel'noy Khirurgii [Bulletin of Emergency and Reconstructive Surgery]*, 2020, Vol. 5, No. 4, pp. 13-22. [in Russian]
- [3] Atadjanov S. K. et al. Modern aspects of diagnosis and treatment of acute calculus cholecystitis in patients with increased operational risk (literature review) // *Theoretical & Applied Science*. – 2021. – №. 3. – C. 254-260.
- [4] Baron T. H. et al. Comprehensive Review of the Management of Patients with Acute Cholecystitis Who Are Ineligible for Surgery // *Annals of surgery*. – 2025. – C. 10.1097.
- [5] Baron T. H. et al. Comprehensive Review of the Management of Patients with Acute Cholecystitis Who Are Ineligible for Surgery // *Annals of surgery*. – 2025. – C. 10.1097.
- [6] Botirov, A. K., et al. Errors, Dangers, and Omissions in Surgery of Gallstone Disease and Choledocholithiasis. *Ekonomika i Sotsium [Economics and Society]*, 2022, No. 5-2 (92), pp. 933-941. [in Russian]
- [7] Bozic D. et al. Assessment of gallbladder drainage methods in the treatment of acute cholecystitis: A literature review // *Medicina*. – 2023. – T. 60. – №. 1. – C. 5.
- [8] Brunt L. M. et al. Safe cholecystectomy multi-society practice guideline and state-of-the-art consensus conference on prevention of bile duct injury during cholecystectomy // *Surgical endoscopy*. – 2020. – T. 34. – №. 7. – C. 2827-2855.
- [9] Cianci P., Restini E. Management of cholelithiasis with choledocholithiasis: Endoscopic and surgical approaches // *World journal of gastroenterology*. – 2021. – T. 27. – №. 28. – C. 4536.
- [10] de Mestral C. et al. Early cholecystectomy for acute cholecystitis offers the best outcomes at the least cost: a model-based cost-utility analysis // *Journal of the American College of Surgeons*. – 2016. – T. 222. – №. 2. – C. 185-194.
- [11] Dibirov, M. D., et al. Diagnostic and Treatment Algorithm for Elderly Patients with Acute Cholecystitis, Choledocholithiasis, and Mechanical Jaundice. *Zhurnal imeni N.V. Sklifosovskii "Neotlozhnaya Meditsinskaya Pomoshch'" [Sklifosovsky Journal "Emergency Medical Care"]*, 2017, Vol. 6, No. 2, pp. 145-148. [in Russian]
- [12] Gallaher J. R., Charles A. Acute cholecystitis: a review // *Jama*. – 2022. – T. 327. – №. 10. – C. 965-975.
- [13] Gallyamov, E. A., et al. Use of Minimally Invasive Technologies in Diagnosis and Treatment of Complications after Cholecystectomy for Acute Cholecystitis. *Khirurgicheskaya Praktika [Surgical Practice]*, 2023, No. 4, pp. 42-54. [in Russian]
- [14] Hung Y. L. et al. Management of patients with acute cholecystitis after percutaneous cholecystostomy: from the acute stage to definitive surgical treatment // *Frontiers in surgery*. – 2021. – T. 8. – C. 616320.
- [15] Khatsko, V.V., et al.. Modern Trends in Diagnosis of Choledocholithiasis. *Vestnik Gigieny i Epidemiologii [Bulletin of Hygiene and Epidemiology]*, 2020, Vol. 24, No. 3, pp. 356-360. [in Russian]
- [16] Loozen C. S. et al. Early cholecystectomy for acute cholecystitis in the elderly population: a systematic review and meta-analysis // *Digestive surgery*. – 2017. – T. 34. – №. 5. – C. 371-379.
- [17] Mencarini L. et al. The diagnosis and treatment of acute cholecystitis: A comprehensive narrative review for a practical approach // *Journal of Clinical Medicine*. – 2024. – T. 13. – №. 9. – C. 2695.
- [18] Missori G. et al. A narrative review about difficult

laparoscopic cholecystectomy: technical tips // Laparoscopic Surgery. – 2022. – T. 6. – C. 24-24.

- [19] Pereira J. et al. Surgeon-performed point-of-care ultrasound for acute cholecystitis: indications and limitations: a European Society for Trauma and Emergency Surgery (ESTES) consensus statement // European Journal of Trauma and Emergency Surgery. – 2020. – T. 46. – №. 1. – C. 173-183.
- [20] Prudkov M. I. et al. Acute cholecystitis. Results of multicenter research and ways to further improvement of surgical tactics // Annaly khirurgicheskoy gepatologii= Annals of HPB Surgery. – 2020. – T. 25. – №. 3. – C. 32-47.
- [21] Saydullaev Z. Y. et al. Minimally invasive methods of treatment of patients with acute cholecystitis // Annals of the Romanian Society for Cell Biology. – 2021. – T. 25. – №. 4. – C. 1956-1961.
- [22] Shabunin, A.V., et al. Chronic Pancreatitis: Modern Perspectives on Surgical Treatment Methods. Vestnik Khirurgii Kazakhstana [Kazakhstan Surgery Bulletin], 2018, No S1, pp. 43-44. [in Russian]
- [23] Shmakov, D.A., et al. Differentiated Approach to Choosing Surgical Access in Calculous Cholecystitis. Sibirskoye Meditsinskoye Obozrenie [Siberian Medical Review], 2020, No. 1 (121), pp. 66-72. [in Russian]
- [24] Wang S. Y. et al. Management of gallstones and acute cholecystitis in patients with liver cirrhosis: what should we consider when performing surgery? // Gut and liver. – 2020. – T. 15. – №. 4. – C. 517.
- [25] Ziyoev, Sh.Kh., et al. Current State of Surgical Treatment Problems for Acute Cholecystitis in Elderly Patients (Literature Review). Vestnik Pedagogicheskogo Universiteta (Eestestvennykh Nauk) [Herald of the Pedagogical University (Natural Sciences)], 2021, Nos. 1-2 (9-10), pp. 295-300. [in Russian]