Impact Factor:					
	ISRA (India) = 6.317	SIS (USA) = 0.912	ICV (Poland) = 6.630
	ISI (Dubai, UAE) = 0.829	РИНЦ (Russia) = 0.126	PIF (India) = 1.940
	GIF (Australia) = 0.564	ESJI (KZ) = 8.997	IBI (India) = 4.260
	JIF = 1.500	SJIF (Morocco) = 5.667	OAJI (USA) = 0.350

SOI: 1.1/TAS DOI: 10.15863/TAS

International Scientific Journal

Theoretical & Applied Science

p-ISSN: 2308-4944 (print) **e-ISSN:** 2409-0085 (online)

Year: 2021 **Issue:** 03 **Volume:** 95

Published: 24.03.2021 **http://T-Science.org**

QR – Issue QR – Article

Sh.K. Atadjanov
Andijan State Medical Institute
researcher

O.S. Khakimov
Andijan State Medical Institute
researcher

Sh.P. Kurbonov
Andijan State Medical Institute
researcher

A.Z. Otakuziev
Andijan State Medical Institute
researcher

M.M. Nosirov
Andijan State Medical Institute
researcher

MODERN ASPECTS OF DIAGNOSIS AND TREATMENT OF ACUTE CALCULUS CHOLECYSTITIS IN PATIENTS WITH INCREASED OPERATIONAL RISK (Literature review)

Abstract: *The authors conclude that for each surgical intervention there are separate indications, mainly as a justification of contraindications for video laparoscopic cholecystectomy, most of the contraindications are due to destruction of the gallbladder, its infiltrate, and pathology of the extrahepatic biliary tract. According to the authors, laparoscopic cholecystectomy overcomes contrain-dications to traditional cholecystectomy, and is feasible in patients with high operational risk. As a result of a long-term study, the authors showed all the positive aspects of laparoscopic cholecystectomy compared with laparotomy.*

Key words: *gallstone disease, acute cholecystitis, surgery, elderly and senile age.*

Language: *English*

Citation: Atadjanov, S. K., Khakimov, O. S., Kurbonov, S. P., Otakuziev, A. Z., & Nosirov, M. M. (2021). Modern aspects of diagnosis and treatment of acute calculus cholecystitis in patients with increased operational risk (Literature review). *ISJ Theoretical & Applied Science, 03 (95)*, 254-260.

Soi: http://s-o-i.org/1.1/TAS-03-95-40 ***Doi***: https://dx.doi.org/10.15863/TAS.2021.03.95.40

Scopus ASCC: *2700.*

Introduction

Acute cholecystitis is quite widespread in urgent abdominal surgery and is currently still relevant. In most cases, the cause of the disease is gallstone disease. [1,2,18]. Gallstones are the cause of acute cholecystitis (AC) in 80-95% of patients with varying degrees of severity of pathomorphological changes in the wall of the gallbladder (GB) [3,6].

In developed countries, 10-15% of the adult population suffer from cholelithiasis. The prevalence directly depends on the age and gender of the patients. According to different authors, in the general structure of AC morbidity, patients aged 60-71 account for 32 to 52.6%, 51-60 years - 26%, 41-50 years -14%. The incidence of AC in the age groups 21-30 years old and 31-40 years old averages 7-8%. [18,12,7,4]. Despite

the fact that the diagnostic criteria are constantly being improved, and the methods of treatment have undergone significant changes due to the advent of minimally invasive technologies, there is no unequivocal proposal for the diagnosis, treatment and prevention of the development of all kinds of complications in this age group. In particular, men suffer from this disease two times less often than women, respectively. Every fifth of women aged 40 and over is faced with cholelithiasis, while men of the same age are faced with it in every tenth case. According to the Third National Health and Nutrition Examination Survey, 6.3 million men and 14.2 million women aged 20 to 74 in the United States had gallbladder disease [45,47,49,51]. In Europe, the Italian Multicenter Study for Gallstone Disease examined nearly 33,000 subjects between the ages of 30 and 69 in 18 cohorts from 10 regions in Italy. The overall incidence of gallstone disease was 18.8% for women and 9.5% for men [34]. However, the prevalence of gallstone disease (GSD) varies significantly depending on ethnicity, for example, the lowest incidence is noted in Ireland (5%), and the highest in Sweden (32%) [38]. The indigenous population of Africa almost does not suffer from gallstones, the frequency of the latter is 1% [9,46], African-American women - three times less often than Indo-American women. In Chile, cholelithiasis is found in 55% of women and 30% of men. Among Pima Indians, gallstone disease is observed in 45% of men and 75% of women, and in women after 70 years - in 90%, which is due to a genetic decrease in the pool of bile acids [50]. In Russia, the annual appealability for gallstones is on average 5-6 people per 1000 population [12]. In Kazakhstan, 22.4% of calls to an ambulance are for gallstones, acute and chronic cholecystitis, [8,17]. More than 750,000 cholecystectomies are performed annually in the United States and the cost of treating these patients is approaching $ 10 billion [48,51,52]. Uzbekistan also belongs to the regions with an increased tendency of patients with calculous cholecystitis, detected by the appeal of the population for medical care, and is 5.82 per 100 thousand, and the number of operations carried out in the republic for complicated forms of calculous cholecystitis ranges from 1 to 1.5 thousand a year. The steady increase in the number of patients with cholelithiasis leads to an increase in its complications from 17 to 83%, often requiring urgent surgical intervention. At the same time, postoperative complications and mortality after emergency operations remain several times higher than with planned surgical interventions [15,25,26], and among males, this figure can reach 27%. The gender of patients should also be considered as an additional factor in the increased risk of morbidity, mortality and possible intraoperative complications. At the same time, according to various authors and according to our data in men, clinical manifestations of acute calculous cholecystitis are by no means always expressed clinical manifestations, which sometimes leads to severe changes in the gallbladder and complicates the operation technique with inevitable conversion [14,16,26].

As for purulent complications in acute calculous cholecystitis (ACC), the leading place is occupied by perivesical infiltrate (15.0%) and empyema of the gallbladder (12.4-16.1%), then subhepatic abscess (2.3-3.6 %), dropsy of the gallbladder (4.7-7.2%), local peritonitis (0.4-1.3%) and diffuse peritonitis (1.4-2.3%) [15]. To conduct a systematic search of scientific information and to achieve this goal, an analysis of the recommendations of the World Society for Emergency Surgery 2016 (Israel) and Tokyo Recommendations 2007 and 2013 (Japan), as well as scientific publications in evidence-based medicine databases (PubMed) was carried out, with using specialized search engines (Google Scholar) and in electronic scientific libraries (CyberLeninka, e-library) from 1990 to 2018 [29].

In the last decade, in order to improve the diagnosis and treatment of ACC, a number of targeted scientific studies have been carried out in the world, including screening for the early detection of patients and the provision of timely therapeutic and preventive care, the development of various methods of operations, including tactical aspects of performing endosurgical interventions.

The Tokyo Clinical Guidelines (TG07) for the treatment of acute cholecystitis were first published in 2007. The main goal of the TG07 was to achieve a consensus among specialists in this field worldwide [29]. Later, in clinical practice, the low diagnostic sensitivity of TG07 in relation to AC and the relationship between the assessment of the severity of the condition and the clinical characteristics of the disease was proved [29,54].

To date, some of the TG13 recommendations are outdated, the OC scoring system has not been tested and proven reliable. Finally, the conclusions are unclear, as all different therapeutic options are available for the same "level of cholecystitis severity", there is ongoing debate about the diagnostic value of uniform ultrasound signs and laboratory tests. Other major controversies regarding AC are the choice of the best method for diagnosing the biliary tract, treatment options, type of surgery, identification and treatment of patients at high surgical risk. There is still controversy regarding the surgical treatment of ACC regarding the timing of the operation. The need for surgical treatment compared with conservative management of patients has been less studied [28].

The most important issue requiring study and in-depth analysis is the issue of timely diagnosis and adequate treatment tactics for different clinical forms of acute cholecystitis in patients with a low pain threshold [6,9,10].

For these reasons, the World Society of Emergency Surgery (WSES) decided in 2016 to convene a Consensus Conference (CC) to examine these controversies and to establish guidelines for the diagnosis and treatment of ACC [29,32,54]. Its main provisions were published in June 2016 in the "International Journal of Emergency Surgery" ("World Journal of Emergency Surgery").

In July 2016 (Ireland, Donegal), a consensus conference "Means of Optimization for Emergency Surgery" was held, where protocols for the diagnosis and treatment of acute surgical diseases based on the best practice and from the standpoint of evidence-based medicine were introduced. Criteria were presented for assessing the quality of emergency surgical care for patients with AC, which took into account such indicators as the duration of treatment, analysis of each death, severe complications and emergency conditions [29].

Diagnosis requires a detailed study of the history, physical examination, and clinical laboratory tests. For patients at risk (over 60 years of age) there is no single clinical or laboratory study with sufficient diagnostic accuracy to establish or exclude AC [9,31,52].

Ultrasonography of the gallbladder continues to be the gold standard for diagnosing ACC. Wide availability, lack of invasiveness, lack of exposure to ionizing radiation, and a short study period are characteristics that make ultrasound the first choice of imaging for diagnosing ACC [44,45]. Meta-analysis by Shi et al. support these data [51].

Another meta-analysis by Kieiwiet et al. Investigated the diagnostic value of computed tomography (CT) and magnetic resonance imaging (MRI) in addition to ultrasound in the diagnosis of AC [58]. According to it, no significant advantages of CT have been identified, in addition, the problem lies in the ionizing radiation to which patients are exposed. As for MRI, its effectiveness is equal to abdominal ultrasound. It is recommended to combine clinical, laboratory and imaging research methods to improve the quality of research and clarify the diagnosis, although the best combination is not yet known [42,44].

Surgical tactics for acute calculous cholecystitis. Today, there are three main technologies in the treatment of various forms of GSD [16, 22]:

- traditional cholecystectomy from a median or oblique laparotomic approach;
- laparoscopic cholecystectomy (LCE), which requires special equipment and sufficient qualifications of the surgeon (accompanied by fewer complications, shorter rehabilitation period and lower cost);
- cholecystectomy from a mini-access, the technique of which is closer to the traditional one;

The most common method of surgery is now LCE [40,59]. According to TG13, video laparoscopic cholecystectomy is now considered a safe surgical technique when performed by emergency surgeons for acute calculous cholecystitis [29,54].

Early LCE is indicated for patients with class I (mild) ACC. This group includes somatically healthy patients without concomitant diseases with moderate inflammatory changes in the gallbladder walls. In the presence of one of such signs in patients as, the duration of the acute period is more than 72 hours, the presence of a palpable gallbladder or infiltrate in the right hypochondrium, leukocytosis more than 18x109 / l, a destructive form of acute cholecystitis, are classified as class II (moderate) ACC. For patients with severe local complications such as biliary peritonitis, emphysematous cholecystitis, gangrenous cholecystitis, and purulent cholecystitis, urgent surgery is performed along with the usual supportive measures. Class III (severe) ACC includes patients with multiple organ failure, hypotension, impaired consciousness, high plasma creatinine levels, and thrombocytopenia in blood coagulation. In this case, TG13 suggests gallbladder drainage and delayed cholecystectomy after improvement in general clinical conditions [55]. But a recently published meta-analysis by Coccolini F. et al. (2015) showed that LCE for ACC is the preferred approach with lower mortality and morbidity, significantly shorter postoperative hospital stays, and reduced incidence of pneumonia and wound infections compared to the open method [41].

According to C. Kum et al. (1996) after LCE in chronic cholecystitis in 0.2% of cases, hepaticoholedochus damage is noted, and in acute cholecystitis - in 5.5% of cases. Similar data are given by other authors [45,48,51,52]. At the same time, the transition to laparotomy is not the optimal way to solve the problem of treating acute cholecystitis complicated by infiltration. B.A.Korolev, D.L. Pikovsky, (1990), H. Burhenne, (1989) believe that carrying out "open" cholecystectomy in acute cholecystitis is accompanied by a significantly higher frequency of deaths, ranging from 1.0% to 10 , 6%. While after LCE performed for acute cholecystitis, deaths are observed much less often - from 0.2% to 0.5% of cases [11,14,34]. Considering that paravesical infiltration is observed in 8.0–40.7% of patients with acute destructive cholecystitis [48,51,52], it is of great practical interest to develop atypical LCE methods that allow avoiding the transition to laparotomy and reducing the frequency of hepaticocholedochus injuries.

As for the timing of interventions, early LCE should be performed as soon as possible, but can be performed up to 10 days after the onset of the first symptoms of AC. However, it should be noted that earlier surgery is associated with shorter hospital stays and fewer complications. One randomized controlled

trial compared early LCE with LCE after symptom resolution but within 5 days of admission in patients with ACC [39]. At the same time, one of the main limitations that still exists today is the time from the moment of the disease. So, according to a number of authors [1,2,6,7,30,35], the optimal time for laparoscopic cholecystectomy is the first 48 hours from the onset of the disease. All these factors determine the indications for an emergency operation or for a staged method of treatment.

Provided by Zafar S.N. et al. (2015) results from a large database review of approximately 95,000 patients with ACC showed that patients who had surgery within 2 days of admission had fewer complications than those who underwent surgery 2 to 5 days after admission. receipts [39, 56]. Finally, several studies have shown that cholecystectomy performed as soon as possible is cost effective [37,50,56].

In the case of severe local inflammation, the presence of adhesions, bleeding in the Kahlo triangle, or suspicion of damage to the bile ducts, then it is necessary to switch to the "open" method of surgical treatment - Tang et al. (2006) in their systematic review, identified the main risk factors for conversion in LCE. These are male sex, deep old age, obesity, cirrhosis, a history of abdominal surgical interventions, severe acute and chronic cholecystitis. Another reason for intraoperative tactical errors and postoperative complications in typical cholecystectomy and LCE is the complex anatomical and surgical conditions of the intervention zone - pronounced variability of the topography of the gallbladder, anatomical forms of the cystic duct and variants of branching and location of the cystic artery, the variability of their relationship with the vascular and ductal structures of the subhepatic space. In this regard, it is obvious that it is necessary to evaluate the techniques used in endosurgery of the biliary tract in terms of effectiveness and acceptability in LCE in various clinical situations, as well as to develop an individualized approach to surgical technique based on the principles of typical variability [38, 46, 53].

According to Eldar et al. (1998), the incidence of complications in ACC is generally associated with a duration of complaints of more than 48 hours, gangrenous cholecystitis, male sex, age> 60 years, other comorbidities, large gallstones, and elevated serum bilirubin levels. As a rule, LCE is safe for catarrhal and phlegmonous ACC and is accompanied by a small number of conversions and complications [46], except for gangrenous cholecystitis, where the conversion rate ranges from 4 to 40% [44.65]. As for patients at risk with AC, some authors prefer multistage treatment, while other authors [30] practically abandoned two-stage treatment due to the good tolerance of LCE, conversion to the traditional method of surgery in this group is 1.7%, mortality is 0. fifteen%.

Traditional cholecystectomy is a safe technique in the presence of perivesical infiltrate, inflammatory and cicatricial changes in the subhepatic region and hepatoduodenal ligament. But due to its shortcomings, such as significant trauma to the structures of the anterior abdominal wall, intestinal paresis, impaired respiratory function, a large number of early and late complications, cosmetic defect, long-term postoperative recovery, make this technique a losing one in comparison with LCE and mini-access [10]. According to the author Dolgov OA (2008), the number of complications in open surgery is 20.4%, and the mortality rate is 3.7% [14].

Complications of acute calculous cholecystitis. About 20% of patients, especially males, seek surgical help after 3-4 days from the moment of illness, due to the paucity of clinical manifestations due to the low pain threshold. As a rule, the operation is performed at this time in conditions of perivesical infiltration. With peri-vesical infiltration, in addition to the presence of changes in the wall of the gallbladder, the surrounding tissues are also involved in the inflammatory process. So in the work of Temirbulatov V.M. et al. (2008) during ultrasound diagnostics of the gallbladder out of 403 patients, 324 (80.4) patients were found to have pericholecystitis, and in 73 cases the presence of perivesical infiltrate, mainly in the area of the gallbladder neck and hepato-duodenal ligament [27]. In the early stages of inflammation, ultrasound visualizes hyperechoic fields without clear boundaries. Subsequently, the inflammatory process is delimited with the formation of an infiltrate in the perivesical region, which is found in the form of a hyperechoic formation with clear contours.

Differentiation of "loose" infiltrate from "dense" infiltrate is necessary, as it dictates different surgical tactics. In the presence of the first option, it is possible to perform surgical intervention; in the case of the second, cholecystectomy may be inappropriate, since it is most often accompanied by intraoperative complications: bleeding and damage to the extrahepatic biliary tract [26,27,32]. So the incidence of complications in the form of the risk of damage to the bile ducts during surgery accounts for 36 to 47 injuries per 10,000 patients during laparoscopic surgery and from 19 to 29 cases of injuries per 10,000 patients during minilaparotomic surgery [4,7]. The experience of the authors of the Russian recommendations speaks in favor of conservative treatment in the presence of a dense infiltrate, and later on performing cholecystectomy from a mini-access [4,15,26]. However, if within half an hour the surgeon fails to verify the cystic duct and the cystic artery in conditions of a strong inflammatory process in the gallbladder neck and hepatoduodenal ligament, then it is recommended to perform a timely conversion from the minilaparotomic approach to an open operation before complications develop.

Discussion.

Analysis of literature data allows us to judge that AC and AC is a fairly widespread pathology. The main goal of the TG07 was to achieve a common vision among specialists in the field of diagnosis and treatment of AC around the world. However, in clinical practice, the low diagnostic sensitivity of TG07 in relation to AC has been proven. In this regard, the TG13 revised diagnostic criteria and criteria for assessing the severity of the patient's condition, as well as the role of surgery. For this purpose, Grade systems for determining the level of evidence and the grade of recommendation were used. However, TG13 did not give an exhaustive answer regarding the determination of the scope of surgical tactics in elderly and senile patients, therefore the WSES 2016 highlighted patients from high-risk groups, where it was noted that the age of patients over 80 years old with AC should be considered as an additional factor of increased risk of intraoperative complications , morbidity and mortality. In the presence of a perivesical infiltrate, which technically complicates the performance of LCE, it is recommended to switch to open surgery. In this case, according to the opinion of the Russian authors A.G. Beburishvili, M.I. Prudkov. the choice of cholecystectomy from the mini-access as a conversion method is more preferable [7].

The criteria for assessing the quality of care for patients with AC and ACC according to the Consensus Conference "Means of Optimizing Emergency Surgery" (Ireland, Donegal, July 2016) are: 80% of patients with AC who are admitted before 16:00 should undergo an ultrasound examination on the day of admission. The 30-day mortality should not be >5%. More than 80% of cholecystectomies should begin laparoscopically and >65% laparoscopically and complete. More than 90% of patients should be operated on in the first 6 days. hospitalization. 80% of patients should be seen by the responsible surgeon within the first 12 hours after admission. 60% of patients with ACC should be operated on at the first hospitalization and in 80% during an acute episode. 95% of patients should have a blood test for amylase / lipase levels. In 100% of cases, patients who underwent cholecystectomy should be entered in the register of the institution for the presence of bile leakage, bleeding and damage to the bile ducts [29].

To date, there is no single protocol for the diagnosis and treatment of acute destructive forms of calculous cholecystitis. And the existing algorithms determine the activities of clinics of regional subordination. We were interested in the question of the possibility of implementing the proposed numerous algorithms for the treatment of acute calculous cholecystitis. In particular, in 2007 adopted (revised in 2016) "Recommended protocols for the provision of emergency surgical care to the population." These protocols do not contradict the regulations adopted by the Ministry of Health and the Republic of Uzbekistan, they are a recommendation for the implementation and examination of diagnostics and treatment of the most common urgent surgical diseases in medical institutions. In the available literature, there are no works reflecting the implementation of the proposed algorithms for the treatment of acute destructive forms of calculous cholecystitis both in clinical hospitals and in level 3 hospitals (central city hospitals and central district hospitals (CRH, CGH). The bulk of medical institutions providing emergency surgical care the population, both on the territory of the Republic of Uzbekistan and in the Andijan region, correspond to levels III and IV (CRH and CGB) - They do not have the equipment and technical equipment to perform high-tech operations, which are operations in acute destructive forms of calculous cholecystitis. point to conduct this study.

Conclusions.

Thus, the introduction into clinical practice of laparoscopic cholecystectomy in the treatment of acute calculous cholecystitis significantly improves the immediate and long-term results. Over the past decades, the increase in patients with cholelithiasis has led to the search for the most sparing, low-traumatic methods of surgery. Today, the modern method of treating acute cholecystitis is laparoscopic cholecystectomy and it is feasible in patients of all age groups, but much depends on the skills and experience of the surgeon. According to the 2016 WHO recommendations, further study and development of intraoperative assessment is required in the choice of the method of completion of the operation in conditions of increased operational risk and destructive changes in the gallbladder, since the study of this issue is still open.

References:

1. Alidzhanov, F.B., Khadzhibaev, A.M., & Baimuradov, Sh.E. (2011). Tactical approaches to the treatment of destructive cholecystitis using minimally invasive technologies. *Shoshilinch tibbiyot axborotnomasi*, № 2.

2. Akilov, Kh.A., Atadzhanov, Sh.K., Akbarov, M.M., & Saydazimov, E.M. (2002). Laparoscopic cholecystectomy for acute cholecystitis: Abstracts. report IX conf. surgeons of hepatologists of Russia and the CIS countries, May 16-18, 2002. *Ann. hir. hepatol.* SPb., T. 7, No. 1, p.82.
3. Altyev, B.K., Rakhimov, O.U., Tursumetov, A.A., Sapaev, D.A., Choriev, Kh. T., & Sapaev, A.D. (2016). Intra-abdominal bleeding after various cholecystectomy options (literature review). *Young scientist*, No. 27, pp.234-239.
4. Aripova, N.U., & Nazyrov, F.N. (2006). Iatrogenic damage to the biliary tract. *Annals of chir. hepatol*., T. 11, No. 3, pp.66-67.
5. Babyshev, V.V., Abdullaev, E.G., & Konchugov, R.Yu. (2005). *Mini-access in surgical practice of complicated cholelithiasis*. Materials of the Ural interregional scientific-practical conference "Mini-access surgery". Yekaterinburg, April 14-15, 2005, p. 5.
6. Bashilov, V.P., et al. (2005). *Comparative evaluation of various methods in the treatment of patients with acute calculous cholecystitis complicated by choledocholithiasis*. Surgery, pp. 40-45.
7. Beburishvili, A.G., Prudkov, M.I., Sovtsov, S.A., Sazhin, A.V., Shulutko, A.M., & Natroshvili, A.G. (2015). *National clinical guidelines "Acute cholecystitis"*. Adopted at the XII Congress of Russian Surgeons "Topical issues of surgery", p.20.
8. Bekeshkyzy, A.B., Gladinets, M.M., Baytuyakova, A.O., Kirimbaeva, A.E., Baiseitova, M.E., & Masalov, A.E. (2014). Choledochotomy in emergency emergency abdominal surgery of the extrahepatic biliary tract. *Science and Health*, no. 1, pp.77-79.
9. Bystorov, S.A., Zhukov, B.N., & Bizyarin, V.O. (2010). Minimally invasive operations in the treatment of gallstone disease in patients with increased operational risk. *Surgery*, 7:55.
10. Galperin, E.I., & Vetshev, P.S. (2006). *Guide to biliary tract surgery*. (p.561). Moscow: "Vidar-M".
11. Gontmakher, E. (2012). Problems of population aging in Russia. *World economy and international relations*, №1, pp. 22-29.
12. Grigorieva, I.N. (2007). The main risk factors for gallstone disease. *Ros.zhurn. gastroenterol. hepatol. coloproctol.*, No. 6, pp. 17-21.
13. Dadvani, S.A., Vetshaev, P.S., Shulutko, A.M., & Prudkov, M.I. (2000). *Cholelithiasis*. (p.139). Moscow: "Vidar-M".
14. Dolgov, O.A. (2008). *Comparative assessment of traditional and laparoscopic technologies in the treatment of complicated cholelithiasis*: author. diss ... cand. medical sciences. (p.26). Moscow.
15. Ermolov, A.S., Dasaev, N.F., Yurchenko, S.V., Durgaryan, T.V., & Ryabykh, V.I. (2002). Diagnostics and treatment of cholangiolithiasis after cholecystectomy. *Surgery*., No. 4, pp.4-10.
16. Ilchenko, A.A., & Ilchenko, A.L. (2004). Classification of gallstone disease. *Therapeutic archive*, No. 2, pp. 75-78.
17. Iskhakov, B.R., Vakkasov, M. Kh., Soliev, B.E., Ruzmatov, A.E., & Ismanov, A. (2008). Complications of laparoscopic cholecystectomy in acute cholecystitis. *Annals of surgeons. Hepatology*,T. 13, No. 3, p.120.
18. Karimov, Sh.I., Krotov, N.F., Kim, V.L., Arustamova, M.N., & Berkinov, U.B. (2000). Complications of laparoscopic cholecystectomy in chronic calculous cholecystitis. *Endoscopic surgery*, N 4, pp.39-41.
19. Karimov, Sh.I., Khakimov, M.Sh., Adylkhodzhaev, A.A., Rakhmanov, S.U., & Khasanov, V.R. (2015). Treatment of complications of transhepatic endobiliary interventions in obstructive jaundice caused by periampullary tumors. *Annals of Surgical Hepatology*, N 3, pp.68-74.
20. Kussainov, A.A., Nurkenova, V.B., Zeinelova, M.A., Ualiev, B.S., & Paizullaev, M.A. (2011). Surgical tactics in acute cholecystitis. *Science and health care*, No. 1, pp.43-44.
21. Kuspaev, E.N. (2011). *Optimization of the organization of work of the admission department in emergency clinics*: dis ... PhD, p.114.
22. Mikhin, I.V., Kukhtenko, Yu.V., & Kosivtsov, O.A. (2014). Differentiated approach to the choice of the option of minimally invasive surgical treatment of patients suffering from different forms of calculous cholecystitis. *Endoscopic surgery*, vol. 20, No. 1, pp. 3-8.
23. Nazyrov, F.G., et al. (2000). Diagnostics and treatment of intraoperative injuries and post-traumatic strictures of the bile ducts. *Annals of Heer Hepatol*, 5 (2): 126-127.
24. Raimzhanova, A.B. (2016). Comparative assessment of various methods of cholecystectomy. *Science and health care*, no.1, pp.40-53.
25. Saveliev, V.S. (2004). *50 lectures on surgery*. (p.751). Moscow: "Triada-X".
26. Sovtsov, S.A., & Prilepina, E.V. (pp.18-23). Cholecystitis in high-risk patients. *Zhurnal im. N.I. Pirogov.*, No. 12, pp.18-23.
27. Timerbulatov, V.M., & Verzakova, I.V. (2008). Ultrasound diagnostics of acute cholecystitis and its complications. *Annals of surgical hepatology*, T. 13, No. 1, pp. 76-82.
28. Timoshin, A.D., Shestakov, A.L., & Yurasov, A.V. (2003). *Minimally invasive interventions in abdominal surgery*. (p.216). Moscow: "Triada".

29. Usenko, A. Yu., Yareshko, V. G., Nichitailo, M. E., Mikheev, Yu.A., & Andreeschev, S.A. (2015). TG13: Updated Tokyo Clinical Guidelines for the Management of Acute Cholangitis and Cholecystitis. *Klichna mrurpa*, No. 10, pp.5-10.
30. Khadzhibaev, A.M., Alidzhanov, F.B., & Egamov, B.T. (n.d.). *Laparoscopic and minilaparotomic cholecystectomy in the treatment of destructive forms of wasps*.
31. Borzellino, G., et al. (2008). Laparoscopic cholecystectomy for severe acute cholecystits. A meta-analysis of results. *Surg Endosc*., 22: 8-15.
32. Brooks, K.R., Scarborough, J.E., Vaslef, S.N., & Shapiro, M.L. (2013). No need to wait: An analysis of the timing of cholecystectomy during admission for acute cholecystitis using the American College of Surgeons National Surgical Quality Improvement Program database. *J Trauma Acute Care Surg.*, 74(1):167-73. 173-4.
33. Cheng, Y., Leng, J., Tan, J., Chen, K., & Dong, J. (2013). Proper surgical technique approved for early laparoscopic cholecystectomy for non-critically ill elderly patients with acute cholecystitis. *Hepatogastroenterology*, 60:688-91.
34. Coccolini, F., et al. (2015). Open versus laparoscopic cholecystectomy in acute cholecystitis. Systematic review and meta-analysis. *Int J Surg.*, 18: 196-204. doi:10.1016/j.ijsu.2015.04.083.
35. Giger, U., Michel, J.M., Vonlanthen, R., Becker, K., Kocher, T., & Krähenbühl, L. (2005). Laparoscopic cholecystectomy in acute cholecystitis: indication, technique, risk and outcome. *Langenbecks Arch Surg.*, 390(5):373-80.
36. Gutt, C.N., et al. (2013). Acute cholecystitis: early versus delayed cholecystectomy, a multicenter randomized trial (ACDC study, NCT00447304). *Ann Surg*. 2013; 258(3): 385-40.
37. Halachmi Di Castro, N., Matter, I., Cohen, A., Sabo, E, Mogilner, J.G., Abrahamson, J., & Eldar, S. (2000). Laparoscopic cholecystectomy for acute cholecystitis: how do fever and leucocytosis relate to conversion and complications? *Eur J Surg*., 166(2):136-40.
38. Hwang, H., Marsh, I., & Doyle, J. (2014). Does ultrasonography accurately diagnose acute cholecystitis? Improving diagnostic accuracy based on a review at a regional hospital. *Can J Surg.*, 57:162-8.
39. Johner, A., Haymakers, A., & Wiseman, S.M. (2013). Cost utility of early versus delayed laparoscopic cholecystectomy for acute cholecystitis. *Surg Endosc.*, 27(1):256-62.
40. Juvonen, T, Kiviniemi, H., Niemela, O., & Kairaluoma, M.I. (1992). Diagnostic accuracy of ultrasonography and Creactive proteine concentration in acute cholecystitis: a prospective clinical study. *Eur J Surg*., 158: 365-9.
41. Kiewiet, J.J., Leeuwenburgh, M.M., Bipat, S., Bossuyt, P.M., Stoker, J., & Boermeester, M.A. (2012). A systematic review and meta-Analysis of diagnostic performance of imaging in acute cholecystitis. *Radiology*, 264: 708-20.
42. Kratzer, W., Mason, R.A., & Kachele, V. (1999). Prevalence of gallstones in sonographic surveys worldwide. *J Clin Ultrasound.*, 27:1-7.
43. Lee, S-W., Yang, S-S., Chang, C-S., & Yeh, HJ. (2009). Impact of the Tokyo guidelines on the management of patients with acute calculous cholecystitis. *J Gastroenterol Hepatol*., 24:1857-61.
44. Overby, D.W., Apelgren, K.N., Richardson, W., & Fanelli, R. (2010). Society of American Gastrointestinal and Endoscopic Surgeons. SAGES guidelines for the clinical application of laparoscopic biliary tract surgery. *Surg Endosc.*, 24(10): 2368-86.
45. Pedersen, G., Hoem, D., & Andren-Sandberg, A. (2002). Influence of laparoscopic cholecystectomy on the prevalence of operations for gallstones in Norway. *Eur J Surg*., 168: 464-9.
46. Qazi, A.R., Solangi, R.A., Shah, P.S., & Memon, G.A. (2010). Reasons for conversion from laparoscopic to open cholecystectomy. *Medical Forum Monthly*, 21:3. 13-17.
47. Rubin, E., & Farber, J.I. (1994). *Cholelithiasis*. *Pathology*. 2-nd ed. (pp.777-782). Philadelphia: J. B. Lippincott Company.
48. Strasberg, S.M. (2008). Acute calcolous cholecystitis. *N Engl J Med.*, 358: 2804-11.
49. Tang, B., & Cuschieri, A. (2006). Conversions during laparoscopic cholecystectomy: risk factors and effects on patient outcome. *J Gastrointest Surg.*,10(7): 1081-91.
50. Trondsen, E., Reiertsen, O., Andersen, O.K., & Kjaersgaard, P. (1993). Laparoscopic and open cholecystectomy. A prospective, randomized study. *Eur. J. Surg.*, Vol. 159, N4, pp.217-221.
51. Yamashita, Y., et al. (2013). TG13 surgical management of acute cholecystitis. *J Hepatobiliary Pancreat Sci.*, 20:89-96.
52. Yokoe, M., et al. (2013). TG13 diagnostic criteria and severity grading of acute cholecystitis. *Hepatobiliary Pancreat Sci.*, 20:35-46
53. Zafar, S.N., Obirize, A., Adesibikan, B., Cornwell, E.E., Fullum, T.M., & Tran, D.D. (2015). Optimal Time for Early Laparoscopic Cholecystectomy for Acute Cholecystitis. *JAMA.*, 150(2):129-36.