International Journal of
Health Systems and Medical Sciences

ISSN: 2833-7433
Volume 2 | No 5 | May -2023

Epidemiological Aspects and the Current State of the Problem of Acute Calculous Cholecystitis on the Background of Obesity (Review)

Botirov A. K[1], Khakimov D. M [2], Mirzabaev G. E[3], Otakuziev A. Z [4]

[1,2,3,4] Andijan State Medical Institute

Abstract: The authors, after analyzing the literature data, note that cholelithiasis and in particular ACC against the background of obesity to this day is one of the most important medical and social problems of society, causing chronic diseases and life-threatening complications, as well as loss of quality of life.

The authors conclude that there is no single diagnostic and treatment algorithm in the literature for ACC against the background of obesity, there are a number of issues related to the choice of methods of surgical intervention and surgical tactics, and intraoperative and postoperative complications have not been sufficiently studied. All this requires an urgent need for further research in patients with ACC on the background of obesity, which will improve the results of surgical treatment.

Keywords: Gallstone disease, acute calculous cholecystitis, acute cholecystitis, cholecystectomy, obesity.

Introduction. In the modern world, cholelithiasis is one of the most common diseases that occurs in 10-20% of the population of developed countries [2; 9; 25; 32]. The same statistics are noted in Europe and the US GSD affects 15-20% of the population [18; 19; 26].

According to E. M. Dorofeenkov. et al. [8] among the adult population of Moscow, stones in the gallbladder were found in 37.6%. In the USA only from 2006 to 2014. the number of admissions to emergency departments for cholelithiasis and cholecystitis increased by 34% [34]. At the same time, the presence of calculi in the gallbladder is associated with a high risk of mortality from cardiovascular and oncological diseases [41] with an increased risk of developing chronic diseases [32].

According to World Health Organization today, cholelithiasis among various diseases of the biliary system takes 50-65% [39]. Diagnostic errors made in 12-38% of cases are accompanied by a consistently high mortality rate (2.5%), and with the development of severe complications, and even more so in the presence of cardiovascular diseases - from 14-27% to 40% of cases [3 ;10] .

Today, acute cholecystitis (AC) ranks second in frequency (after acute appendicitis) of the occurrence of urgent surgical diseases. This fact is confirmed by the reports of a number of researchers about a twofold increase in the frequency of diagnosing cholelithiasis approximately every 10 years, which is due to improved diagnosis, changes in lifestyle, diet, and a number of other factors [2].

With an increase in life expectancy and a change in lifestyle and diet, there is an increase in the number of patients over 60 years of age, as well as those with overweight and obesity, which constitute a risk group due to severe comorbidities. In these patients, the mortality rate from AC often reaches 27%. Despite a marked improvement in treatment outcomes, mortality after emergency operations (9.4–37%) for AC complicated by peritonitis remains several times higher than in elective surgical interventions [15;28].

Being the cause of the largest number of hospitalizations among all diseases of the gastrointestinal tract, cholelithiasis, with a tendency to develop a number of life-threatening complications, also occupies the position of one of the most costly diseases of the digestive system for healthcare [14; 18; 19; 26]. Thus, in the United States, the annual cost of surgical treatment of cholelithiasis is estimated at $6.5 billion [33].

The main risk factors for cholelithiasis include: hereditary predisposition; elderly age; overweight or obesity; female; pregnancy; taking estrogens during the postmenopausal period; high-calorie diet, rich in easily digestible carbohydrates and poor in fiber [22;23]. Despite the fact that the disease occurs mainly at the age of over 40 years, there is a widespread trend towards its rejuvenation, which is primarily associated with physical inactivity, obesity, diabetes mellitus, and early pregnancy [7; 18].

The composition of the stones is divided into cholesterol and pigment. They can be localized in the gallbladder, less often in the common bile duct and intrahepatic bile ducts. In 80% of cases, the disease is asymptomatic and stones are detected incidentally during ultrasound examination. Of these, 80 - 90% consist mainly of cholesterol [22;23].

Insulin resistance, hyperglycemia, and obesity play a key role in the formation of cholesterol stones [22]. Against the background of insulin resistance, the synthesis of endogenous cholesterol in the liver and its secretion with bile increases, which leads to a supersaturation of the latter with cholesterol; the reverse transport of cholesterol to the liver as part of high-density lipoproteins is disrupted; the level of bile acids that prevent stone formation decreases; there is a violation of motility and evacuation function of the gallbladder (GB) [22]. Hypertriglyceridemia, diabetes mellitus, and obesity have a similar negative effect on the emptying of the gallbladder, cholesterol synthesis, and bile composition [29].

There is more and more data characterizing cholelithiasis not only as an independent disease, but also as a comorbid pathology that has a close etiological and pathogenetic relationship with other diseases. It can contribute to their development and progression, influence outcomes. An inverse relationship is also possible: certain diseases and conditions can serve as an additional risk factor for stone formation [18; 36].

In view of the anatomical and physiological unity of the hepatobiliary system, the combination of CC with liver diseases deserves special attention. Additional factors contributing to stone formation in these patients are older age, high BMI, and female gender [26]. The high frequency of cholelithiasis in women is due to the influence of estrogen, which consists in increasing the synthesis of cholesterol and reducing the formation of bile acids [18].

From the point of view of pathogenesis, the association of cholelithiasis with cardiovascular and cerebrovascular diseases is explained by common pathogenetic factors - insulin resistance, obesity, diabetes mellitus, biliary dysmotility, hyperglycemia, dyslipidemia, inflammation, impaired bile outflow and common genetic polymorphisms [14;26;36].

In general, it can be stated that the formation of cholesterol stones in the gallbladder is a consequence of the combined influence of a number of local and general factors, and the cholelithiasis itself should be considered as a manifestation of systemic disorders of metabolic and inflammatory origin. At the same time, high prevalence rates, frequent complications and mortality indicate the relevance of the problem of ACC.

Significant progress in the surgical treatment of cholelithiasis in recent decades is associated with the introduction of laparoscopic cholecystectomy (LC) and CE from mini-approaches, which is due to

less trauma, high efficiency, and relatively rare occurrence of life-threatening complications. With the accumulation of practical work experience, the indications for them have expanded significantly, including in patients with obesity. At the same time, the issue of performing CE by minimally invasive methods in patients with overweight and obesity remains debatable to date. Thus, some researchers consider obesity a relative contraindication to LCE [20], and only a few consider it possible to perform LCE in this category of patients [5].

Thus, cholelithiasis and, in particular, ACC against the background of obesity to this day is one of the most important medical and social problems of society, causing both chronic diseases and loss of quality of life.

Obesity is a chronic multifactorial heterogeneous disease, manifested by excessive formation of adipose tissue, progressing in a natural course, as a rule, having a high cardiometabolic risk, specific complications and associated comorbidities. Currently, worldwide high prevalence of people with obesity is the cause of significant financial expenditures aimed at overcoming its consequences [11;15] .

The prevalence of obesity in the world is so great that it has become a global problem. Obesity is now recognized as a new chronic non-infectious "epidemic". According to the World Health Organization (WHO), by the end of the 20th century, about 30% of the inhabitants of our planet had overweight, i.e. about 1.7 billion man [35]. Thus, the prevalence of obesity in the Russian Federation is 59.2% and 24.1%, respectively [31]. Overweight occurs in almost 30% of the adult and 12% of the child population in economically developed countries and in the European territory of the post-Soviet space. In a third of adults, obesity, which began in childhood and adolescence, continues to progress, leading to a significant reduction in life expectancy and the development of life-threatening complications [6].

According to Baroudi meta-analysis R ., [17] in the industrialized countries of the world, 20-50% of the population are overweight. From 1960 to 1991 in the United States, the proportion of obese people among the total population increased, amounting to 55% in recent years>, in Canada it is 12%, in Denmark 10%, in Switzerland 28%, in Romania 32%. In Russia and the CIS countries, approximately one in three adult residents suffer from obesity of varying degrees.

According to a UN report, in 2013 the Russian Federation ranked 19th among all countries in the world in terms of the prevalence of obesity, lagging behind the leaders of the list, Mexico and the United States by 8%. According to a meta-analysis in 11 regions of the Russian Federation, the prevalence of obesity in the population was 29.7% [12].

Over the past decades, the prevalence of overweight and obesity in the world has increased by almost 30-50%. Today, obesity is considered as the most important risk factor for cardiovascular diseases and type 2 diabetes mellitus (according to WHO data, obesity predetermines the development of up to 44-57% of all cases of type 2 diabetes, 17-23% of cases of coronary artery disease, 17% of arterial hypertension, 30% - cholelithiasis, etc. [40], as well as reproductive disorders and an increased risk of developing cancer [27].In general, obesity, according to expert estimates, leads to a 4-fold increase in the risk of cardiovascular mortality and mortality as a result of oncological diseases by 2 times [15].

According to WHO data [37], 82 environmental and lifestyle factors have been identified that contribute to the development of obesity. Obesity is caused by an imbalance between consumed and expended energy, which is based on metabolic disorders, genetic predisposition, impaired behavioral reactions and the influence of external factors.

Malik V. _ S. , Willett W ., [30] note that the norm of the percentage of adipose tissue in healthy men is about 15-20%, in women - 25-30% . The percentage of adipose tissue can be indirectly estimated using the Deurenberg equation: % fat mass = 1.2 (BMI) + 0.23 (age) - 10.8 (sex) - 5.4, where age is the number of completed years, and gender is a coefficient equal to 1 for men and 0 for women [21]. This equation has a standard error of 4% and takes into account approximately 80% of the total body fat mass. Despite these limitations, some authors propose to include the percentage of

adipose tissue in the definition of obesity. The percentage of adipose tissue of more than 25% in men is regarded as obesity, indicators of 21 - 25% are borderline. In women, the corresponding figures are 33% and 31-33%. At the same time, it is necessary to exclude obesity associated with hereditary, endocrine and other pathologies (secondary, symptomatic). Since almost 30% of obese patients have eating disorders, they should be identified in the history taking. During an external examination, the type of distribution of adipose tissue is determined. According to the predominant place of fat deposition, obesity is distinguished: visceral, peripheral and mixed. [15].

The prevalence of obesity is increasing rapidly, and 51 million adults and 15 million children are projected to be obese in the coming decades [38]. A particularly challenging trend is the increasing prevalence of obesity among adolescents. This trend is exacerbating the adult obesity epidemic and posing a growing health problem for future generations. Among the adult population, overweight and obesity annually account for about 80% of cases of type 2 diabetes, 35% of cases of coronary heart disease and 25% of cases of hypertension. In the European continent, according to the WHO, over 1 million deaths and 12 million years of life with poor health are annually due to obesity [24].

A very special group is made up of patients in whom inflammatory diseases of the gallbladder occur against the background of obesity. It is known that obesity is characterized by changes in many organs and systems that create a constant tension in the body's compensatory capabilities. There are reports in the literature that acute cholecystitis leads to high postoperative mortality, reaching up to 14.6%, which is especially high (20-23%) in elderly patients, among whom are predominantly obese people [1]. Moreover, in those suffering from cholelithiasis that developed against the background of obesity, various concomitant diseases are most common, which aggravate the general condition of patients and worsen the results of treatment of the underlying disease. This is expressed in more frequent disorders of the cardiovascular and respiratory systems, in violation of the physiology of blood coagulation, in an increase in the number of purulent-septic complications. The progression in recent years of metabolic diseases, including obesity and cholelithiasis, is to a certain extent caused by a persistent state of energy imbalance in a modern person [1;11;15].

Golochevskaya VS, Genya L.P., [4] by studying the etiological factors of obesity and cholelithiasis established their pathogenetic relationship. Both types of the disease are characterized by a nutritional imbalance, which is expressed in a sharp prevalence of animal fats and carbohydrates in the diet, in a decrease in the proportion of vegetable fats, fresh vegetables and fruits, and hypokinesia also plays an important role. In patients with obesity, there is an increased content of crystalline precipitates in bile, which indicates a decrease in colloidal balance. Therefore, obesity is often complicated by the formation of gallstones, and the addition of an infection worsens liver function, making it difficult to normalize fat metabolism [1].

Treatment of patients with overweight, obesity, metabolic syndrome requires not only weight loss, but also the treatment of all its components. Addressing the risk factors for obesity and treating the resulting complications is just as important as treating obesity. When performing surgical interventions, in some cases, the trauma from access is more significant than the intervention itself on the organ. This disadvantage of abdominal surgery has been eliminated with the development of laparoscopic technology. However, during laparoscopic interventions in obese patients, the occurrence of additional technical difficulties depends on the characteristics of fat distribution [13]. Compared with non-obese patients, complications are much more common among patients with severe forms of obesity, especially in patients with AC, among whom the frequency of open surgery was significantly higher [16].

Conclusion. Thus, the literature data testifies to the extreme relevance and medical and social significance of the problem, in which there are still many unexplored issues. In ACC against the background of obesity, there is no single treatment and diagnostic algorithm in the literature, there are a number of issues related to the choice of methods of surgical intervention and surgical tactics, and intraoperative and postoperative complications have not been sufficiently studied. All this requires an urgent need for further research in patients with ACC on the background of obesity, which will improve the results of surgical treatment.

REFERENCES

1. Aimagambetov M.Zh., Abdurakhmanov S.T., Bulegenov T.A. Peculiarities of diagnostics and surgical treatment of acute destructive calculous cholecystitis in overweight and obese patients. Literature review // Science and Health. 2019. 3 (vol. 21). Pp.54-67.
2. Vakhrushev Ya.M., Kudrina E.A., Gorbunov A.Yu. Epidemiology of cholelithiasis in the Udmurt Republic // Health, demography, ecology of the Finno-Ugric peoples. - 2015. - No. 1. - C. 43-46.
3. Galperin E.I. Obstructive jaundice: the state of "imaginary stability", the consequences of the "second blow", the principles of treatment / Galperin E.I. / Annals of surgical hepatology. - 2011. - No. 16(3). - S. 16-26.
4. Golochevskaya B. C., Genya L.P. Conservative treatment of patients with cholelithiasis with preparations of chenodeoxycholic and ursodeoxycholic acids // Clinical Medicine. - 1992. - T. 70; No. 7/8. -WITH. 60-63.
5. Davlatov S.S. The effectiveness of minimally invasive methods of surgical treatment of patients with acute destructive cholecystitis // Academy. 2017. No. 7. S. 92-94.
6. Doc A. The epidemiology of obesity. - M. Medicine, 2002. - 97s.
7. Dorofeeva S.G., Konoplya E.N., Mansimova O.V. Cholelithiasis: modern ideas about etiology and pathogenesis // Integrative tendencies in medicine and education. - 2020. - Volume 2. - C. 21-25.
8. Dorofeenkov E.M. Prevalence and features of the clinical picture of cholelithiasis in the population of Moscow // Dissertation of the candidate of medical sciences 14.00.05. - 2006. - S. 130.
9. Ivashkin V.T., Maev I.V., Baranskaya E.T. and other Recommendations of the Russian Gastroenterological Association for the diagnosis and treatment of gallstone disease // Russian Journal of Gastroenterology, Hepatology, Coloproctology. 2016; 26(3):54-80.
10. Maistrenko HA, Romashchenko P.N., Strukov E.Yu. Obstructive jaundice syndrome of benign genesis: optimization of diagnostic and therapeutic approaches // Actual problems of surgical hepatology: Mat. XX Int. Congress of the Association of Surgeons-Hepatologists of the CIS countries - Donetsk: Publisher Zaslavsky A.Yu., 2013. - P.118.
11. Mishalov V.G., Bondarev R.V., Kondakova E.Yu. On the features of surgical treatment of chronic calculous cholecystitis in patients with obesity and ptosis of the anterior abdominal wall after previous operations on the organs of the upper floor of the abdominal cavity. Surgery of Ukraine. 2016. No. 4. S.24-29.
12. Muromtseva G.A. and others. The prevalence of risk factors for non-communicable diseases in the Russian population in 2012-2013. Results of the ESSE-RF study // Cardiovascular therapy and prevention. 2014. V. 13. No. 6. S. 4-11.
13. Onopriev A V., Aksenov I.V. Sheiranov N.S. Technical features of laparoscopic cholecystectomy for acute cholecystitis in patients with morbid obesity. Kuban Scientific Medical Bulletin. 2013. No. 3 (138). pp. 99-103.
14. Sukharev, V.F. Complications of cholelithiasis (etiology, pathogenesis, clinic, diagnosis, treatment) / VF Sukharev, Yu.N. Ulyanov, E.G. Tsvetkov, A.V. Kradenov, V.I. Ivanov, A.M. Popov, Yu.N. Sokolov. - St. Petersburg: Firma Stiks LLC, - 2018. - 24 p.
15. Shlyakhto E.V., Nedogoda S.V., Konradi A.O. Diagnosis, treatment, prevention of obesity and associated diseases // National Clinical Recommendations. St. Petersburg, 2017.
16. Augustin T., Moslim MA, Brethauer S. et al. Obesity and its implications for morbidity and mortality after cholecystectomy: A matched NSQIP analysis // Am J Surg. 2017. No. 213(3). R.539-543 .

17. Baroudi R.: Body contouring surgery// Clin. Plast. Surg. 76:263, 1989.
18. Di Ciaula A., Wang DQH, Portincasa P. An update on the pathogenesis of cholesterol gallstone disease. Current Opinion in Gastroenterology 2018; 34(2):71-80.
19. European Association for the Study of the Liver (EASL). Electronic address: easloffice@easloffice.eu EASL Clinical Practice Guidelines on the prevention, diagnosis and treatment of gallstones // Journal of Hepatology. - 2016. -Vol. 65.- No. 1.-P. 146-181.
20. *Frazee RC, Roberts JW, Symmonds R., Snyder SK, Hendricks J., Smith R., Custer MD What are the contraindications for laparoscopic cholecystectomy? // Ain-J-Surg 1992 - Nov. - V. 164(5) - P. 494-5.*
21. Gallagher D. et al. Healthy percentage body fat ranges: an approach for developing guidelines based on body mass index //The American journal of clinical nutrition. 2000 Vol. 72. No. 3. P. 694-701.
22. Guarino MP, Cocca S., Altomare A. et al. Ursodeoxycholic acid therapy in gallbladder disease, a story not yet completed // World Journal of Gastroenterology: WJG. - 2013. - Vol. 19. - No. 31. - P. 5029-5034.
23. Gutt C, Schläfer S, Lammert F. The Treatment of Gallstone Disease. Dtsch Arztebl Int. 2020 Feb 28;117(9):148-158. doi: 10.3238/arztebl.2020.0148. PMID: 32234195; PMCID: PMC7132079.
24. James WPT, Jackson-Leach R., Mhurdu CN et al. Overweight and Obesity. In Comparative Quantification of Health Risks: Global and Regional Burden of Disease Attributable to Selected Major Risk Factors: eds. Ezzati M., Lopez AD, Rodgers A., MurrayCJL WHO Geneva, 2003.
25. Lammert F., Gurusamy K., Ko CW, Miquel JF et al. Gallstones // Nature Reviews. Disease Primers. 2016. (2). P. 16024. 129.
26. Li X., Guo X., Ji H. et al. Gallstones in patients with chronic liver diseases // Bio Med Res Int. 2017. 9749802.
27. Ligibel JA et al. American Society of Clinical Oncology position statement on obesity and cancer // Journal of Clinical Oncology. 2014. Vol. 32. No. 31. P. 3568 - 3574.
28. Littlefield A., Lenahan C. Cholelithiasis: Presentation and Management // Journal of Midwifery & Women's Health. -2019. -Vol. 64. - No. 3. -P. 289-297.
29. Liu, T., Wang, W., Ji, Y., Wang, Y., Liu, X., Cao, L., Liu, S. Association between different combination of measures for obesity and new–onset gallstone disease // PLOS ONE. - 2018. - Vol. 13. - No. 5. - P. e0196457.
30. Malik VS, Willett WC, Hu FB From the Downey Obesity Report, February 28th, 2013 Global obesity: trends, risk factors and policy implications //Nature Reviews Endocrinology. 2013. Vol. 9. No. 1. P. 13–27.
31. Ng M. et al. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis for the Global Burden of Disease Study 2013 // The Lancet. 2014. Vol. 384. no. 9945. P. 766-781.
32. Nimanya S., Ocen W., Makobore P., Bua E., Ssekitooleko B., Oyania F. Prevalence and risk factors of gallstone disease in patients undergoing ultrasonography at Mulago hospital, Uganda //African Health Sciences. - 2020. - Vol. 20.-No. 1.-P. 383-391.
33. Pak M., Lindseth G. Risk Factors for Cholelithiasis // Gastroenterology Nursing: The Official Journal of the Society of Gastroenterology Nurses and Associates. - 2016. - Vol. 39. - No. 4. - P. 297-309.
34. Peery AF, Crocket, SD, Murphy CC et al. Burden and Cost of Gastrointestinal, Liver, and Pancreatic Diseases in the United States: Update 2018 // Gastroenterology. - 2019. - Vol. 156. - No. 1. - P. 254-272.e11.

35. Seidell JS, Tommy LS, Visscher RT Overweight and obesity in the mortality rate data: current evidence and researchissues. Medicine and science in sports and exercise 1999; 31(11 Suppl): S 597-601.

36. Snou-Feng Zhao, Ai-Min Wong et al. Association between gallstone and cardiocerebrovascular disease: Systematic Review and meta-analysis. Exp. Ther. Med. 2019; 17(4): 3092-3100.

37. Stefan N et al. Metabolically healthy obesity: epidemiology, mechanisms, and clinical implications // The Lancet Diabetes & Endocrinology. 2013. Vol. 1. No. 2. P. 152-162.

38. WHO Global NCD Infobase, WHO global comparable estimates. [online database]. Geneva, World Health Organization, 2005 (http://www.who.int/ncd surveillance/info base/web/Info Base Common).

39. World Health Organization Media Centre. Obesity and overweight. Fact sheet no Geneva: World Health Organization. 2013.

40. World Health Organization. Fact sheet no.377. World Health Organization website 201 7 . http://www.who.int/mediacentre/factsheets/fs377/en/ .

41. Zheng Y., Xu M., Heianza Y. et al. Gallstone disease and increased risk of mortality: Two large prospective studies in US men and women /Journal of Gastroenterology and Hepatology. - 2018. - Vol. 33. - No. 11. - P. 1925-1931.