



CLINICAL RESEARCH

ACUTE CHOLECYSTITIS IN ELDERLY AND SENILE AGE: FEATURES OF CLINIC AND THE CHOICE OF TREATMENT STRATEGY

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ABSTRACT

Diseases affecting gall bladder and bile ducts commonly occur in the elderly and senile age, first of all gallstone disease and acute cholecystitis. Surgical interference with subsequent conservative therapy is the optimal treatment of acute cholecystitis. Complications that develop from the reduction of the functional reserve in older organism lead to an increase in the lethality among elderly patients. Evidently, unsatisfactory results of acute cholecystitis treatment among this category of patients are due to diagnostic mistakes in preoperative period. The erased and atypical clinical picture of acute cholecystitis in elderly patients as well as “syndrome of mutual aggravation” developing as a result of the presence of associated diseases also should be noted. It is natural that this group of patients is categorized as those with high operational and anesthetic risk. After the emergency interventions the postoperative lethality rate exceeds by 40-50%, which is 5-10 times greater than in younger patients with similar indicators.

Modern surgical practices within new surgical technologies are characterized by minimal invasiveness. Minimally invasive surgery leads to the reduction of operational trauma number, and decreases the indicators of postoperative lethality and complications. Cholecystectomy from the mini-access reduces the number of specific postoperative complications by 3 times and nonspecific by 5 times in comparison with traditional access among elderly and senile patients. It allows to perform a full scope surgical treatment and intraoperative research of patients with acute calculous cholecystitis and its complications in older age groups, provides the possibility of an early activation of patients, the reduction of the pain syndrome expressiveness, and the reduction in hospital stay by 1.5 times. It is possible to perform a cholecystectomy with mini-laparotomy access among the elderly patients, even with the presence of complications due to gallstone disease with the expressed inflammatory and adhesive process. Minimally invasive treatment is recommended even when severe comorbidity is combined with an acute cholecystitis and there are indications of obstructive jaundice.

An interesting method of acute cholecystitis treatment for elderly and senile persons with a high anesthetic risk is the use of decompression activities that are performed under ultrasound in combination with the obliteration of gall bladder cavity by a new synthetic material called MM-gel. It can be an alternative treatment for acute cholecystitis for the obliteration of gall bladder cavity if a radical surgical treatment is not possible. Surgical interventions from laparoscopic access are also prospective for elderly and senile patients suffering from acute cholecystitis after the evaluation of indications and contraindications, outlines of preoperative preparation and postoperative maintenance.

KEYWORDS: cholecystitis, cholecystectomy, minilaparotomy access.

Presently, the tendency of aging population is practically registered worldwide, and it will be continued, at least, for the next few decades. According

to the U.N.O's forecasts, the number of world's elderly residents aged 65 years and older will amount 25.2% of the population by 2050 and those aged 85 years – about 5% [Wanless D, 2006]. This finding concerns the public health sector because the state of older adults is generally associated with negative tendencies. According to numerous researches nearly the half of elderly men and more than 60% of women suffer from chronic disease. The chronic

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condition is expected to increase with further advancement in the age [Shchepin O et al., 2006; Malleva T, Sinyavskaya O, 2010].

There are numerous widespread diseases that affect this age group, two of which are the gallstone disease and acute cholecystitis. Currently, 60% of patients, hospitalized in surgical hospitals for acute calculous cholecystitis are individuals of elderly and senile age. Consistently, gallstones are detected in every fourth patient at the age of 60-70, and after 70 years – in every third [Galperin E, Vetshev P, 2006]. Respectively, the greater the age, the more frequent the occurrence of gallstone disease and acute cholecystitis. Therefore, taking into account the tendency to aging of population, the situation is unfavorable.

Meanwhile, the treatment of acute cholecystitis in elderly patients is a complex issue. Currently, surgery is the primary treatment for acute cholecystitis, while conservative therapy is more frequently applied as a preoperative preparation [Kurbanov R, 2011]. However, surgery is regarded as highly risky for 84.6-100% of patients of this age group in most cases due to diseases that are associated with the vital organs. Accordingly, therapeutic approach for elderly and senile patients remains a subject for debate. Furthermore, it is necessary to take into account that the incidence of complications' development connected with both the development of acute cholecystitis and exacerbation of associated diseases in this group of patients. So, the rate of complications in patients with acute cholecystitis at the age of 70 and older reaches to 36.6%. This number is nearly 3 times higher than in patients who are younger than 60 years [Vorobyov A, 2006]. Consequently, the complications that develop from the reduction of functional reserve in aging organism lead to an increase in the lethality among such patients [Sotnichenko B et al., 2001]. The comparative analysis carried out by a number of researchers showed that the postoperative lethality of acute cholecystitis do not exceed 2.3-3.3% among the group of patients aged 60 years. However, it could reach to 10.6-24.6% among the group of patients older than 60, and for complicated diseases – to 30-43% [Prikupets V, 1988; Akhtamov D, 1995].

Evidently, unsatisfactory results of acute cholecystitis treatment among elderly patients are due to

diagnostic mistakes in preoperative period. Actually, the course features of inflammatory process in the gall bladder, against the background of involution changes of an organism, often mislead doctors. Subsequently, it resulted in fatal diagnostic mistakes. It is related to the incompatibility of expressed pathomorphological changes in the wall of gall bladder, coupled with the manifestations of the disease with not visible clinic among elderly and senile patients. Thus, according to some authors, heavy irreversible processes are registered in the wall of the gall bladder in this group of patients during the first hours after the cholecystitis attack begun [Chopra S et al., 2001; Bakkaloglu H et al., 2006; Yasuda H et al., 2007; Chumakov A et al., 2008]. In most cases, inflammatory process strikes all layers of the gall bladder wall and diffusely proceeds [Guyton A, Hall J, 2000; Timoshin A et al., 2003]. Evidently, it is promoted by changes of the gall bladder wall that precede the inflammation as progressive fibrosis of all layers (mainly muscular cover and arteries), an atrophy of a muscular layer of the gall bladder, the disturbance of blood supply of the wall, thus causing the rapid development of destructive forms of acute cholecystitis in older age [Yemelyanov S et al., 2004; Okhotnikov O, Yakovleva M, 2006; Lazebnik L et al., 2007; Chumakov A et al., 2008; Rybachkov E et al., 2008; Sukhareva G et al., 2008]. Additionally, the age features of the immune system also promote the rapid development of destruction forms of acute cholecystitis. They cause the depression of cellular and humoral immune system and the decrease in intensity of monocytic phagocytosis [Revnivikh I, 2003].

Simultaneously, many researchers noted an erased and atypical clinical picture of acute cholecystitis in elderly patients, in addition to its discrepancy with the pathomorphological changes in the gall bladder [Gostishchev V, Evseev M, 2001]. Typical clinical manifestations of acute cholecystitis such as fever, expressed pain syndrome and symptoms of irritation of peritoneum in elderly and senile patients are mostly expressed very poorly or are even absent [Ilchenko A, 2006; Nesterenko Yu et al., 2006]. Furthermore, the researchers focused on the insignificant reaction from peripheral blood that complicates the diagnosis of acute cholecystitis in some studies [Dorofeenkov M, 2006].

Unquestionably, associated diseases typically

to older adults have impact both on the clinical picture and on diagnostics. As already mentioned above, practically, 100% of the diseases associated with the elderly, manifest themselves. Most often, the vital organs and the organ systems of patients with acute cholecystitis are affected. For example, the cardiovascular system, the respiratory system and the kidneys are affected by 100%, 67.3%, 13.3%, respectively [Nesterenko Yu et al., 2006]. Moreover, in 80% of patients, the disease has a combined character – on average of 2.2 diseases per patient [Prilepina E, 2011]. As a result, so called “syndrome of mutual aggravation” develops in elderly patients, when an exacerbation of associated diseases occurs due to acute attack, which in turn, aggravate the patient state [Panfilov B, 1996].

Considering the aforementioned, it is natural that this group of patients refers to the category of individuals with high operational and anesthetic risk which from the perspective of a radical intervention deems them as inoperable [Korolija D et al., 2004; Leshchenko I et al., 2005; Mamsurov M, 2009; Sukhareva G, Dorofeenkov M, 2008]. This creates a problem in terms of the tactical choice in maintenance of elderly patients with acute cholecystitis. According to some researchers, postoperative lethality rate exceeds by 40-50% after the emergency interventions of patients older than 80. This is 5-10 times greater from similar indicators of younger patients [Privalov V et al., 1998; Altmeir G, 2001]. All noted facts confirm the danger and inefficiency of traditional surgical treatment of patients with high operational and anesthetic risk. However, a number of randomized clinical trials showed that an operation during early terms is beneficial. It leads to a reliable decrease in the lethality and frequency of complications associated with a progressive inflammatory process in the gall bladder and the development of extracystic and systemic complications [Budarin V, 2000]. Moreover, it has been determined that conduction of a long-term conservative treatment of acute cholecystitis, among elderly and senile patients, resulted in a special danger [Bobrov O et al., 2000].

The solution of current situation occurred is the insertion of new surgical technologies characterized by minimal invasiveness. Minimally invasive surgery leads to the reduction of operational traumas' number, and decreases the indicators of post-

operative lethality and complications. Therefore, E.V. Prilepina (2011) suggested that general lethality rate of patients older than 80 years with acute cholecystitis, who had executed cholecystectomy procedure from minilaparotomy access, was 4.3%, while the postoperative lethality was 8%, which is significantly lower than the previous indicators. The researcher believes that when the patient's general condition is serious and the organs are unable to decompensate the associated diseases, operational treatment is possible in two stages. The first one is cholecystectomy and the second is cholecystectomy after stabilization of the state from minilaparotomy access. Similarly, G.K. Zhumakayeva (2008) observed almost the same results in her research, who notes that the cholecystectomy from the mini-access, among elderly and senile patients, reduces the number of specific postoperative complications by 3 times and nonspecific by 5 times in comparison with traditional access. Further she emphasized that this type of surgery offers numerous benefits. It allows to perform a full scope surgical treatment and intraoperative research of patients with acute calculous cholecystitis and its complications in older age groups, provides the possibility of an early activation of patients, a reduction in the length of time of the pain expression syndrome, and a reduction in hospital stay by 1.5 times.

In his work, B.V. Kharlamov (2007) specified that it is advisable to do a cholecystectomy with slanting and variable section in the right subcostal area: the use of this section differs in best operational characteristics. The result of his study is an extremely valuable finding. It showed that the performance of cholecystectomy from mini-access is possible under peridural anesthesia because it does not lead to the deterioration of the operating conditions. The researcher's finding represented an important factor for a broad practice considering that most of the elderly and senile patients not only belong to a high operational group, but they are also anesthetically a risky group. In his turn S.V. Tigiyev (2011) found it possible to perform cholecystectomy with mini-laparotomy access among the elderly patients, even with the presence of complications due to gallstone disease, with the expressed inflammatory and adhesive process. According to the researcher, the only contraindication to this

type of surgery is the widespread peritonitis and the need for a broad audit of the abdominal cavity.

Notably, besides a direct treatment of acute cholecystitis with a minimum level of complications, the cholecystectomy with mini-laparotomy access, among the elderly patients, leads to a reliable improvement of the contractile ability of myocardium in late postoperative period. Additionally, the elimination of constant pain impulsion from the region in patients with concomitant hypertonic disease leads to the reduction of blood pressure [Tezyaev V, 2005b].

According to some authors, minimally invasive treatment is recommended in case of acute cholecystitis combined with severe comorbidity and indications of obstructive jaundice [Prilepina E, 2011; Pritula A, 2012]. The first stage is to perform an urgent puncture decompression of gallbladder, followed by remitting inflammatory reaction, and an edema signs of jaundice surgical treatment planned from mini-access. According to the researcher, the use of this algorithm reduces postoperative complications in the elderly patients from 26.7% to 7.7%, the mortality rate from 13.3% to 1.5%, and the hospital stay by 2.3%. However, not all researchers hold similar views regarding the efficiency of the two-stage approach for the treatment of acute cholecystitis among elderly patients. These researchers had to consider that their study outcomes did not show that the two-stage intervention decreased the lethality of the patients. They explained that the "cold" period maintains a high degree of operational risk and infiltrative changes in the neck area of a gall bladder among many patients [Beburishvili A et al., 2002; Kasumyan S et al., 2002].

It should be noted that some researchers consider possible limiting by only the first step while using a phased approach in the treatment of elderly patients with acute cholecystitis in some cases. In their studies, Yu.G. Shapkin and co-authors (2011) conducted 60 cases of minimally invasive echo-controlled interventions in elderly patients with acute cholecystitis, in a planned manner within 4-6 months. Only 26 of them underwent surgery. All of them were taken to a radical surgery without any complications. The researchers summarized that palliative minimally invasive echo-controlled decompression of the gallbladder is undisputable. However, during a landmark

treatment of acute cholecystitis, in the framework of active surgical tactics, a person is permitted to decline a forced emergency surgery and is scheduled for a radical surgery. Other researchers also believe that decompression puncture may not be regarded as a preparatory stage for radical surgery in patients with a severe condition due to the presence of pronounced cardiopulmonary disorders, systemic diseases, and others, but rather as an independent method of treatment. In this case, patients undergo intensive conservative treatment under a dynamic clinical and ultrasound control environment [Zhidkov S, 2005]. Cholecystostomy is indicated due to the inefficiency of these methods [Korovin A et al., 2005].

However, prolonged standing of cholecystectomy tube reduces the life quality of patients and it leads to the development of complications. In addition, repeated attacks of acute cholecystitis often and external biliary fistulas form after the gallbladder healed through the fistula and closing cholecystostomy. It is not always possible to perform a cholecystectomy, even in a planned manner and after knocking off all urgent conditions. One of the effective ways to complete cholecystostomy is to obliterate the lumen of the gallbladder, which is equivalent to its removal. Thus, there are known chemical, thermo-ablation methods and electrical destruction of mucous membrane of gall bladder [Arkhipov O, 2001]. However, according to existing data, chemical mucoclasia of the gallbladder leads to the obliteration of its lumen only in 65.3% of patients [Volkov D, Gorelik S, 2011]. The need for preliminary obliteration of the cystic duct and multiple cholecystocholangiography increase the radiation exposure to the patient. This makes the procedure cumbersome and lengthens the patient's hospital stay. Therefore, in this regard, the researchers proposed a method known as bipolar mucoclasia, which reliably promotes the deactivation of the gallbladder wall in 82.4% of patients.

Decompressive activities performed under the control of ultrasound study and the obliteration of the gall bladder cavity by a new synthetic material called MM-gel are a very interesting method for the treatment of elderly and senile patients with acute cholecystitis and high anesthetic risk. MM-gel is a macroporous polymeric hydrogel that has high biocompatibility. According to the study of this new treatment effectiveness it was concluded that the obliteration of the gall

bladder by inserting a percutaneous cholecystostomy of MM polymer gel might be the preferred surgical intervention method for a complex treatment of elderly and senile patients with acute cholecystitis and severe comorbidity. The efficacy of MM-gel for the obliteration of gall bladder cavity was experimentally confirmed. The results of morphological examination with the use of MM-gel revealed the replacement of gall bladder cavity with connective tissue with a complete obliteration of its lumen within 3 months during the experiment [Sidoruk A, 2014]. The obtained results permit to confirm, that the obliteration of the gall bladder cavity with the use of MM-gel is an alternative treatment of acute cholecystitis in elderly and senile patients with high surgical anesthetic risk in case of impossible radical operative treatment. It should be noted that in both cases, the researchers emphasized the need for further development of this directive and further study of the long-term results.

Seemingly, surgical interventions from laparoscopic access are prospective for elderly and senile patients with acute cholecystitis. In his study, I.A. Pavlov (2002) summarizes that the highest percent of positive long-term results from the acute cholecystitis surgical treatment were found in the elderly patients undergoing this kind of gallbladder operation. However, the researcher admitted that the laparoscopic cholecystectomy of acute cholecystitis was recommended only for elderly and senile patients with a predicted favorable outcome. Simultaneously, it was recommended that the surgical treatment should follow a step-by-step process for the seriously ill patients. Essentially, the first stage is the cholecystectomy (laparoscopic or surgical) step and the second stage is the process of reducing the severity – radical operation. The researcher recommends carrying out a complex correction of the somatic frustration among the elderly and senile patients during preoperative preparation stage to achieve a reduction of the severity, and to increase the chances of carrying out a cholecystectomy. This is obligatory for all patients.

There is an opinion that the efficiency of the laparoscopic cholecystectomy in acute catarrhal and phlegmonous cholecystitis is very effective without signs of perivesical process, but, however, they recognize that cholecystectomy from mini-laparotomy access is a more effective method especially among patients with associated diseases

of cardiovascular and respiratory systems [Kuznetsov N et al., 2000; Rakhmatullayev R et al., 2011]. At the same time, K.P. Raganyan (2006) demonstrated the possibility of performing a laparoscopic cholecystectomy to older adult patients with serious associated diseases, in his research. The researcher focused on using this type of interventions to promote the reduction of complications and to shorten the duration of hospitalization. Both undoubtedly have an economic impact. According to the results of retrospective study it was also noted that previous research showed a 10-year period of the treatment depreciation while performing a laparoscopic cholecystectomy in elderly patients with acute cholecystitis [Shi H et al., 2010].

In series of other studies, any essential distinctions weren't detected in the results of elderly patients' treatment using surgical interventions, such as laparoscopic cholecystectomy, or a cholecystectomy from mini-access. However, mini-access is considered to be the optimal option for a cholecystectomy in senile patients. The researchers based their opinion on several advantages. These include the lack of hemodynamic and metabolic frustration connected with pneumoperitoneum, constant visual control, and the possibility of a manipulation by a traditional technique and other advantages [Kurbanismailova R, Medzhidov R, 2013].

According to some researchers, the results of a laparoscopic cholecystectomy in patients of 65-70 years old were comparable with younger patients. At the same time, the researchers noted that although the lethality among patients older than 70 years represented only 2%, they indicated a higher frequency to transition to a laparotomy. From the results of a comparative analysis of laparoscopic cholecystectomy in middle aged and senile patients, the researchers concluded that conducting a laparoscopic cholecystectomy often requires the application of additional intraoperative techniques and the extension of indications to a traditional cholecystectomy after considering the technical difficulties and complications. The authors of both researches pointed to the importance of preoperative preparation for receiving better results from laparoscopic treatment for older adult patients [Bingener J et al., 2003; Polychronidis A et al., 2008].

Any discussion on the possibility of using a laparoscopic cholecystectomy in older adult pa-

tients should include current problems. One of them is the need for the creation of a long and intense carboxyperitoneum of laparoscopic operations that can demand the correction of the artificial pulmonary ventilation settings. Moreover, essential shifts in the functioning of the cardiovascular system, a change in the lungs and kidneys function, including quite expressed ones, were detected during and after the carboxyperitoneum [Shestakov A, 1999]. These changes were caused by a change in the breathing mechanic. It resulted from the constriction of the diaphragm and damage to the hemodynamics because of a compression of the abdominal aorta and the inferior cava vein; it activated the reactions of the peroxidation of the lipids [Khripun A et al., 2001; Slesarenko S et al., 2001]. In other words, the polymorbidity, that is characteristic to elderly patients, limits the possibility of applying a laparoscopic cholecystectomy to them. However, some researchers continue to consider this type of surgical intervention as a safe procedure for elderly patients with acute cholecystitis. It reduces the complications' frequency and the terms of the treatment [Chau C et al., 2002].

Overall, most of researchers do not consider age as a contraindication to perform a laparoscopic cholecystectomy. In this surgery, they noted a low level of complication among advanced age and senile patients [Tambyraja A et al., 2004; Stanisić V et al., 2009; Aksenov I et al., 2013]. Based on the analysis of numerous references devoted to the problem of a laparoscopic cholecystectomy in elderly patients, S.F. Abbasova (2011) concluded that this kind of surgery is quite possible in the elderly. However, there are demands to specify the indications and contraindications, the development of safe modes of intervention, the outlines of preoperative preparation, and the postoperative maintenance of patients.

As for the increasing difficulties in conducting this type of interventions, the search for opportunities to perform a laparoscopy, without gas insufflation in abdominal cavity is continuing. In particular, there are already "gas-free" methods to perform a laparoscopic cholecystectomy [Chousleb M et al., 2004; Tezyaev V, 2005a]. It has been considered that one possible solution to this problem is the use of so-called lifting technology. It allows the creation of an operational space in the abdomi-

nal cavity, through raising the anterior abdominal wall. Many surgeons suggest the use of this technique in patients who express serious cardiovascular and respiratory systems pathology [Korolija D et al., 2004; Mazitova M, Lyapakhin A, 2008]. A.Yu. Nekrasov and co-authors (2011) offer their own modification of this technique; they suggest the use of a fanlike laparolift that expand indications, while performing laparoscopic operations. The changes of the pulmonary system are less expressed in comparison with carboxyperitoneum during a gas-free laparoscopic cholecystectomy, with the application of a fanlike laparolift. Finally, the researchers concluded that the technique they offer improves the treatment results of acute cholecystitis among the elderly and senile patients. Among others, the results shorten hospitalization stay and they lower the frequency of postoperative complications.

The existence of multiple and (or) large concretions can be one more obstacle for a laparoscopic cholecystectomy. The sanitation of the biliary tracts takes a long time. It aggravates a serious condition of the patient, and it leads to an excess of material inputs [Tokin A et al., 2008; Yermolov A et al., 2011]. Besides, it is difficult to achieve this treatment method during a surgeon's daily routine practice, because of the lack of the corresponding equipment or the pathomorphological changes in the big duodenal nipple zone and the hepatoduodenal ligament. For these reasons, some researchers believe that it is unnecessary to avoid the surgical treatment method, provided that the elderly patients, with this condition, receive a well preoperative preparation [Parshikov V, 2005; Agayev B et al., 2011; Teremov S, Mukhin A, 2012].

Acute cholecystitis is the most realistic problem for older adult patients. It is a widely occurring pathology among the elderly and senile, and it is a feature of its clinical course. In this sense, it triggers a problem on how to match a strategic option to maintain elderly patients with acute cholecystitis. On the one hand, taking into account the presence of numerous associated diseases and involute changes of main organs and their systems, elderly patients refer to the group of high operational-anesthetic risk, which interferes the ability to conduct surgical interventions on them. On the other hand, there is a quick tendency to use destructive processes in gall

bladder wall, against age oppression of the immune system activity. Along with complications from acute cholecystitis, conservative tactics are not only ineffective in maintaining this type of patients, but they are also dangerous.

Many researchers consider the form of low-invasive surgical technologies' development solution from the current situation. In reality, most of experts believe that the cholecystectomy from mini-access or laparoscopic access is an effective treatment method for acute cholecystitis for elderly and senile patients. It is recommended that, a staged approach to the treatment with the preliminary imposition of a cholecystectomy should be administered to the patient during the initial serious condition. However, each of the listed methods has its advantages and disadvantages. Also, there are some difficulties, and they intervene with the ability to realize a number of clinical situations. Nonetheless, this stimulates the need to search for new modifications and techniques in treating acute cholecystitis among patients who are at high risk.

The operations with the use of 1.5 T magnetic resonance cholangiography started to be conducted in "Yerevan" medical center of Armenia from 2012, after the beginning of successful coopera-

tion with Diagnostic and Treatment Center of International Institute of Biological Systems (filial branch – Yerevan Medical and Diagnostic Center of International Institute of Biological Systems), which has more than 70 diagnostic centers of magnetic resonance and multispiral computed tomography located in different cities of Russia and countries of CIS. Present method is meant for the study of biliary systems in patients with complicated forms of cholelithiasis, and is the best for the non-contrast study of bile ducts, which gives an opportunity to escape from ineffective invasive diagnostic and operative interference and choose the right and purposeful treatment strategy. The methodology helps to differentiate concrements from structures or space-occupying processes, reveal the level of obstruction, extension of ducts above the permitted level and estimate their condition below the location of obturation.

Over 100 magnetic resonance cholangiography was produced with the use of magnetic resonance tomograph "Siemens symphony maestro" with magnetic field intensity by 1.5 T, superconducting magnet in "Yerevan" medical center during the period of 02.06.12 to 22.12.15.

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