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A.A. Zhmur, T.V. Formanchuk, M.I. Pokidko, O.V. Honcharenko, M.A. Hudz, I.M. Vovchuk
National Pirogov Memorial Medical University, Vinnytsya

OPTIMAL TIME OF LAPAROSCOPIC CHOLECYSTECTOMY IN PATIENTS WITH ACUTE CALCULOUS CHOLECYSTITIS

e-mail: tformanchuk@vnmu.edu.ua

In order to determine the optimal time from the onset of the disease to laparoscopic cholecystectomy in patients with acute calculous cholecystitis, the treatment results of 107 patients were analyzed. All patients were divided into three groups, depending on the time from the onset of the disease to surgery: the first group included 34 (31.8 %) patients operated on up to 24 hours from the onset of the disease; the second – 49 (45.8 %) patients operated from 24 to 72 hours; third – 24 (22.4 %) patients operated on within >72 hours. The data obtained indicate that the optimal time for laparoscopic cholecystectomy in patients with acute calculous cholecystitis was up to 24 hours, which allowed to significantly reduce the duration of surgery, intraoperative blood loss, number of conversions, postoperative hospital stay, duration of antibiotic therapy, postoperative biliary complications rate.

Key words: gallbladder, acute calculous cholecystitis, laparoscopic cholecystectomy, perivesical tissues, postoperative biliary leakage.

А.А. Жмур, Т.В. Форманчук, М.І. Покидько, О.В. Гончаренко, М.А. Гудзь, І.М. Вовчук

ОПТИМАЛЬНИЙ ЧАС ЛАПАРОСКОПІЧНОЇ ХОЛЕЦИСТЕКТОМІЇ У ХВОРИХ НА ГОСТРИЙ КАЛЬКУЛЬОЗНИЙ ХОЛЕЦИСТИТ

З метою визначення оптимального часу від початку захворювання до лапароскопічної холецистектомії у пацієнтів з гострим калькульозним холециститом були проаналізовані результати лікування 107 пацієнтів. Усі пацієнти були розділені на три групи, залежно від часу від початку захворювання до операції: до першої групи ввійшли 34 (31,8 %) пацієнти, оперовані до 24 годин від початку захворювання; до другої – 49 (45,8 %) пацієнтів, оперованих від 24 до 72 годин; до третьої – 24 (22,4 %) пацієнти, оперовані протягом 72 годин. Отримані дані свідчать про те, що оптимальний час для лапароскопічної холецистектомії у пацієнтів з гострим калькульозним холециститом становив до 24 годин, що дозволило значно скоротити тривалість операції, інтраопераційну крововтрату, кількість конверсій, тривалість післяопераційного перебування в лікарні, тривалість антибіотикотерапії, рівень післяопераційних жовчних ускладнень.

Ключові слова: жовчний міхур, гострий калькульозний холецистит, лапароскопічна холецистектомія, перивезикальні тканини, післяопераційне підтікання жовчі.

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Acute cholecystitis due to gallstone disease remains one of the main problems of general surgery and related specialties. This explains the development of new and constant revisions of existing protocols for the diagnosis and treatment of this pathology by the surgical community around the world [1, 9]. Surgical treatment, which is used at different stages of this pathology, is the only effective method to improve the quality of life of patients and prevent complications. The advantages of laparoscopic cholecystectomy in acute cholecystitis versus open surgery have been proven in many studies [3, 5, 7].

There are limited absolute and relative contraindications to surgical treatment (surgical in general and laparoscopic – in particular). Often when performing laparoscopic surgery, as the first stage of surgery for cholecystectomy, the surgeon is faced with various intraoperative perivesical complications that make difficult further laparoscopic surgery, or even require conversion. These include the condition of the gallbladder and perivesical tissues with varying degrees of involvement in the process of surrounding structures and organs, anatomical features of the elements of the hepatoduodenal ligament and the difficulty of their differentiation on the background of perivesical spread of inflammation. The presence of intraoperative complications increases the duration of surgery, increases the trauma of the operation and the risk of iatrogenic injuries, worsens the postoperative course, leads to postoperative complications, and often causes conversion, the frequency of which in early surgery (between days 0 of 3 of admission) is 3.6 % and is significantly lower than the same indicator at ≥8 days from admission – 4.7 % [10]. The risk of developing wound infection and hospital stay are also significantly lower when performing surgery at an early stage compared to delayed [11]. Despite the general tactics of management of patients with acute cholecystitis developed in accordance with international guidelines and local treatment protocols, the terms of surgical treatment have not been clearly defined to date [6]. We have found a large number of publications that do not indicate the predominance of early cholecystectomy over delayed and planned operations after acute attacks of acute cholecystitis [2, 8, 10].

It is important to note that the term "early" laparoscopic cholecystectomy is interpreted differently in different international guidelines and national guidelines. There is some uncertainty about the timing of operations for acute cholecystitis due to gallstone disease, where different clinics take different terms as a starting point, namely, the time from the onset of biliary colic in some institutions or the time from the start of hospitalization in others. All this leads to differences in the interpretation of the results of treatment of patients with acute cholecystitis, which affects the further development of treatment protocols for patients with acute cholecystitis.

The purpose of the study was to determine the optimal timing for laparoscopic cholecystectomy in patients with acute calculous cholecystitis.

Materials and methods. The results of treatment of 107 patients with acute calculous cholecystitis who were operated on in the surgical department of the Vinnytsya city clinical emergency hospital from 2016 to 2021 were retrospectively analyzed.

The analysis included patients operated on for biliary colic, acute calculous cholecystitis with different degrees of wall destruction without signs of choledocholithiasis and mechanical jaundice on the day of hospitalization and in the anamnesis, without interventions on the large duodenal papilla. The exclusion criteria from the study were: patients with acute cholecystitis due to the vascular component; with signs of hydropsy and gallbladder empyema, which were considered as chronic aseptic and infected cholecystitis; perivesical abscess; as well as patients with acute biliary pancreatitis.

Among all 107 patients, 42 were men (39.3 %) and 65 (60.7 %) were women. The age of patients varied from 23 to 71 years, and in the age group up to 40 years there were 14 patients (13.1 %), 40–60 years – 73 patients (68.2 %), over 60 years – 20 patients (18.7 %).

All patients were hospitalized with signs of liver colic, inflammation of the bladder wall with or without its destruction, which occurred for the first time or repeatedly. The period of hospitalization of patients in the hospital from the beginning of the attack was from 4 hours to 3 days after self-administration of antispasmodics and analgesics. The examination of patients included general clinical, laboratory and instrumental methods. In all patients, the presence of gallstones in the gallbladder was confirmed by ultrasound.

The main complaint of patients during hospitalization was pain in the upper abdomen of varying intensity. In the general analysis of blood the total number of leukocytes was determined. All patients underwent complete biochemical blood tests. Assessment of the condition of the gallbladder was performed every 1-2 days by ultrasonographic examination of the abdominal cavity. Esophagogastroduodenoscopy was performed before surgery in 37 patients (35 %).

Bacteriological examination of Morrison's pocket irrigation fluid was mandatory during surgery. Bile collection for bacteriological culture was performed in 85 patients during surgery by puncture of the bladder. After the operation, histological examination of the gallbladder was performed comparing morphological changes of the gallbladder and the microbial landscape of the obtained fluids with the clinical picture in case of gallbladder colic and in case of acute cholecystitis.

Among the concomitant pathology in patients, cardiovascular pathology predominated: ischemic heart disease, hypertension, a constant form of cardiac arrhythmia. According to the results of examinations, these patients were classified as mild acute cholecystitis (grade 1) according to the criteria of severity of acute cholecystitis according to TG13/TG18 [5], and 21 patient had moderate severity. Severe cholecystitis was detected in 12 patients. Patients with moderate and severe severity underwent short-term preoperative preparation.

According to the duration of the attack, as the main criterion for dividing patients into groups, from the beginning of hepatic colic (determined by anamnestic) to surgery, patients were divided into three groups: the first group included 34 patients (31.8 %) who were operated on before 24 hours from the onset of the disease; the second group included 49 patients (45.8 %) who were operated on within 24 to 72 hours from the onset of the disease; the third group included 24 patients (22.4 %) who were operated on within 72 hours from the onset of the disease. The groups were representative by age, sex and severity of the pathological process.

In all groups of patients the duration of surgery, intraoperative blood loss, the percentage of conversions, the percentage of laparotomies in the early postoperative period for postoperative complications, postoperative hospital stay, the duration of postoperative antibiotic prophylaxis, duration of operation and complications were analyzed.

The results of treatment of the second and third groups were compared with the first group of patients. StatSoft Statistica 6.0 software and Microsoft Office Excel were used for statistical data processing.

Results of the study and their discussion. At the time of hospitalization, pain was detected in all patients, which on the background of analgesic, antispasmodic and anti-inflammatory therapy for 2 hours decreased in 40 (37.4 %) patients. At the same time, signs of hypertension in the gallbladder persisted in 88 patients (82 %), which was determined intraoperatively. Histological picture of the gallbladder indicated destructive changes in the wall with massive infiltration of leukocytes with or without microcirculation. The cause of hypertension in the gallbladder were stones ranging in size from 3 mm to 3 cm, which were located in the neck of the bladder or Hartmann's pocket, as well as swelling of the neck of the gallbladder due to irritation by stones. In 19 patients (18 %) gallbladder hypertension decreased or was absent. In the postoperative examination of the gallbladder, morphological changes ranged from normal wall structure to moderate signs of inflammation.

When comparing the duration of surgery, intraoperative blood loss, conversion rate, duration of postoperative hospital stay, duration of postoperative antibiotic prophylaxis, bile leakage from the gallbladder bed, there was a significant decrease in these indicators in the first group compared to the second and third (tabl. 1).

Table 1

Comparison of clinical indices in groups of patients with different terms of laparoscopic cholecystectomy

Clinical indices	Group I (n=34)	Group I (n=49)	Group III (n=24)
Duration of surgery	1.1±0.31	1.4±0.23 (p<0.05)	1.7±0.22 (p<0.05)
Intraoperative and postoperative blood loss, ml	48.2±10.7	75.3±12.6 (p<0.05)	97.1±15.4 (p<0.05)
Number of patients and conversion rate	1 (2.9 %)	3 (6.1 %) (p<0.05)	4 (16.7 %) (p<0.05)
Postoperative hospital stay, day	4.7±1.3	5.7±1.8 (p<0.05)	7.8±1.7 (p<0.05)
Duration of perioperative antibiotic prophylaxis/ antibiotictherapy, day	2.1±0.31	3.0±0.73 (p<0.05)	5.4±1.24 (p<0.05)
The number of patients and the percentage of bile leakage in the postoperative period	0	1 (2 %)	3 (12.5 %)
Correspondence of clinical signs and morphological changes of the gallbladder wall	62.5 %	80 % (p<0.05)	100 % (p<0.05)

The duration of surgical treatment increased with increasing time from the onset of the disease to surgery and was significantly higher in the second and third groups of patients compared with the first group. This was due to the formation of an infiltrate around the gallbladder, the infiltration of tissues around the elements of the gallbladder neck. This process developed from the beginning of the attack to the moment of surgery and its severity increased over time. Infiltration of tissues on the background of inflammation varied from loose non-volumetric in the II group to voluminous (with involvement in the process of hepaticocholedochus) and dense in the III group of patients, which required a more thorough revision in the area of the Callo triangle. These manipulations were accompanied by increased tissue bleeding. Thus, intra- and postoperative blood loss increased significantly from the first to the third group and amounted to 48.2±10.7 against 97.1±15.4 ml ($p<0.05$). Bleeding was noted from the separated greater omentum, the surface of the liver at the site of the bladder bed, loose tissue, and the peritoneum in the neck of the gallbladder.

Intraoperative puncture of the bladder was performed in 31 patients: 4 patients from the group I, 11 patients from the group II and 16 patients from the group III. This was due to a sharp tension in the gallbladder and/or infiltration of its wall, which made it impossible to grip the wall of the gallbladder by clamps and to manipulate during cholecystectomy. Bacteriological culture of bile gave a negative result in patients of the first and second groups and a positive result in 10 (41.7 %) patients operated on after 72 hours from the onset of the disease.

The number of cases of postoperative bile leakage was the highest in the third group of patients. It was not associated with iatrogenic injury of the main bile ducts, but was the result of trauma to the liver parenchyma during removal of the bladder from its bed and additional coagulation of the bed to stop parenchymal bleeding. Bile leakage lasted up to 4 days with a flow rate of up to 100 ml per day and stopped on its own on the background of the antispasmodics in the postoperative period. In the first group such complication was not noticed.

In 12 patients from the third group the local peritonitis with the presence of serous fluid around the bladder was determined. Bacteriological culture in these patients and lavage in all others did not revealed

the growth of microorganisms, but increased the drainage time of the bladder bed and Morrison's pocket, which, in turn, increased the postoperative stay of patients in hospital.

Histological examination of the gallbladder showed that in the first group of patients the clinical picture of biliary colic in 65 % (22 patients) had signs of chronic cholecystitis without involvement of the mucous membrane, in 35 % (12 patients) of cases the inflammatory process was limited to the mucous membrane. In the second group of patients, in 73.5 % (36 patients) of cases, the inflammatory process involved the mucous membranes and submucosa, which on ultrasound gave a thin strip of fluid in the bladder wall, in 26.5 % (13 patients) of cases the process spread, including the muscle layer. At ultrasound there was a lamination of a wall of the gallblader. In the third group, 16.7 % (4) of patients had a spread to the muscle layer, 25 % (6 patients) – with the involvement of the muscle layer and 58.3 % (of the inflammatory process spread to the entire wall of the gallbladder and was present the reaction of the peritoneum to inflammation. The divergence between the expected timing of obstruction and histological changes was due to the administration of antispasmodics, which reduced intravesical bile pressure on the mucosa, and the administration of anti-inflammatory drugs that reduced the local inflammatory response.

Differences in clinical data with morphological changes of the bladder wall were: in the first group with severe pain, deeper destruction of the bladder wall was expected; with the reduction of pain on the background of antispasmodic and anti-inflammatory therapy in patients of the second and third groups, smaller infiltrative-destructive changes of the gallbladder wall and surrounding tissues were expected.

Analyzing the world literature of recent years, it is obvious that the problem of acute cholecystitis remains relevant and requires constant review and updating of approaches to improve treatment results [9]. The world surgical community no longer uses the morphological classification of acute cholecystitis in its work, but distinguishes it by the severity of the process and the impact on organism. The impact on the body is determined by the degree of destruction of the bladder, the occurrence of peri-bladder complications (infectious complications, peritonitis, fistulae, etc.) and accompanying pathology.

According to the results of our and previous studies, we can say that the complications that formed the basis of modern recommendations are the result of the remoteness of emergency care from the patient [7].

The appointment of antispasmodic, anti-inflammatory and analgesic therapy led to disharmony of the preoperative clinical picture with the macroscopic intraoperative picture, namely: the pain syndrome decreased with the progression of inflammatory changes in the peribladder tissues.

The results of our retrospective study indicate that up to 48 hours after the onset of the attack, the changes in the gallbladder do not have time to acquire destructive changes in the entire wall and the transition of the inflammatory process to the peri-bladder organs and tissues. And this expands the indications for laparoscopic cholecystectomy, facilitates the course of the operation and the postoperative period with the rehabilitation of patients, which coincides with the data of previous studies [5, 10, 11], although in them the optimal period of performing interventions is determined to be up to 72 hours from the onset of the disease.

The term when biliary colic turns into acute catarrhal cholecystitis remains uncertain. This transitional period in different patients depends on many factors: the degree of filling of the gall bladder at the time of blockage of the cystic duct, the degree of "training" of the muscle layer, taking antispasmodics.

The results of our analysis did not differ from the current international recommendations [9], demonstrating that conservative therapy in most cases does not lead to the elimination of obstruction, as the main factor in the development of acute calculous cholecystitis. Only slows down the inflammatory process, without stopping the progression. An extended period of conservative therapy may be justified in patients with significant comorbidities.

Surgical treatment of biliary colic and acute cholecystitis carried out in the early period reduces the risk of intraperitoneal complications and is accompanied by a smooth course of the postoperative period. The results of our 6-year study echo the latest Tokyo guidelines for the treatment of acute cholecystitis, published in December 2018, which also emphasize early surgical intervention [4]. But this period is slightly shifted in time relative to the results of our observations, when there is an infection of inflamed tissues that are involved in the course of acute cholecystitis. This, in our opinion, is connected with late hospitalization.

The purpose of further analysis will be to determine the time of infection of bile and gallbladder tissues and the dependence of the time of destructive phenomena in the gallbladder wall on the duration of gallbladder hypertension.

Conclusions

1. Acute calculous cholecystitis during the first 72 hours is characterized by the presence of pain with minimal disorders of the body, aseptic contents of the gallbladder and the surrounding space.

2. Surgical treatment performed up to 24 hours from the onset of the disease is accompanied by reactive changes in the gallbladder wall in the form of catarrhal changes with minimal inflammatory signs in the surrounding tissues and is the most comfortable for surgery and postoperative course.

3. Early appointment of complex therapy, which included analgesics, antispasmodics and anti-inflammatory drugs suppressed the inflammatory reaction in the gallbladder wall and surrounding tissues, as well as differences in the clinical picture of acute calculous cholecystitis and morphological changes in the gallbladder wall.

4. Elimination of gallbladder obstruction in biliary colic and acute cholecystitis is not an indication for delaying surgical treatment at an early stage.

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