

Innovative Approach to Surgical Treatment of Acute Obturation Cholecystitis in Elderly and Senile Patients

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Abstract In acute obstructive cholecystitis in elderly and senile patients, at the first stage of the surgical treatment method, it is recommended to use the method of intravesical photodynamic therapy developed by us, which allows achieving regression of the active inflammatory process according to clinical and laboratory indicators and to apply the second stage of the surgical treatment method on average after 4.9 ± 1.1 days.

Keywords Obstructive cholecystitis, Photodynamic therapy, Elderly and senile age

1. Introduction

A review of the literature on the choice of surgical treatment for acute obstructive cholecystitis in elderly and senile patients indicates an increasing tendency to refuse to use laparoscopic cholecystectomy. This is due to the presence of a large proportion of complex cases of not only the technical nature of the cholecystectomy operation, leading to the development of intraoperative complications of an iatrogenic nature in the form of damage to the bile ducts, bleeding, etc., but also the development of an impressively large number of postoperative complications [1,2,5,7,15,22]. The increase in the number of conversions of laparoscopic cholecystectomy using the traditional form of surgery can be considered an acceptable choice for acute obstructive cholecystitis in elderly and senile patients with a mild form of the disease [4,6,8,10,16,20,21,23,24]. However, as our studies have shown, with moderate and severe forms of acute obstructive cholecystitis in elderly and senile patients in the early stages of treatment (up to 7 days of treatment), it is not possible to perform laparoscopic cholecystectomy even if the 2018 Tokyo Guidelines are followed.

The presence of a pronounced inflammatory infiltrate around the gallbladder and concomitant somatic pathology with a comorbid course in elderly and senile patients, even with the use of PTCS at the first stage of the surgical method of treating acute obstructive cholecystitis, does not allow achieving the desired treatment results while maintaining a high proportion of the development of multiple organ failure and death [3,9,11,12,13,14,17,25,26].

All of the above necessitates the improvement of treatment methods for acute obstructive cholecystitis in elderly and senile patients already at the first stage of surgical intervention in the form of PCS. For this purpose, in patients of the main group, we used the method of intracavitary local photodynamic therapy of the gallbladder through the installed percutaneous drainage at the first stage of the surgical method of treating acute obstructive cholecystitis [18,19,27]. The main goal of this stage of treatment using intracavitary photodynamic therapy was to improve blood circulation, rapid resorption of inflammatory changes in the gallbladder and perivesical tissues in acute obstructive cholecystitis.

All of the above determined the main vector of this work.

The aim of the study is to improve the treatment results of elderly and senile patients with acute obstructive cholecystitis.

2. Materials and Methods

The study was conducted in 107 patients with acute obstructive cholecystitis in the elderly and senile age, who were examined and treated at the Bukhara regional branch of the Republican Scientific and Practical Medical Center for Emergency Medical Care of the Ministry of Health of the Republic of Uzbekistan from 2021 to 2024 inclusive.

All patients, according to the established goals and objectives, were divided by us into 2 groups: - control - 52 (48.6%) patients with acute obstructive cholecystitis in old and senile age, who were treated and examined in our clinic from 2021 to 2022 and who underwent standard (traditional) two-stage surgical interventions (the first stage is the use of percutaneous cholecystostomy, the second stage is the use of one of the cholecystectomy options); - main - 55 (51.4%) patients with acute obstructive cholecystitis in old and senile age, who were treated and examined in our clinic from 2023 to

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2024 and who were treated with the methods of endobiliary photodynamic therapy and criteria for predicting unsatisfactory postoperative results developed by us and approved by the Ethics Commission of the Ministry of Health of the Republic of Uzbekistan.

To obtain reference values for laboratory general clinical and biochemical blood parameters, 10 volunteers, recognized by the medical commission as practically healthy, took part in the study. In total, female patients (35.5%) and elderly patients (56.7%) prevailed. Of the total number of patients, the ratio of elderly and senile age was 1:0.7.

The distribution of patients by the severity of acute obstructive cholecystitis (according to the Tokyo Guidelines of 2018) showed a predominance of patients (53.3%) with one sign of the following pathological conditions: multiple organ failure, arterial hypotension requiring drug correction, impaired formation, development of adult respiratory distress syndrome, elevated plasma creatinine, impaired blood clotting and thrombocytopenia.

The main complaints of patients were pain in the right hypochondrium and epigastric region of varying intensity, which were noted in all patients, both elderly and old. Further, in descending order, patients were bothered by nausea, symptoms of concomitant pathology, clinical signs of intoxication, vomiting, bitterness in the mouth and signs of paralytic intestinal obstruction. On average, there were 6.2 units of complaints per elderly patient, and 5.6 units per aged patient. In total, there were 5.9 units of complaints of the disease per 1 patient with acute obstructive cholecystitis in the elderly and old age.

The nature of the chronology of the development of acute obstructive cholecystitis was manifested by the predominant duration of the attack from 3 to 5 days from the onset of pain syndrome. At the same time, despite the presence of patients who came to the clinic with acute obstructive cholecystitis at an earlier date, they nevertheless had other clinical and laboratory criteria corresponding to moderate and severe degrees of the disease. Among elderly patients, patients with a history of the onset of the disease more than 5 days prevailed.

Among the objective clinical signs of the disease, a dry tongue coated with a brown coating was noted in all patients, both in the elderly and in the senile age. In general, out of 13 objective clinical signs of acute obstructive cholecystitis in elderly and senile patients, they were present in more than half of the patients in 76.9% of cases. Signs such as hyperthermia of the body, a positive symptom of Pekarsky and Mendel with varying severity in elderly and senile patients were noted less frequently. On average, no patient with acute obstructive cholecystitis in the elderly and in the senile age had 9.6 units of objective clinical signs of the disease.

The main cause of acute obstructive cholecystitis was cholelithiasis (93.5%). In other cases, it was mucus, lumps of mucous membrane and polyps of the neck of the gallbladder (6.5%). The average frequency of concomitant diseases per patient was 4.4 units. At the same time, among elderly patients, this indicator was 5.2 units, and among elderly

patients - 3.9 units.

The main concomitant diseases were from the cardiovascular system (mainly coronary heart disease and hypertension), respiratory organs (mainly chronic non-specific lung diseases), gastrointestinal tract (mainly chronic colitis, gastric ulcer and duodenal ulcer, as well as chronic hepatitis) and endocrine system (mainly type 2 diabetes mellitus or metabolic syndrome).

In general, it can be noted that patients with acute obstructive cholecystitis in the elderly and senile age are characterized by an aggravated and severe course of the pathological process and require a thorough and comprehensive preoperative examination.

3. Results and Their Discussion

The main goal of this stage of treatment using intracavitary photodynamic therapy was to improve blood circulation, quickly resolve inflammatory changes in the gallbladder and perivesical tissues in acute obstructive cholecystitis.

The method is carried out as follows. Indications - acute obstructive cholecystitis of moderate or severe course.

Anesthesia - local infiltration anesthesia with 0.5% novocaine solution. Technique. After local layered infiltration anesthesia, a skin incision is made along the lower edge of the right hypochondrium along the anterior axillary line up to 0.5 cm long and a microcholecystostomy is applied under ultrasound control.

After taking samples for microbiological examination, a complete evacuation of the gallbladder contents was performed. Then, under X-ray control, cholecystography was performed by introducing iodine-containing contrast (hypaque, cardiotrast, urografin, uroselectan, triotrast, etc.) into the drainage.

The contours, volume and level of gallbladder blockage, as well as the zones and nature of the location of the stones were determined. The next step was to evacuate the contrast solution until it was completely removed and into the gallbladder cavity. After that, the appropriate volume of photosensitizer in the form of 0.05% methylene blue solution, which belongs to the phenothiazine group with maximum absorption (λ_{\max} nm) - 668 nm, was introduced into the gallbladder cavity and the solution was exposed in the cavity for 5 minutes by clamping the drainage with a clamp. After the exposure time had elapsed, the clamp was opened and methylene blue was drained through the drainage. The gallbladder cavity was washed with a warm 0.9% sodium chloride solution.

Then, through the drainage installed in the cavity of the gallbladder, a conductor was inserted for photodynamic laser radiation using the ALT-Vostok model 03 device, corresponding to the technical specifications TSh 64-15302652-002:2010 for up to 10 minutes.

If the patient experienced a burning sensation or other thermal discomfort in the right hypochondrium, the photodynamic therapy session was stopped for that day. The second photodynamic therapy session lasted up to 5 minutes, and in the following days – up to 3 minutes. In dynamics,

daily ultrasound examination of the abdominal organs was performed, with control of changes in the hepatobiliary zone (the volume of paravesical infiltrate and the state of the hepatoduodenal ligament, the presence of fluid in the abdominal cavity, in the subhepatic space or in the omental bursa, etc.).

As the patient's condition improved (compensation of organ dysfunction, abatement of the active inflammatory process according to clinical and laboratory parameters, reduction in the volume of inflammatory infiltrate in the gallbladder and liver hilum, reduction in microbial contamination of the gallbladder), the question of using the second stage of the surgical treatment method was collectively considered and raised. The average duration of intravesical photodynamic therapy was 4.9 ± 1.1 days.

In dynamics, daily ultrasound examination of abdominal organs was performed with control of changes in the hepatobiliary zone (volume of paravesical infiltrate and state of the hepatoduodenal ligament, presence of fluid in the abdominal cavity, in the subhepatic space or in the omental bursa, etc.). The use of differentiated methods of intracavitary photodynamic therapy at the first stage of the surgical method of treating acute obstructive cholecystitis in elderly and senile patients made it possible to significantly reduce the time of reduction of the local inflammatory process. In particular, the reduction in the gallbladder size was achieved on average on day 2.2 ± 0.8 of photodynamic therapy; a decrease in blurring and an increase in the ultrasound clarity of the gallbladder contours – on day 4.5 ± 0.5 ; a decrease in homogeneity and the appearance of a difference in the echostructure of the perivesical zone – on day 3.4 ± 0.6 ; the disappearance of cystic formations in the perivesical infiltrate – on day 4.7 ± 0.3 ; improved visibility of the hepatoduodenal ligament structure – on day 5.2 ± 0.9 , restoration of the liver echostructure in the gallbladder area – on day 6.5 ± 0.5 ; normalization of echodensity between the gallbladder and the perivesical infiltrate – on day 5.1 ± 0.9 .

The use of photodynamic therapy at the first stage of surgical treatment of acute obstructive cholecystitis made it possible to achieve positive results in the elimination of the local inflammatory reaction, with the transfer of the acute process to a chronic one and thus to apply early laparoscopic cholecystectomy.

Thus, the main goal of endobiliary photodynamic therapy at the first stage of the surgical method of treating acute obstructive cholecystitis in elderly and senile patients after percutaneous drainage of the gallbladder or bile ducts is the early achievement of local improvement of blood circulation and rapid resorption of inflammatory changes.

4. Conclusions

1. In order to improve local blood circulation, achieve rapid resorption of inflammatory changes in the gallbladder and perivesical tissues in acute obstructive cholecystitis in elderly and senile patients, at the first

stage of the surgical treatment method, it is recommended to use the method of intravesical photodynamic therapy developed by us.

2. Intracavitary photodynamic therapy allows achieving regression of the active inflammatory process according to clinical and laboratory indicators and applying the second stage of the surgical treatment method on average after 4.9 ± 1.1 days.

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