Choice of surgical tactics for acute calculous cholecystitis on patients with coronavirus infection anamnesis

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Abstract. During the COVID-19 pandemic, the delivery of emergency and elective surgical procedures has been fundamentally changed. Everyone knows that conservative treatment, percutaneous drainage of the gallbladder and cholecystectomy are widely used to treat patients with acute calculous cholecystitis. However, the question of the most effective tactics for treating acute cholecystitis in the early post-Covid period remains poorly understood. It follows that, at this time, it is important to analyze the data on the use of percutaneous and transhepatic drainage of the gallbladder, determine the optimal time for cholecystectomy in acute calculous cholecystitis and compare the effectiveness of “early” and “delayed” cholecystectomy.

Keywords: acute cholecystitis, laporoscopic cholecystectomy, percutaneous gallladder drainaging, post-covid period, coronarivus anamnesis.

Introduction. The epidemiological situation that engulfed the entire world in 2020 forced us to rethink our lives and look at the world in a new way. The pandemic had defined priorities in medicine, in all its structures, including surgery. As Hippocrates wrote, "epidemics seem to hold up a mirror to humanity in which we can see who we really are".

In the context of the COVID-19 pandemic, the practice of providing both planned (including oncological) and emergency specialized and high-tech surgical care has inevitably changed.

At the beginning of the coronavirus pandemic, changes in the tactics of providing surgical care were due to organizational measures: mobilization of beds, including intensive care units, as well as the involvement of medical and nursing staff to treat infected patients. The number of anesthesiologists working in the operating rooms of surgical clinics decreased, since many specialists from the anesthesiology and intensive care departments were involved in providing emergency care to patients with severe respiratory failures caused by coronavirus infection. A similar situation arose with the limitation of the ability to use operating rooms, since artificial lung ventilation devices could be required in intensive care units. All this is due to the need to save consumables used, first, to ensure the safety of medical personnel.

However, an analysis of the first results of treatment of acute surgical pathologies showed that the priority is not so much the solution of organizational issues, but rather the tactical approach to the treatment of surgical diseases.

Since the outbreak of the SARS-CoV-2 coronavirus infection, several surgical societies have published their recommendations on how to manage the impact of the

COVID-19 pandemic on daily clinical practice. The recommendations for emergency surgery have generated controversy among surgeons internationally.

The World Society of Emergency Surgery (WSES) advocated a rational approach to the problem, especially regarding the choice of surgical methods, preferring a "selective" approach that does not exclude the use of laparoscopy a priori, but, on the contrary, actively considers it. This approach is based on an analysis of the organization of human and material resources in which each surgeon works, and takes into account the surgical skills that each specialist developed in the pre-COVID-19 era.

Recommendations and position of surgical societies

The most common morphological form of destructive acute cholecystitis is its gangrenous form, which accounts for about 15% (range 2-30%) [1]. Gangrenous cholecystitis is associated with an increased mortality rate (mortality rate from 15 to 50%) compared to phlegmonous cholecystitis [2]. Retrospective studies that examined risk factors and prognostic factors associated with gangrenous cholecystitis have shown that men, elderly patients with diabetes, coronary heart disease and other comorbidities have a higher risk of developing gangrenous cholecystitis [1-3]. Another study found longer delay before admission and low white blood cell count as independent risk factors affecting mortality. Also, studies have shown that the presence of diabetes mellitus, higher levels of aspartate aminotransferase , alanine aminotransferase , alkaline phosphatase and total bilirubin in the blood, perivesical fluid effusion on ultrasound increased the conversion from laparoscopic to "open" surgery, and as a factor, increased mortality [2]. In any case, the treatment of gangrenous cholecystitis is similar to the treatment of patients with acute cholecystitis. However, in the presence of gangrenous cholecystitis, cholecystectomy may be difficult due to adhesions, poor anatomical control, and possible complications such as bleeding and bile duct injury. Reported conversion rates vary greatly: from 30% to 50% [4] and up to 8.7% [5]. These results are likely related to careful preoperative patient selection for laparoscopic and open cholecystectomy [6]. In their studies, Hunt et al reported a reduction in morbidity and mortality rates with the introduction of laparoscopic cholecystectomy for gangrenous cholecystitis [7]. Onder et al. showed that mortality was higher in cases where there was a transition to open surgery [2]. Recently, many authors have described that COVID-19, complications of pneumonia, and the virus-induced coagulopathy it causes contribute to the earlier formation of gangrenous and perforative forms of acute cholecystitis [8-10].

New guidelines, reflecting the position of several medical societies, suggest considering percutaneous gallbladder drainage in cases where conservative therapy is inefficient. However, they emphasize that advanced age or other increased risk factors are not sufficient grounds for choosing this alternative treatment, except in situations where cholecystectomy is truly impossible [11]. Due to the lack of evidence and recommendations for the management of patients with acute cholecystitis during the COVID-19 pandemic, percutaneous gallbladder drainage (PGBD) in patients at high surgical risk remains the gold standard treatment for acute cholecystitis in patients with COVID-19. However, it is associated with high

morbidity and prolonged hospital stay, increasing the risk of viral spread among healthcare staff and patients who test negative for COVID-19.

The UK Intercollegiate Guidelines for General Surgery during the COVID-19 Pandemic recommend non-operative management where possible, such as for early appendicitis and acute cholecystitis [1]. However, other surgical societies, such as the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) and the European Association for Endoscopic Surgery (EAES), suggest a more individualised approach that takes into account specific hospital and patient conditions [2, 3, 4]. There is ongoing debate about whether our surgical indications for emergencies should be reconsidered in the context of a global pandemic.

According to reports from China, asymptomatic COVID-19 patients who undergo surgery experience adverse clinical outcomes, including increased mortality and respiratory complications [5].

This problem, along with the increased burden of conservative treatment, which has had a significant impact on the work of hospitals around the world, including in Uzbekistan, has led to a revision of the tactics of managing some surgical diseases, including acute cholecystitis (ACC).

The discussion that has arisen around these recommendations has highlighted some additional concerns about the potential evolution towards worsening of ACC during conservative management, such as the need for a higher level of care after failure of antimicrobial therapy. This level of care may not be available in a setting where intensive care units are still occupied by patients with COVID-19 pneumonia .

As scientific researchers, we must remember that treatment strategies are established based on the best available scientific evidence, and organizational choices must be based on the evidence that science and research provide to health systems. This fundamental principle should never be forgotten. Even when reconsidering surgical indications in the context of the COVID-19 emergency (or other emergencies in the future), this fundamental principle must be taken into account.

So what strategy should be used for acute cholecystitis in the context of the COVID-19 pandemic? Laparoscopic Cholecystectomy (LC) continues to be the treatment of choice for acute cholecystitis (ACC) even in the context of the COVID-19 pandemic. Current guidelines recommend LC as the “gold standard” for the treatment of ACC, as it demonstrates better outcomes in terms of mortality, morbidity, and postoperative hospital stay compared to “open” cholecystectomy (OC) [6, 7, 8].

Bloodborne viruses (HPV, HBV, HIV) are known to be present in the plume generated by electrocautery and other energy devices [10, 11]. Although SARS-CoV-2 RNA has recently been detected in peritoneal fluid [12], there is no evidence yet of SARS-CoV-2 in surgical smoke. On the one hand, laparoscopy keeps surgical smoke in the abdominal cavity, but on the other hand, evacuation of the pneumoperitoneum may expose staff to be infected.

It is currently of utmost importance to study the data on the timing of laparoscopic cholecystectomy (LC) in acute cholecystitis (ACC), comparing the results of “early” cholecystectomy with the results of “delayed” cholecystectomy, performed after a period of conservative therapy to overcome the acute phase.

Early cholecystectomy is recommended in all the above guidelines based on the results of several meta-analyses randomized controlled trials comparing the two different approaches have shown that early cholecystectomy (i.e. performed 'as soon as possible' after the onset of symptoms and in any case no later than ten days after the onset of symptoms) does not result in worse outcomes compared with delayed cholecystectomy in terms of morbidity, mortality and conversion rate (i.e. six weeks after the acute episode). Early cholecystectomy is therefore preferable to delayed cholecystectomy due to the shorter overall length of hospitalisation (taking into account the sum of the stay in the first hospitalisation, i.e. acute cholecystitis, and the second, delayed intervention).

The equivalence of the two strategies in terms of morbidity, mortality and conversion rates cannot justify the systematic use of delayed cholecystectomy. During a coronavirus outbreak , it may be appropriate to delay surgery until the outbreak is over, even if this entails increased use of health care resources (e.g., increased length of hospital stay).

Equivalence in morbidity and mortality between the two approaches may justify wider application of delayed cholecystectomy, subject to analysis of the hospital's human and material resources, the organizational practices adopted, and the local epidemiological situation.

During the period of conservative treatment, it is imperative to closely monitor the parameters of sepsis and the progression of pain, despite the analgesic therapy being administered. The danger of progression of the septic condition, as well as the risk of developing a gangrenous form or perforation of the gallbladder may in any case require emergency cholecystectomy.

If before the COVID-19 pandemic, cholecystectomy in patients considered to be at high risk had a mortality rate of up to 19% [14], this criteria becomes even more important when COVID-19 tests positive or is suspected in patients who are already considered to be at high risk for surgery.

Both the incidence of acute cholecystitis (ACC) and mortality from COVID-19 are higher in elderly patients. Although this group of patients often has comorbidities that complicate the postoperative course, the early use of laparoscopic cholecystectomy (LC) in ACC remains safe and effective for this group of patients, although it is associated with an increased conversion rate [15].

Italian guidelines (SICE, ACOI, SIC, SICUT, SICOP) for laparoscopic cholecystectomy [6] and the latest WSES guidelines [7, 9] suggest that in patients considered to be at excessive surgical risk ("unfit for surgery"), percutaneous gallbladder drainage may be considered as an alternative after failure of conservative therapy. However, it should be noted that age and other increased risk factors for COVID-19 are not sufficient grounds for choosing this alternative treatment option, except in situations where cholecystectomy is truly not possible.

An analysis of the international literature based on high-quality observational studies demonstrates a low mortality rate in patients undergoing percutaneous gallbladder drainage. Low mortality has also been documented in recent large retrospective analyses [16, 17].

As mentioned earlier, percutaneous cholecystostomy is performed after unsuccessful or ineffective conservative therapy, which is the first step in the treatment strategy for these particularly vulnerable patients. Among all the treatment options mentioned in the literature, PGBD, transpapillary drainage, transmural drainage, is generally considered preferred due to its ease of performance, minimal frequency complications ratio, safety, and lower costs.

Optimal timing for percutaneous cholecystostomy are actively debated. However, performing cholecystostomy within 24 hours of the onset of clinical presentation is associated with fewer complications, such as bleeding, and a shorter hospital stay [19]. However, the timing of percutaneous The choice of cholecystostomy depends primarily on the clinical indications. Urgent drainage should be considered in cases of severe sepsis in patients for whom surgical intervention is not indicated. For other patients, who are not suitable for surgery, cholecystostomy is usually performed, if the patient's condition does not improve within 1 to 3 days after initiation of antibiotic therapy.

Conclusions

Laparoscopic surgery, as a method, does not pose a risk of spreading COVID-19 infection compared to open surgery. Therefore, it should be organized in a way that ensures safe implementation even in the current pandemic conditions, which will allow predicting the best results for patients. Minimally invasive surgery remains an important tool in the management of surgical diseases, minimizing risks and improving outcomes.

For patients in whom surgery is not possible due to high risk, percutaneous transhepatic Cholecystostomy may be considered as an alternative treatment option after conservative therapy has failed. This approach provides infection control and allows for tailoring of treatment strategies in resource-limited, high-risk settings.

Thus, in the current pandemic conditions, it is important to consider not only the efficacy and safety of minimally invasive methods, but also to apply alternative strategies depending on the patient's condition and available resources to ensure an optimal outcome and minimize risks.

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