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VARIA

Clinical and therapeutic particularities of acute gallstones disease during COVID-19 pandemic

Simona Balasescu¹, Andra Maria Trotea^{1,2}, Dragos Margaritescu³, Alexandru Sabau⁴

Abstract: Gallstones disease (GD) is a common pathology, with an incidence of approx. 20% in developed countries, a third of these cases being symptomatic. The paper aims to identify the diagnostic and therapeutic features of acute manifestations of gallstones during the COVID-19 pandemic.

Materials and method: A retrospective, comparative study was performed of the cases presented to the emergency room (ER) and hospitalized for acute manifestations of gallstones in April-June 2020 vs similar period of 2019. The data regarding clinical form, associated pathology, therapeutic management were analyzed from the ER presentation register, hospitalization sheets and surgical protocols.

Results: During the COVID-19 pandemic, the number of hospitalized cases for acute cholecystitis and other acute manifestations of GD was significantly lower than in the same period last year (21 vs 49 patients). In both study groups the main form of presentation was acute catarrhal cholecystitis (52.4% vs 63.2%). During the SARS-Cov-2 pandemic, we report an increased incidence of complicated forms, mainly hydrops (23.8% vs. 4.1%, $p < 0.05$) and angiocholitis (19% vs. 4.1%, $p < 0.05$). Conservative treatment was chosen more frequently during the pandemic (48% vs. 29%). For operated patients, laparoscopic cholecystectomy was the main option, performed in 85.7% in both groups.

Conclusions: We maintain that laparoscopic cholecystectomy remains the gold standard for acute cholecystitis, even in the COVID-19 pandemic, as it guarantees the best outcomes for the patients. Conservative management may be an option for mild cases, but it carries the risk of recurrence of symptoms and increased incidence of severe complications.

Keywords: laparoscopic cholecystectomy, gallstones disease, COVID-19 pandemic, acute cholecystitis

INTRODUCTION

Gallstones disease (GD) is a common pathology, with an incidence of approx. 20% in developed countries, a third of these cases being symptomatic [1].

Laparoscopic cholecystectomy is the gold standard of treatment for this condition. Acute forms are of clinically

variable severity, from possible regressive under conservative treatment to life-threatening, namely: biliary colic, acute cholecystitis, cholecysto-pancreatitis and acute angiocholitis. Early surgical treatment was recommended as

Corresponding author: Simona Balasescu
sim_deea90@yahoo.com

¹ University Emergency Hospital Bucharest, IVth Surgery Department, Bucharest, Romania

² "Carol Davila" University of Medicine and Pharmacy, Bucharest, Romania

³ University of Medicine and Pharmacy Craiova, Romania

⁴ "Lucian Blaga" University, Faculty of Medicine, Sibiu, Romania

standard in acute cholecystitis to prevent subsequent recurrent episodes, as well as migratory and infectious complications related to the displacement of stones in the main bile duct [2, 3].

The global spread of SARS-CoV-2 pandemic, with the declaration of a state of emergency in our country on the 16th of March 2020, for 60 days, followed by the state of alert since 15th of May, still in force today, had a profound impact on the surgical practice. The initial recommendations of the International and National Surgical Societies were to delay elective surgery, and to attempt first-hand a conservative management of mild and moderate forms presented to the emergency room. Another aspect was that of the aerosolization potential in laparoscopic interventions associated with the induction and dessufflation of the pneumoperitoneum, trocar leakage and laparoscopic smoke. Since the time of SARS-CoV, in 2003, there has been convincing evidence that aerosol-generating procedures (AGP) could potentially result in a wider human-to-human coronavirus transmission radius [4]. Bioaerosols range in size from 0.3 to 100 µm, and particles up to 5 µm remain airborne and can travel distances of more than 100 m, which may be a transmission path for SARS-CoV-2 [5]. Safety guidelines have been developed in laparoscopic surgery to prevent infection of medical personnel in patients suspected or infected with SARS-Cov2, which focuses on preoperative testing of patients, wearing appropriate PPE, consisting of FFP2 masks, goggles or faceshields, ultrafiltration of pneumoperitoneum and preventing accidental leakage of CO2 and plume during laparoscopic surgery [6-13]. Also, the addressability of the population and the desire for surgical treatment was lower for this pathology, partly explained by the fear of a possible contamination in the emergency room or hospital.

Aim

The paper aims to identify the diagnostic and therapeutic features of acute manifestations of gallstones during the COVID-19 pandemic.

MATERIALS AND METHODS

A retrospective, comparative study was performed of the cases presented to the guard room and hospitalized in emergency for acute manifestations of gallstones in April-June 2020 vs similar period of 2019. The data from the presentation register at the guard, hospitalization sheets and surgical protocols, on the particularities related to the clinical form at hospitalization, associated pathology, therapeutic management of patients with acute gallbladder disease, in the absence and during the SARS-CoV-2

pandemic. Changes in the surgical practice of patients with acute manifestations of gallstone disease imposed by international and national guidelines were also analyzed, as well as organizational changes in institutional circuits to prevent the spread of SARS-CoV-2 infection.

RESULTS

Establishing separate circuits within the department for the prevention of SARS-CoV-2 infection

During the pandemic COVID-19, our hospital, an emergency university center with many specializations, made sustained efforts to remain COVID-free, to be able to ensure the safe treatment of patients, and to prevent nosocomial contamination with SARS-Cov2.

In this regard, a strict protocol was implemented which involves testing by RT-PCR at the time of admission of all patients in the emergency room, their isolation respecting separate circuits until the result is obtained, simultaneously with the beginning of the appropriate treatment. If surgery is required immediately, it was performed by treating the patient as SARS-CoV-2 suspect, with all the precautions required by this: proper equipment of PPE in the operating room, avoidance as much as possible of aerosol-generating methods, including laparoscopic surgery, according to the recommendations of the national endoscopic surgery company ARCE in force during the analyzed period. When it was possible to delay the intervention for 24 hours until the result was obtained, in case of negative, the patient was operated laparoscopically, with standard PPE. If the test confirms the infection, the patient was transferred to one of the hospitals designated as a COVID-support hospital and further treated according to the guidelines in force.

Study group analysis

During April-June 2020, during the COVID-19 pandemic, the number of hospitalized cases for acute cholecystitis and other acute manifestations of GD was significantly lower than in the same period last year (21 vs 49 patients). Of the total presentations at the emergency room during the COVID-19 pandemic, only a percentage of 27.6% agreed with the hospitalization (vs 48.5% in 2019), the rest expressing their request for conservative treatment.

The sex ratio was similar in the 2 groups (F: M = 2: 1), but the incidence of patients treated with rural origin was lower, this could be correlated with the travel difficulties imposed by the legislation during the state of expedite. The average age was higher in 2020, but statistically insignificant (64 vs 56 years).

Regarding the clinical forms, in both study groups the main

form of presentation was acute catarrhal cholecystitis (52.4% vs 63.2%). We note, during the SARS-Cov-2 pandemic, the absence of mild forms of biliary colic, with increasing incidence of complicated forms, mainly hydrops (23.8% vs. 4.1%, $p < 0.05$) and angiocholitis (19% vs. 4.1%, $p < 0.05$).

From the analysis of associated comorbidities, we notice the increase of the share of cardiovascular diseases and diabetes in patients hospitalized during the pandemic, these diseases increasing the potential for aggravation of the general condition in patients with acute cholecystitis, making them unsuitable for conservative management.

Table 1: Comparative analysis of patients with acute manifestations of GD during the COVID-19 pandemic compared to the same period last year: demographic data, clinical forms at hospitalization, comorbidities

	April-June 2020	April-June 2019
Number	21	49
Male	33.3%	36.7%
Female	66.7%	63.3%
Urban/Rural	6:1	4:1
Age	64+/-3.2 years	56+/-2.7 years
Clinical form		
Biliary colic	0	8 (16.3%)
Acute cholecystitis		
- Catarrhal	11 (52.4%)	31 (63.2%)
- Phlegmonous	1 (4.7%)	2 (4.1%)
- Gangrenous	0	1 (2%)
Hydrops	5 (23.8%)	2 (4.1%)
Pio-cholecystitis	0	1 (2%)
Cholecistopancreatitis	1 (4.7%)	2 (4.1%)
Angiocholitis	4 (19%)	2 (4.1%)
Associated pathology:		
Obesity	6 (28.5%)	10 (20.4%)
Adherential Syndrome	5 (23.8%)	16 (32.6%)
Cardiac pathology	6 (28.5%)	6 (12.2%)
High Blood pressure	6 (28.5%)	16 (32.6%)
Diabetes	5 (23.8%)	3 (6.1%)
Gastritis/ Dyspeptic syndrome/Ulcer	3 (14.3%)	5 (10.2%)
Bronchopulmonary chronic obstructive disease	2 (9.5%)	0
Recent cerebrovascular accident	1 (4.7%)	0
Hepato-splenomegaly. Port vein thrombosis	1 (4.7%)	0
Hiatal hernia	0	1 (2%)
Neuropsychiatric disorders (epilepsy, drug addiction)	0	2 (4%)

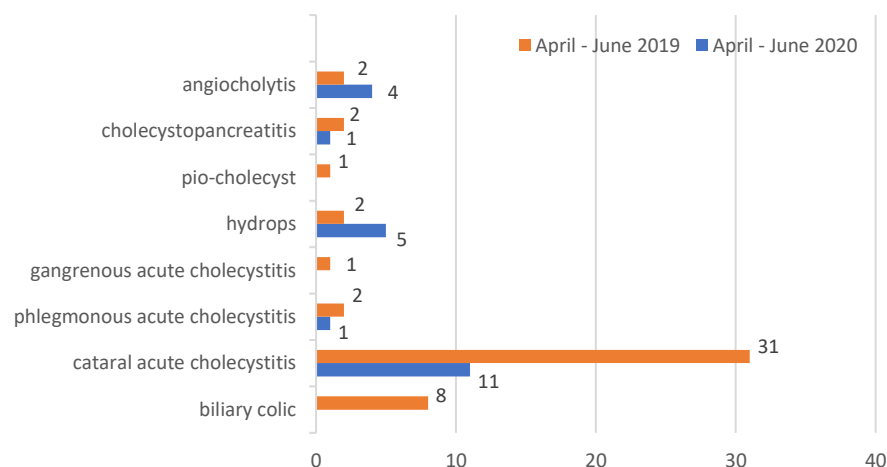


Figure 1: Comparative data for clinical forms during Covid-19 pandemic vs non-COVID period

After admission, all patients in the pandemic group were tested for Sars-CoV-2 infection and were hospitalized in a

COVID-19 suspect area, with separate circuits from the rest of the department. Medical therapy was initiated,

depending on the clinical form, with spasmolytics, analgesics, antibiotics and hydro-electrolytic rebalancing. In 20 of 21 cases, surgery could be delayed for up to 24 hours until the absence of COVID infection was documented. In one case, a piocholecyst with imminent of perforation was operated on in an immediate emergency, by open approach, and a cholecystectomy and subhepatic drainage were performed, with a slowly favorable evolution. In a case diagnosed with angiocholitis, SARS-CoV-2 positive, the patient was transferred for ERCP to a surgery department at a COVID-19 support hospital, evolving favorably under minimally invasive treatment.

Table 2: Therapeutic management and postoperative outcome in the COVID-19 pandemic group vs control group.

	April-June 2020	April-June 2019
% surgery	11 cases (52%)	35 cases (71%)
Type of surgery:		
LC	18 (85.7%)	30 (85.7%)
Conversion	0	2 (5.7%)
OC	1 (4.7%)	0
ERCP	1 (4.7%)	3 (8.6%)
ERCP+LC	1 (4.7%)	0
Hospital days	6.62	5.6
Postoperative complications:		
Deaths	2 (comorbidities)	0
Bleeding	1 (conservatory)	1
Infection of the wound	0	0

LC: laparoscopic cholecystectomy; OC: open cholecystectomy; ERCP: Endoscopic retrograde cholangiopancreatography

Regarding therapeutic management, there is an increase in cases that benefited from conservative treatment during the pandemic (48% vs. 29%). For operated patients, laparoscopic cholecystectomy was the main option, performed in 85.7% in both groups, except that during the pandemic, the intervention was delayed 24-48 hours to obtain confirmation of the absence of SARS-CoV-2 infection. There were no conversions for the pandemic group, a possible explanation being the better documentation of cases and the favorable effect of early medical therapy in cases with an increased risk of conversion due to local inflammatory anatomical changes.

The average hospital stay was slightly increased, but statistically insignificant, a possible explanation being the timing related to RT-PCR, but also the higher incidence of comorbidities and more severe forms of treated patients. The latter aspect also explains the higher rate of postoperative deaths (9.5% vs 0%), being related to cardiovascular and metabolic decompensation through the associated countries, in elderly patients.

DISCUSSION

The COVID-19 pandemic had a major impact on the management of acute gallstones. During this period, the proportion of cases treated conservatively increased, either outpatient, in the case of patients who refused hospitalization, or in hospitalized patients. This is communicated by similar studies conducted in Spain. Italy, UK or USA, also countries with a significant number of SARS-CoV-2 infections nationwide [1, 14-19].

One of the causes is the reluctance of patients to go to the emergency room or to consent to hospitalization for fear of infection. Harnett et al. estimates in this regard a decrease of up to 50% in the presentation of patients in the emergency room in the US during the pandemic [20]. On the other hand, given the increased pressure on health systems, but also of studies that show a bad outcome in surgeries performed on COVID + patients during the incubation period, international practice guidelines recommend conservative management and avoidance of surgery, if safe for the patient [6, 7, 12, 22-25].

Another important aspect is the reluctance to laparoscopic surgery, due to the possibility of aerosolization of surgical plume and CO₂ at pneumoperitoneum desufflation [4]. Preoperative testing of patients is encouraged, as far as resources allow, however studies show a 30% chance of false-negative results, which can have unfavorable consequences for both the patient and the medical staff [26]. Considering possible presence of the infectious agent in blood, feces and intestinal wall and to avoid leakage near the trocar orifices, the use of low pneumoperitoneum pressure and low energy levels during electrocautery.

Regarding gallstone disease, laparoscopic cholecystectomy has established itself worldwide as a gold-standard, due to its indisputable advantages related to the reduction of operative complications, early recovery and reduced hospitalization time. Even during the COVID-19 pandemic, when the open approach was encouraged due to avoiding aerosolization, laparoscopic cholecystectomy remained the preferred technique in surgical practice in our department, being practiced in 87.5% of cases. Similar results are reported by Manzia, Narvaez and Kabir [1, 17, 27]. Moreover, Flemming and Kabir show that SARS-CoV-2 is not present in bile, gallbladder samples and peritoneal fluid [27, 28]. These preliminary findings suggest that the potential infectious risk for operating theater staff and surgeons during open and laparoscopic operations in SARS-CoV -2 patients is lower than initially expected.

Another observation found in the present study is the increase in the severity of cases hospitalized and operated

during the SARS-Cov-2 pandemic compared to the same period last year. Gallstones disease, even if not an emergency, should receive surgical treatment when symptomatic. Neglecting this extremely common pathology can increase the incidence of severe, life-threatening complications such as cholangiopancreatitis or angiolcolitis [28-33].

Additionally, a more advanced disease at the time of surgery may result in increasingly morbid operations, which are associated with prolonged hospital stay and higher costs. Since the global healthcare community has never faced a dramatic scenario such as the COVID-19 pandemic, it is difficult to forecast the effects of untreated GD and the development of its related complications during and after

COVID-19 [1].

CONCLUSIONS

In light of recent findings, but changes to the surgical protocol are required to increased safety for medical personnel.

We maintain that laparoscopic cholecystectomy remains the gold standard for acute cholecystitis, even in the COVID-19 pandemic, as it guarantees the best outcomes for the patients.

Conservative management may be an option for mild cases, but it carries the risk of recurrence of symptoms and an increased incidence of severe complications.

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