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Case report

Open surgical cholecystostomy under local anaesthesia as salvage therapy of acute cholecystitis during the 4th COVID-19 wave in Northern Italy: experience from a rural hospital

Filippo Montali[1], Ballabeni Lucia[2], Bignone Maddalena[2], Alessio Rollo[1], Edoardo Virgilio[1,2], Renato Costi[1,2]

[1]Department of Surgery, Azienda Sanitaria Locale di Parma, Vaio Hospital, Fidenza (PR), Italy; [2]Department of Medicine and Surgery, University of Parma, Parma

Abstract. The COVID-19 pandemic outbreak delayed interventions of elective surgery worldwide. Symptomatic cholelithiasis represents one of the most common, benign medical conditions in the world leading the affected patients to general surgeons'attention; in 0.5% of cases gallstones (symptomatic or not) can complicate with acute lithiasic cholecystitis (ALC) whose universally acknowledged treatment of choice is laparoscopic cholecystectomy. Delaying in surgery of ALC can increase the rate of complications like severe ALC, acute cholangitis and sepsis. During the 4th wave of COVID 19 in Northern Italy the occurrence of difficult communication and delays in ALC patients transfer between first and second level hospitals lead to the re-emergence of obsolete surgical procedures. In our rural hospital, in fact, a 92 years old patient affected with ALC and several comorbidities was treated with a successful emergency surgical procedure of transperitoneal cholecistostomy in lieu of a radiological transperitoneal approach. Such a choice was dictated by the absence of an interventional radiology unit in our hospital as well as the unavailability of patient transfer to our central referral hub (the hospital of Parma) due to hospital overcrowding secondary to the 4th wave of COVID 19 pandemic. (www.actabiomedica.it)

Key words: Cholecystostomy, acute cholecystitis, gallbladder drainage, cholecystectomy, COVID-19

Introduction

Since its outbreak, the COVID-19 pandemic has considerably impacted surgical daily practice in the world (1). Several aspects have been involved. Many surgical patients requiring elective treatment, for example, have avoided the necessary scheduled care because concerned about the risk of contracting SARS-CoV-2 coronavirus infection at hospitals, clinics and clinician offices. As a consequence, non-urgent and non-emergency operations have been delayed creating a large backlog of patients necessitating surgical care. Surgeons have thereby witnessed one of the most dramatic changes in their routine practice with a rapidly decreasing number of elective surgery. The knock-on effect of the SARS-CoV-2 pandemic to surgical services inevitably led to a heavy decline in population access to surgical care: 28 million elective operations, in fact, have been cancelled worldwide during the first three months of the pandemic (2). Italy was the Western country most severely affected by COVID-19 and from March to June 2020 elective surgery was completely interrupted; it is estimated that 410000 elective operations were cancelled (3-5). In summer 2022, this scenario of profound stress for the Italian healthcare system is still present due to the

4th, Omicron-fuelled, wave of COVID-19. Delaying elective surgery, in fact, caused a flare-up or worsening of surgical diseases causing an increased rate of conditions requiring emergency management. Furthermore, pandemic context experienced by general surgeons working in some local or peripheral hospitals appeared even more complicated. Occasionally, in fact, given the absence of some specialists as well as the unavailability of county ambulance service, in such centers surgery may represent the only tool available for patients unfit for surgery and presenting with a disease necessitating an emergency treatment.

Herein, we present a paradigmatic case witnessing the delicate phase experienced by surgical patients in Italy during this great pandemic. More precisely, the case of a frail, geriatric patient admitted to a rural hospital for acute calculous cholecystitis and in the need of an emergent treatment is discussed.

Case presentation

A 92 years old man was admitted to our Emergency Department for one-week generalized abdominal pain, food intolerance, jaundice and severe anemia. His past medical history was significant for chronic bronchopulmonary disease, ischemic-arrhythmic-hypertensive heart disorders and type II diabetes. Admission blood tests showed increased cholestatic indexes (total bilirubin 7.35 mg/dl, direct bilirubin 4.39 mg/dl, indirect 2.96 mg/dl), acute renal failure (creatinine 2.29 mg/dl), elevated inflammation proteins (C-reactive protein -CRP- 6 mg/L, procalcitonin -PCT- 1.25 ng/ml) and an anticoagulant state. At the abdominal examination, Murphy's sign was positive. An abdominal ultrasound (US) revealed an over-distended gallbladder (longitudinal diameter of 13 cm) with 2 cm thickened walls and filled with microcalculi. The choledochus, which was dilated with a 17 mm caliber, was replete with biliary sludge. Contrast-enhanced CT scan of the abdomen confirmed the US diagnosis of acute lithiasic cholecystitis (ALC) with choledocholithiasis (Figure 1); moreover, a dilation of the entire intrahepatic biliary tract was observed.

Considering his severe comorbidies, a surgery with open or laparoscopic cholecystectomy was ruled out. Consequently, an empiric intravenous antibiotic therapy with piperacillin/tazobactam was immediately commenced; nevertheless, over the following 48 hours, patient's clinical condition deteriorated showing an acute abdomen and a positive Blumberg's sign at the right hypochondrium. There was also a worsening of blood test with a leukocytosis of 20000/mm^3, PCT of 86.02 ng/ml, CRP of 203 mg/L and thrombocytopenia (86000/mm^3). Due to the 4th wave of COVID, patient transfer to our first level hospital -which has an interventional radiology unit that can regularly perform transcutaneous cholecystotomy- was not available at that time; hence, given the ongoing sepsis, we

Figure 1. Contrast-enhanced CT scan of the abdomen showed a swollen thickened gallbladder reaching the right side of the anterior abdominal wall.

decided to accomplish an urgent surgery with transperitoneal cholecystostomy under local anaesthesia as described hereafter.

The procedure was US-guided:

- A blind sedation was performed by anesthesiology team;
- Local anesthesia was injected in the area of the right upper quadrant (lidocaine 2%);
- Kocher incision (5 cm) and dissection of layers;
- Access to the abdominal cavity and identification of gallbladder;
- Grabbing and opening of the gallbladder fundus (Figure 2);
- Aspiration of the its contents which was also sent for microbiological analysis;

Figure 2. To accomplish the open surgical cholecystostomy, after local anaesthesia and abdominal incision through the right hypochondrium, we found and exteriorized the fundus of the gallbladder.

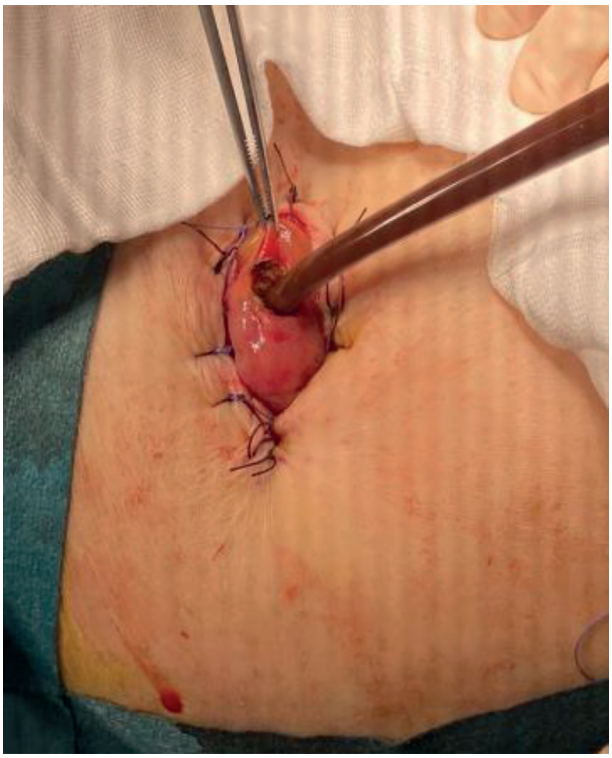

Figure 3. To complete the intervention, after removing the stones and tapping the sludge from its lumen, the gallbladder fenestration was anastomosed to the skin in order to secure the surgical cholecystostomy.

- Suture of the fundus of the gallbladder to the anterior abdominal wall (surgical cholecystostomy) (Figure 3);
- Lavage of the gallbladder with sterile saline solution;
- Application of pouch and plate.

During the postoperative course, the stoma was euchromatic, trophic and productive: more than 1 liter of bile, in fact, poured into the pouch daily with an improvement of the cholestatic jaundice (total bilirubin 3.41 mg/dl, direct bilirubin 1.94 mg/dl) and inflammation indexes (white blood cells of 5.22/mm^3, PCT of 2.64 ng/ml, CRP of 34 mg/L). At 6th postoperative day, an endoscopic retrograde management (ERCP) of common bile duct stones was arranged: it showed choledochus dilated up to 15 mm with multiple filling defects compatible with biliary calculi. ERCP sphincteromy was performed followed by pneumatic dilation

of the papilla with extraction of numerous stones and biliary sludge; a plastic biliary endoprosthesis was left *in situ*. Following the endoscopic procedures, the cholestatic enzyme pattern returned to normal value and the daily output of the stoma decreased progressively to zero. Hence, the patient was discharged 10 days after surgery. We also observed a progressive and complete fibrotic healing of the stoma in the outpatient clinic after one month. Written informed consent was obtained from the patient before the writing of the article.

Discussion

Following the COVID-19 outbreak and the subsequent waves, Italy, the first Western country to be severely affected by COVID-19, was forced to conduct major rearrangement in its health system. In fact, while the population continues to be affected by the whole spectrum of pre-existing diseases, hospitals were swamped with a massive number of COVID-19 patients (1, 3-4). And the 4th, Omicron-fuelled, pandemic wave in Northern Italy is still putting the healthcare system under additional stress. From the beginning of the pandemic, national surgical departments had to re-schedule their activity giving priority to urgent procedures and non-deferrable oncologic cases (5). Far from the major cities and larger centers, rural hospitals had to cope with even harder situations. The management of very frequent benign diseases such ALC, in fact, has become a very laborious task for the surgical operators working in such places. And the case reported above represents a clear testimony.

The first procedure of draining a lithiasic gallbladder was accidentally performed in a young woman with a big abdominal mass by John Stough Bobbs in his third-floor office in downtown Indianapolis on June 15, 1867. After accessing to the peritoneal cavity, professor Bobbs found a translucent sac crammed by "several solid bodies about the size of ordinary rifle bullets". So, he left the gallbladder in place performing the first open surgical cholecystostomy (OSC) (6). According to our studies, the second OSC ever performed should be attributed to Russian Professor Nikolay Sklifosovsky approximately in the 1870s. Later on, in 1882 Dr. Langenbuch perfomed the first cholecystectomy on a man who had suffered from gallstones for 16 years: the treatment met with clinical and popular success. Open cholecystectomy became the gold standard for close to a century. Then, in 1985, the modern era of cholecystectomy began with German surgeon Erich Mühe who removed the gallbladder from a patient using laparoscopic instruments (7).

Currently, the management of ALC patients who are considered poor candidates for surgery remains controversial throughout the world: in subjects, in fact, who present to a surgical attention 10 days after the commencement of the symptoms or where age, frailty and several or severe comorbidities contraindicate general anaesthesia, an immediate cholecystectomy is associated with higher morbidity and mortality rates compared to standard ALC subjects (8-10). In such circumstances percutaneous cholecystostomy (PC), performed through a transhepatic or transperitoneal gallbladder drainage or aspiration, represents a cogent alternative treatment to cholecystectomy (including both open and laparoscopic approach) allowing for source control of the infection, symptomatic relief as well as saving such patients from potential complications (such as bleeding or iatrogenic bile duct injury) deriving from a major invasive act which can eventually put their lives at even greater risk (11). Although PC has been originally conceived as a temporary solution to the underlying problem of symptomatic cholelithiasis, occasionally it represents a definitive and safe approach for individuals with numerous comorbidities and aged over 80, 90, even 100 years (8-13). At any rate, PC is not a risk-free procedure and an interventional radiology's team is needed.

As in the experience of the management of symptomatic peripancreatic fluid collections (PFCs) an alternative non invasive technique is EUS-guided gallbladder gastrostomy (EUS-GBD). Novel EUS-specific stent designs such as the lumen-apposing metal stents (LAMSs) for example Hot AXIOS™ appear to be effective and safe reaching technical and clinical successes rate of 98.7% and 95.9%, respectively (14,15).

Although largely abandoned for several decades (with the exception of very rare cases), OSC still represents another possible method of treatment for ALC patients assessed unfit for surgery (16). As witnessed by our rural experience here in Northern Italy, the

difficult situation shared by many other small, faraway hospitals might cause a resurgence of popularity of this traditional but simple, effective and safe kind of surgery. In our case, it did represent the last chance to save our patients' life.

Conclusion

The morbidity and mortality rates associated with cholecystectomy for ALC in the elderly are higher compared with the general population due to several surgical and anaesthesiological aspects. PC is considered the first line treatment for this kind of patients; however, percutaneous techniques have associated complications and can be done only in main hospital. The 4th, Omicron-fuelled, wave of COVID-19 pandemic made the normal process of interaction and support among hospitals very difficult, especially to the detriment of the small, faraway centers where interventional radiology's team are often not available and transport of patients cannot always be assured due to the measures required by the pandemic itself. In such events, resorting to an OSC under local anaesthesia can represent the last life-saving available option to accomplish.

Conflict of Interest: Each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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Correspondence:

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Filippo Montali
Department of Surgery
Azienda Sanitaria Locale di Parma, Vaio Hospital
Via Don Tincati 5, 43036 Fidenza (PR)
E-mail: fmontali@ausl.pr.it