

Case report

Acute surgical abdomen due to duodenal perforation in an elderly COVID-19 patient

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Summary

Introduction. Since the announcement of the SARS-CoV-2 pandemic, the health system has been facing great challenges. Due to several uncertainties and concerns, surgeons face a huge challenge in solving urgent surgical conditions in order to save a life.

Case report. We present a patient with a coronavirus (COVID-19) infection and acute abdomen who was in poor general condition at the time of surgery, septic, all as a result of duodenal ulcer perforation. She did not have a positive RT-PCR at the time of surgery, but the lung CT scan showed highly indicative signs of COVID-19 infection. She had a positive nasopharyngeal swab RT-PCR test for the SARS-CoV-2 virus on the first postoperative day.

Conclusion. All suspected COVID-19 patients during surgery should be treated as positive for SARS-CoV-2 virus with the use of all staff protection measures.

Keywords: COVID-19, acute abdomen, RT-PCR, CT

Introduction

Since initially discovered in China, in the city of Wuhan, in December 2019, the SARS-CoV-2 coronavirus began to spread unstopably around the world, so the pandemic was declared in March 2020 [1]. The consequences of this new disease are noticed at all levels of the health system, primarily due to the engagement of many health workers in the treatment of patients with COVID-19. Medical doctors of all specializations, including surgeons, are involved in the treatment of patients with COVID-19 disease.

A specific challenge is to treat patients who require urgent surgical intervention during this pandemic situation because the surgical treatment of COVID-19 patients requires more serious protection measures than treating non-COVID-19 patients. Waiting for the real-time polymerase chain reaction (RT-PCR) report for SARS-CoV-2 can further endanger life of the

patient who needs urgent surgical intervention. Radiological diagnostic methods such as X-rays and CT play a major role in diagnosing COVID-19 patients or at least raising the suspicion of the disease. Therefore, all cases of suspicious COVID-19 patients, who need emergency surgical intervention, it is necessary to be treated as COVID-19 patients, using safety protocol measures, until the arrival of negative RT-PCR result [2, 3].

We are presenting a COVID-19 patient with acute abdomen and perforated duodenal ulcer that required emergency surgery.

Case report

The 75-year-old patient checked in at the pre-admission surgical clinic due to epigastric pain that spreads to the right side of the chest, and nausea. The pain started a few hours earlier. On admission to the clinic the abdomen was soft, painfully sensitive to palpation in the epigastrium. Comorbidities - hypertension, previous treatment of rheumatic problems, and an amputated toe due to vascular issues. Following protocol for all patients who require hospital treatment, a rapid serological test, rapid antigen test and nasopharyngeal swab RT-PCR test were done in the admission clinic - the result was negative. Patient had negative epidemiological data for COVID-19. An ultrasound of the abdomen was performed - we discovered minimal collection of free fluid in the pouch of Douglas, other findings were normal. X-ray of the abdomen showed no signs of pneumoperitoneum, X-ray of the lungs showed very sharpened pulmonary bronchovascular pattern. Lung CT findings showed bilateral, multilobar, predominantly peripheral and posterior distribution of subpleural lines and fibrous bands with zones of consolidation mainly in the lower lobes suggestive of COVID-19 disease; free fluid present in the abdomen without signs of pneumoperitoneum. Due to ra-

diologically verified lung changes indicating the possible SARS-CoV-2 virus infection, she was admitted to the COVID-19 department for further diagnosis and treatment. Initial laboratory findings were RBC 3.81, WBC 8.1, HGB 102, CRP 131, LDH 251, albumin 30. Treatment started according to the protocol for COVID-19. A nasopharyngeal swab PCR test on SARS-CoV-2 was taken twice, and the second one was positive. Despite the applied therapy, the general condition worsened as well as the laboratory parameters after 4 days of hospitalization (CRP 315.2, RBC 3.4, WBC 29.2, fibrinogen 15.5, albumin 18). In addition, abdominal distension with diffusely painfully sensitive palpation occurred, patient was febrile and exhausted. Control CT of the chest and abdomen was performed: changes in the lungs which are characteristic of COVID-19 were in progression compared to the previous images. A large amount of thick fluid content and pneumoperitoneum were present in the perihepatic region (Figure 1 and 2). Boey score of 2 set indications for surgery. Under general endotracheal anesthesia, an open abdominal operation was performed, with an upper medial incision. Perforation was documented on the front side of the duodenal bulb up to 1.5 cm in size, with fibrin deposits along the serosal surfaces. Perforation site suture was performed with perforation site omentoplasty. Diagnostic peritoneal lavage was performed, and two drains were placed - subhepatic and in the pouch of Douglas. After the surgery, the patient was transferred to the COVID-19 intensive care unit, where conservative treatment was continued with oxygen therapy (max 8 l O₂) via an oxygen mask. On the 4th postoperative day, she was transferred to the COVID-19 department, where conservative treatment with antibiotics (Imipenem, Vancomycin, and Metronidasole), anticoagulant therapy (Nadroparin calcium 0.6 ml sc twice a day), proton pump inhibitors (PPI), oxygen support (via a mask with a flow of up to 6 l O₂), corticosteroids was continued, as well as

vitamin therapy with fluid replacement and other symptomatic therapy. Patient was without oxygen support from the 10th postoperative day. On the 20th day of hospitalization, she was released for home treatment, in good

general condition and with appropriate local findings, with inflammatory biochemical parameters within normal range and advice for regular examinations.



Figure 1a. Lung CT on a submission day



Figure 1b. Lung CT on a day of surgery

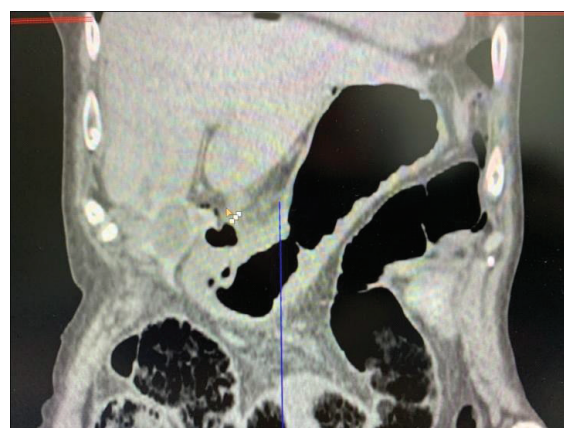
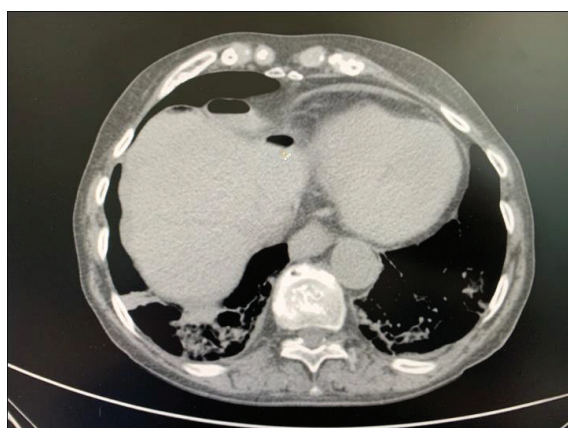


Figure 2a. and 2b. Abdominal CT - subdiaphragmatically and down the anterior abdominal wall (with the patient lying on his back) free gas collections indicating perforation of the hollow organ

Discussion

COVID-19 is typically characterized by respiratory tract symptoms, but sometimes may be presented with abdominal pain, without having findings of abdominal disease, and with no respiratory symptoms. In a retrospective study, 11.8% of patients were positive for SARS-CoV-2, without respiratory symptoms and with abdominal problems and verified changes on CT screening of the lungs, characteristic of COVID-19 [4].

In a COVID-19 patient, an acute abdomen may develop for multiple reasons. Although gastrointestinal symptoms may appear in up to 70% of the patients, they do not usually present a severe abdominal situation [5]. The mechanisms of abdominal pain during SARS-CoV-2 infection may be classified as pulmonary (with CT abnormalities), due to the involvement of lower pulmonary lobes, and extrapulmonary, as a result of direct damage of gastrointestinal (GI) epithelium by SARS-CoV-2 virus attack on angiotensin-converting enzyme 2 (ACE2) in GI cells, as a receptor for viral entry or as a complication of the drugs used [6, 7].

Since the declaration of the COVID-19 pandemic in our country, all patients presenting at the emergency surgical clinic are treated as potential COVID-19 suspects. According to the protocol in our hospital, examination in the surgical clinic requires the use of personal protective equipment (PPE), and if the patient's condition requires hospitalization, all patients are tested by rapid antigenic tests on SARS-CoV-2 before admission. If the result is negative, they are admitted to the surgical department, and if it is positive, they are admitted to the COVID-19 department, for further diagnosis and treatment.

In our case, on admission, the patient had no respiratory distress, with an initially negative rapid test for SARS-CoV-2 virus. Abdominal X-ray showed no pneumoperitoneum, ultrasound and CT of the abdomen was nonspecific, but the positive finding on chest

X-ray and CT of the chest suggested that the patient had COVID-19, with no clear signs of acute abdominal surgical disease. That is why the patient was admitted to the isolation unit of the COVID-19 department, where the treatment began. Since the patient has not had previous gastrointestinal problems, we cannot say with certainty what caused the duodenal ulcer perforation. Several studies and associations state that whenever possible, non-surgical treatment should be applied and patients should be treated with conservative therapy for conditions that allow it (acute cholecystitis, appendicitis, diverticulitis, etc.) [5]. However, many authors argue that although COVID-19 increases mortality and morbidity in surgical patients, abdominal conditions should be surgically solved urgently. It is important to emphasize that the absence of pneumoperitoneum on X-ray of the abdomen is not an absolute sure sign of the absence of perforation of hollow organs of the abdomen [5, 8].

The data showed that only a quarter (25%) of patients who went to the operating room (OR) had an RT-PCR swab test performed. According to published studies, negative RT-PCR swab tests have been reported up to 34.7% of patients with chest CT findings suggestive of COVID-19 initially. Most of the patients with consistent CT COVID-19 findings and initial negative RT-PCR results will develop RT-PCR positivity after approximately 5 days [9]. Patients presenting with an acute abdomen are likely to undergo surgery regardless of the findings of CT of the lungs or the findings of swabs if their clinical condition requires urgent surgery [10]. On the 4th day of hospitalization, the patient underwent a control CT scan of the chest and abdomen after which an emergency surgery was scheduled.

On the day of surgery, the second RT-PCR was in progress, and the first one was negative (taken on the 2nd day of hospitalization). The second RT-PCR was positive, postoperatively.

The question arises, to use laparoscopic or open surgery in COVID-19 patients. The

SARS-CoV-2 virus is spread and transmitted by respiratory droplets and direct contact. The virus was also detected in fecal masses. Some authors state that they did not isolate the virus in peritoneal fluid, while other authors say they did [7, 11,12]. In patients with duodenal ulcer perforation, perforation site suturing with omentoplasty is a validated technique equally in laparoscopic and open surgery in terms of efficacy and safety, with somewhat easier early postoperative recovery after laparoscopic surgery [7]. In our case, we decided to do a laparotomy because there were no technical possibilities for laparoscopic surgery in the COVID-19 OR.

Many authors present data on the number of infected health workers, which puts additional pressure on the already burdened health system in all countries [13]. Therefore, according to the protocols, the number of elective surgeries in surgical wards has been reduced, but urgent surgical matters cannot wait and must be performed in order to save human lives [14]. The risk of exposure for the surgical staff is high, especially for anesthesia teams. Therefore, it is necessary to use the complete PPE as well as to take all precautions necessary related to the preparation of the OR and the instruments, before, during, and after the surgery.

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Conclusion

This paper does not present a clinical rarity, and the situation of the occurrence of two simultaneous acute diseases with all the diagnostic and therapeutic dilemmas they carry is possible in everyday clinical practice. We should not forget about the possibility of non-infectious pathology, during pandemics, as well as the possibility of acute chronic disease. Stress ulcers can also occur, so the possibility of existing pharmacotherapeutic gastroprotection should be used.

We also emphasize the importance of multiple testing during COVID-19 in the case of early negative findings of serological and PCR tests, as well as to consider the possibility of indirect, non-etiological, diagnosis of the disease, e.g. by performing CT of the lungs with epidemiological data.

Acute surgical diseases in patients with COVID-19 should be treated surgically whenever possible, using laparoscopic or open surgery. The choice depends on the affinity and training of the surgeon with the aim of minimizing the duration of the operation and reducing exposure to the virus. Further research on the isolation of SARS-CoV-2 from the peritoneal cavity with urgent surgical conditions is needed to reconcile conflicting views.

Conflict of interest. The authors declare no conflict of interest.

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Duodenalna perforacija sa akutnim hirurškim abdomenom kod pacijenta sa Covid-19

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Uvod. Od proglašenja pandemije SARS-CoV-2 virusa, zdravstveni sistem u svetu se nalazi pred velikim izazovom. Zbog niza nepoznanica i nedoumica, hirurzi se nalaze pred velikim izazovom prilikom rešavanja urgentnih hirurških stanja u cilju spašavanja života.

Prikaz slučaja. Predstavljamo pacijenta sa COVID-19 infekcijom i akutnim abdomenom koji je u trenutku operacije bio lošeg opšteg stanja, septičan, a sve kao posledica perforacije ulkusa duodenuma. U trenutku operacije nije imao pozitivan RT-PCR, ali sa radiološki visokoindikativnim znacima COVID-19 infekcije na CT-u pluća. Prvog postoperativnog dana je imao pozitivan RT-PCR bris nazofarinksa na SARS-CoV-2 virus.

Zaključak. Svi pacijenti suspekti na COVID-19 prilikom hirurške intervencije trebalo bi da se tretiraju kao da su pozitivni na SARS-CoV-2 virus uz upotrebu svih mera zaštite osoblja.

Ključne reči: COVID-19, akutni abdomen, RT-PCR, CT