Case report

Chest CT Scan or RT-PCR: Which One is Appropriate for Screening of COVID-19 among the Surgical Patients in the Preoperative Period? A Case Report

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Abstract

Coronavirus disease 2019 (COVID-19) is associated with high morbidity and mortality. It has been a significant impact on the surgical care of the patients. There is still no consensus on elective surgeries under time epochs with national partial control of the disease. The objective is to report the clinical course of the surgical patient who was eventually diagnosed with COVID-19 despite preoperative screening. A 69 years old woman was referred to the surgical ward for elective low anterior resection (LAR). The complete preoperative workup was performed with acceptable results. Reverse transcriptase-polymerase chain reaction (RT-PCR) of SARS-COV-2 was not performed because the patient was asymptomatic and the surgical procedure was scheduled during the time of the country's partial pandemic control; the nadir of the curve in daily reported COVID-19 patients. Following the surgery, the patient's clinical status was stable for about 8 hours; however, the patient became anuric and hypotensive, receiving a variety of treatments for a list of differential diagnoses, including fresh lung CT scan and RT-PCR test; both of the latter were positive for COVID-19. Despite COVID-19 management and respiratory support, the patient died on day 15 of hospitalization. It seems that postponing elective surgeries if possible and general screening with RT-PCR in situations where delay in surgeries is not possible, are rationale strategies for surgical management of the patients during the COVID-19 pandemic, even when the daily situation of the pandemic seems.

Keywords: COVID-19, SARS-CoV-2, Screening, Elective Surgery

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Introduction

Severe acute respiratory syndrome Coronavirus-2 (SARS-CoV-2) is a novel coronavirus that has spread throughout the world since its first detection in the last week of December in Wuhan, China (1). The world health organization has declared it as coronavirus disease 2019 (COVID-19) and later announced this

outbreak as pandemic on March 11, 2020 (2).

The first case of COVID-19 was diagnosed on February 19, 2020, in Iran. As of January 4, 2021, more than 80 million people were infected with SARS-CoV-2 worldwide, and more than 1,800,000 deaths were recorded. These values were more than 1 million and more than 50 thousand in Iran, respectively (3).

Although emergent and urgent surgeries should be performed, it is not completely clear whether elective surgeries are performed or postponed during the COVID-19 pandemic particularly in the conditions of adequate control of the disease. On March 30, 2020, the Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) and the European association for endoscopic surgery (EAES) recommended that all elective producers were postponed. Of note, they recommended that the disease burden and the patient's condition be considered when making decisions. Another recommendation of the societies was that the patients were tested for COVID-19 in the preoperative period if possible (4).

We want to report the clinical course of a surgical case that was eventually diagnosed with COVID-19 despite preoperative screening.

Case Report

A 69 years old woman was referred to the surgical ward of Imam Khomeini Hospital Complex for elective low anterior resection (LAR) on June 7, 2020. Following detection of a rectosigmoid lesion in magnetic resonance imaging (MRI) of the pelvis, the biopsy was done which showed well-differentiated adenocarcinoma about a month ago. Therefore, LAR was to be performed on June 9, 2020. The complete workup was done before surgery.

The patient underwent echocardiography, electrocardiography (ECG), and an exercise stress test that no abnormality was detected and the ejection fraction (EF) of the patient was 55%. The patient's chest computed tomography (CT) scan was seen and assessed by the radiologist that did not report any abnormality. According to the prevalence of COVID-19 in Iran, the patient was examined clinically and

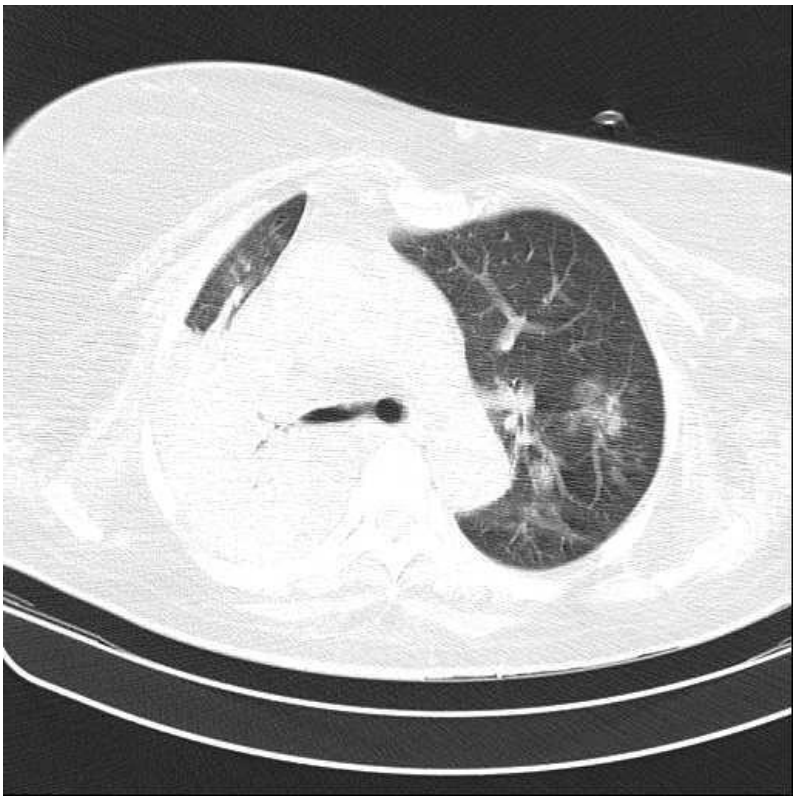

Figure 1. Chest computed tomography scan of the patient.

paraclinical. She had no respiratory symptoms and a history of close contact with a confirmed case of COVID-19. A reverse transcriptase-polymerase chain reaction (RT-PCR) test was not done because the patient was completely asymptomatic. On schedule, the patient underwent LAR surgery on June 9. After completion of the surgery, the patient was transferred to our intensive care unit (ICU) as the extubated state. At the time of presentation, the patient had stable hemodynamics and had no certain problem. After 6 to 8 hours, the patient developed oliguria. The next day, she became anuric and hypotensive (mean arterial pressure= 53 mm Hg). Norepinephrine was started with a dose of 5-10 mcg/min.

Also, piperacillin-tazobactam (2.25 g/IV infusion/TDS) was initiated with suspicion of septic shock after sepsis workup and checking of C-reactive protein (CRP) and procalcitonin (PCT) level. Consultation with the cardiologist was requested immediately and the results of echocardiography demonstrated that the patient's EF decreased to 20 to 25%. Also, moderate to severe right ventricular (RV) enlargement and severe RV dysfunction were reported. Pulmonary arterial pressure was estimated as 50-55 mm Hg. Then troponin level was checked and ECG was taken.

Furosemide and dopamine were initiated with an infusion rate of 6 mg/h and 3 mcg/kg/min, respectively based on the consultation of a cardiologist. Also, heparin with a therapeutic dose was considered for the patient with the probability of myocardial infarction (MI) or pulmonary embolism. It was decided that the patient was transferred for taking of CT-angiography if her hemodynamic condition allowed. Wave changes consistent with MI were not detected in ECG and troponin was negative. The patient was intubated owing to respiratory distress and tachypnea in the evening. Since the patient was still anuric, continuous renal replacement therapy (CRRT) was initiated for 12 hours at post-operation day (POD) 2. Following CRRT, significant improvement in urine output was observed and the serum creatinine and urea decreased. In the next few days, attempts for weaning of the patient from the ventilator were not successful and RT-PCR of SARS-COV-2 was requested at POD 7 that its result was reported as positive after 48 hours. At POD 9, a chest CT scan was taken that the pattern of involvement was consistent with COVID-19 (figure 1). On that day, Atazanavir/ritonavir (300/100 mg daily) and hydroxychloroquine (400 mg BD for two doses than 200 mg BD) were started for management of COVID-19 based on consultation of an infectious disease specialist. Despite all efforts, the patient died at POD 13. At the time of hospital admission, no abnormality was seen among the checked laboratory data. Among laboratory data related to poor prognosis of COVID-19, the patient had lymphopenia, thrombocytopenia, high neutrophil to lymphocyte ratio, increased urea and creatinine, elevated CRP, Erythrocyte Sedimentation Rate (ESR), PCT, D-dimer, and Ferritin. The only positive microbial cultures were blood and tracheal secretions cultures that were reported on POD 13. These infections were caused by extensively drug-resistant (XDR) *Acinetobacter baumannii*.

Discussion

We reported a case that her clinical status deteriorated after LAR surgery and finally intubated and died. Despite management strategies such as on-time initiation of antibiotic therapy, vasopressors, inotropes, CRRT, and optimal respiratory support, the weaning and extubation of the patient were not possible. With a delay of seven days, RT-PCR was requested which was positive. Also, the pattern of involvement in chest CT scans was consistent with COVID-19.

A complete screening for COVID-19 except for RT-PCR of respiratory secretions was performed in the preoperative period. Although the sensitivity of chest CT scans is high, it has a moderate specificity. Indeed, a chest CT scan is an appropriate tool for screening patients with high suspicion for COVID-19. In contrast, RT-PCR has a high specificity and moderate sensitivity (5-8). Therefore, it seems that this test is appropriate for screening the patients such as our patients. Due to resource limitations, consideration of RT-PCR was not possible for all patients before surgery in Iran. Thus, the most logical strategy was the delay of elective surgeries up to adequate control of pandemics in the country. Although, the surgery of our patient was done at the time of partial control of the pandemic in Iran. If the decision is to continue the

surgeries in the pandemic period, an adequate number of RT-PCR kits must be provided to the hospital. Another possibility was that the patient was infected in the operating room. According to the observance of the protocols for COVID-19 in the operating rooms of our hospital, the possibility of transmission was low in this way.

The first report of clinical characteristics and outcomes of surgical patients infected with SARS-COV-2 was published on March 26, 2020. In this report, the clinical course and outcomes of four patients were stated. In one case, the symptoms initiated on POD 2 and at least two weeks after surgery in two cases. In the remained case, the symptoms started one the day before surgery. Of four cases, three cases died. Of note, two of died cases had old age and poor prognostic features such as lymphopenia, elevated D-dimer, CRP, ESR, and troponin (9-11). According to interval time between the date of surgery and symptoms initiation, only one case was likely infected in the hospitalization course and infection of other cases with SARS-COV-2 in the hospital setting was uncertain. On the other hand, preoperative screening of the patients was not mentioned. In a multicenter and retrospective study, the characteristics and outcomes of 34 patients undergoing elective surgery during the COVID-19 pandemic were reported in China. The median age of the patients was 55 years old and about 41% were male. About sixty percent of the patients had at least one comorbidity. More than 80 percent of the patients were lymphopenic (lymphocyte count < 1100 cells/µl). The median value of CRP and LDH was 30 mg/L and 209 U/L. The median time from surgery to symptoms onset was 2 days. Also, the median time from admission to the hospital to surgery was 2.5 days. Approximately 44% of patients needed admission to ICU and 7 patients died. All non-survivors developed ARDS and shock and acute cardiac injury occurred in about 60% of them[9]. The major difference of this study with our report is that all their patients lived in Wuhan city and had a history of exposure while our case had no history of exposure to confirmed cases of COVID-19 and surgery was done in the time of partial control of COVID-19 in Tehran, Iran. Similar to their patients, our patient was likely in the incubation period that the surgery accelerated the disease course. The median time from admission to dyspnea and ARDS was 11 and 16 days whereas this time was very short for our case (2-3 days). Indeed, the clinical status of our patient rapidly deteriorated and finally, she died. Moliere et al reported the frequency of COVID-19 in patients undergoing chest CT scan that was taken owing to acute respiratory symptoms in the post-operative period. Despite lung involvement consistent with COVID-19 was detected in imaging of 87% of the patients, finally, a definite diagnosis of COVID-19 was confirmed in 17%[10]. As previously mentioned, a chest CT scan is a proper screening tool for patients with symptoms highly suspicious for COVID-19.

Together, the purpose of sharing this experience as a case report is that COVID-19 should be considered as a likely diagnosis among differential diagnoses in confronting similar cases. If COVID-19 is diagnosed as soon as possible in such cases, the transmission risk of the disease from infected cases to uninfected cases and personnel can be minimized by prompt isolation. Also, the patient chance of survival can be increased by the application of effective strategies such as restrictive fluid therapy, administration of corticosteroids, consideration of anticoagulants with intermediate to the full dose, and prone position.

Conclusion

It seems that postponing elective surgeries if possible and general screening with RT-PCR in situations where delay in surgeries is not possible, are rationale strategies for surgical management of the patients during the COVID-19 pandemic. To the best of our knowledge, this is the first case report that complete screening and clinical status of the surgical patient infected with SARS-COV-2 in both preoperative and postoperative periods were reported.

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Conflicts of Interest

The authors declare that there are no conflicts of interest.

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