Case Series

Colorectal Cancer

For reprint orders, please contact: reprints@futuremedicine.com

Therapeutic challenges in colorectal surgery practice during COVID-19 outbreak: a case series

Mahdi Alemrajabi[1], Mohammad Moradi*[,2], Esmail Amiri[2] & Masoud Vahdani[3]

[1]Assistant Professor of Colorectal Surgery, FCRDC, Firoozgar Hospital, IUMS, Tehran, Iran

[2]Resident of General Surgery, FCRDC, Iran University of Medical Sciences, Tehran, Iran

[3]General Practitioner, Shaded Faculty of Medicine, Tehran, Iran

*Author for correspondence: Tel.: +98 912 795 5803; Mohammad.mrdi@gmail.com

After the outbreak of COVID-19, several issues in the field of general surgery have remained unknown. Here we present two consecutive patients operated on in a coronavirus center in February 2020, during the outbreak in Tehran, Iran. Moreover, we highlight some challenges surgeons face in the management of these patients during the outbreak. We suggest surgeons to perform the safest technique with the least risk. In borderline conditions, it is suggested to prefer stoma over anastomosis. This lessens the course of hospitalization and probable complication rates. We suggest establishing clean centers and prepare guidelines for the general surgery team members to lessen the risk for patients and healthcare providers.

First draft submitted: 21 April 2020; Accepted for publication: 5 June 2020; Published online: 7 August 2020

Keywords: clean center • colorectal surgery • coronavirus • COVID-19 • elective surgery • emergency surgery • general surgery • iran • outbreak • pandemic

Therapeutic challenges in general surgery practice during COVID-19 outbreak

After the emergence of the new coronavirus (COVID-19) from Wuhan, China, nobody could guess it might present as a global pandemic affecting many parts of medical healthcare [1]. Surgical practice was not an exception to this. COVID-19 has affected many aspects of general surgery such as surgeons' protective measures during practice in coronavirus centers, or some perioperative diagnostic dilemmas regarding surgical complications with overlapping COVID-19 signs or symptoms. Moreover, many elective or semi-elective operations including for gastrointestinal malignancies have been postponed, which could endanger patients health to a great extent [2]. However, several questions remain unclear, including whether neoadjuvant therapy should be continued or how to perform semi-elective or emergent operations in the COVID-19 centers. Here we present two patients who underwent colorectal surgery in a COVID-19 center and some challenges the surgeons faced.

The first patient was a 30-year old man with rectal cancer, where the tumor has passed through the rectum wall but has not invaded adjacent organs and has spread to one to three nearby lymph nodes (clinical staging criteria T4aN1a). The patient underwent ultralow anterior resection, repair of urethra due to tumoral invasion, cystostomy and diverting loop ileostomy 12 weeks after chemoradiation. He did not have comorbidities and had no signs or symptoms indicative of COVID-19 at admission. Postoperative course was uneventful and the patient was discharged after a week. Four days later, he was re-admitted due to partial obstruction. He had no signs of peritonitis, therefore conservative management was planned. He had no signs of COVID-19 at the second admission as well.

Despite this, laboratory exams demonstrated leukopenia from the second day of hospitalization (white blood count; 2800, lymphocytosis; 17% (normal range; 20–40%), which exacerbated during the course of stay (white blood count; 1600, lymph; 7%). An abdominal computed tomography (CT) scan was first performed to rule out anastomosis leakage. There were no signs of an abdominal sepsis, but lower sections of the lungs had some suspicious infiltrations suggestive of COVID-19. Therefore, a chest CT scan was performed, which revealed patchy infiltrations suggestive of COVID-19 infection (Figure 1). COVID-19 diagnostic PCR test was positive. He was then admitted to COVID-19 intensive care unit (ICU) and intubated due to gradual dyspnea exacerbation and

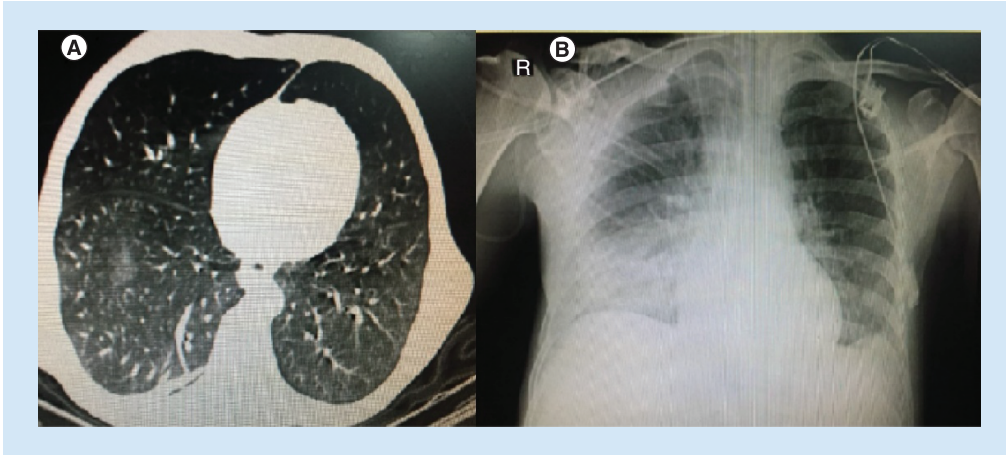

Figure 1. (A) Chest CT scan showing patchy infiltrations suggestive of COVID-19. (B) CXR on the ninth day of hospitalization.
CT: Computed tomography; CXR: Chest X-ray.

decreased oxygen saturation. He died on the tenth day of hospital stay. Laboratory findings of leukopenia could initially be misleading, with clinicians leaning toward abdominal sepsis or anastomosis leakage if COVID-19 infection was not considered.

The question remains whether Hartman pouch with end colostomy was safer. If we perform a Hartman procedure with an end colostomy in such cases, the patient can be discharged faster compared to early colo-anal anastomosis, because anastomosis leakage has always been an important early postoperation complication, which necessitates longer hospitalization and in some circumstances re-operation. When a patient is re-admitted due to fever or leukopenia in such circumstances, anastomosis leakage or abdominal sepsis could not be distinguished from another infectious process like COVID-19. On the other hand, in case of colorectal anastomoses, the hospital course might be longer, which puts patient at risk of nosocomial COVID-19 infection. As end colostomy or ileostomy allows for earlier initiation of oral feeding and therefore, the patient can be discharged sooner, there will be more beds available for critical COVID-19 patients. Also, our patient was admitted to the COVID-19 ICU and general surgery residents had to visit the patient routinely, which endangers healthcare providers and other patients as well.

The second patient was a 48-year old male with sigmoid cancer and liver metastasis that resolved after chemotherapy. He was then a candidate for sigmoidectomy. On the fifth postoperative day, he underwent another operation due to abdominal sepsis and a potential anastomosis leak. Intraoperative findings confirmed anastomosis leakage and Hartman's pouch with an end colostomy was then performed. On the second day, tachycardia and tachypnea occurred. However, on the same day, the patient on the adjacent bed had been transferred to the COVID-19 ICU. Chest X-ray revealed bilateral pneumothorax and chest tubes inserted on both sides. Probably pneumothorax had occurred 3 days prior when trying to insert a central venous catheter on both sides. Chest CT scan was also performed, which identified right inferior lobe pneumonia (Figure 2). PCR for COVID-19 was negative. Therefore, this patient was not transferred to the COVID-19 ICU and discharged after 10 days of antibiotic therapy and supportive care.

If this patient had been transferred to the COVID-19 ICU, prior to a confirmatory PCR test, he would have been kept in the hospital, increasing the likelihood of acquiring COVID-19. Due to his underlying pneumonia and respiratory failure, as well as previously receiving chemotherapy for liver metastasis, this patient would have likely died if he had contracted COVID-19. Hence, we suggest not to hurry the transfer of suspected COVID-19 patients to the specialty ICU wards but wait until the diagnosis is confirmed by chest CT scan and/or a PCR test. Furthermore, regarding semi-elective operations in the outbreak, whether continuation of chemo-radiation or surgical operation is a matter of debate. As we know, the operation *per se*, weakens the immunity system and might put patient at risk of infection during the hospital course or postoperative period [3]. On the other hand, chemoradiotherapy does the same, probably to a greater extent. Many studies have previously highlighted the significant impairment in immune system following chemotherapy [4].

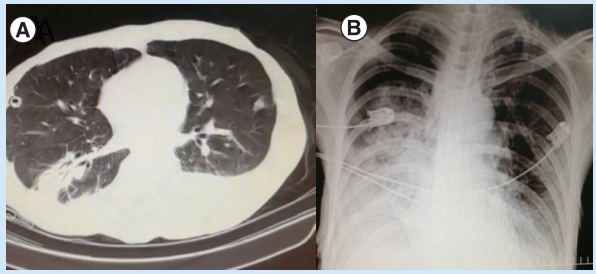

Figure 2. (A) Chest CT scan showing right inferior lobe pneumonia. (B) CXR showing right inferior lobe infiltrations.
CT: Computed tomography; CXR: Chest X-ray.

Despite this, patients might benefit the most if semi-elective or elective surgical operations are performed under strict circumstances at 'clean centers' where patients are thoroughly evaluated at admission by physical examination and para-clinics to rule out COVID-19 infection. Nonetheless, establishing a clean center during the pandemic outbreak is difficult, because many patients or healthcare providers might be asymptomatic.

Until now, there has been little data regarding the exact transmission routes of COVID-19. Therefore, some providers have postponed noncancer procedures and prioritized emergency cancer surgeries [5]. In line with our idea, a recently published letter also claimed against the usage of laparoscopic approaches due to aerosolization following pneumoperitoneum or vapor formed by heat-generating cautery devices [6]. However, there is still no evidence regarding the presence of COVID-19 in laparoscopy aerosols and the advantages of minimally invasive techniques such as shorter hospital stay could not be ignored, but should be balanced against the risk of virus spread to other patients and the operating room staff [7].

A recent scoping study was published reviewing recently published articles on surgical practice during the outbreak. They concluded that key factors for a good practice are summarized in staff training for patient transfer, providing protective equipment and reducing nonurgent surgical practice such as outpatient visits, endoscopic procedures or nonurgent elective surgery. They also suggested to reach to a consensus in each hospital to provide a guideline including protective protocols for emergency surgeries based on local situations and resources [8].

Nevertheless, there is a recently published manuscript indicating that COVID-19 remained viable in aerosols throughout the duration of experiments (~3 h) [9]. This might endanger the safety of both the patient and the healthcare providers in the operation room in case of laparoscopic surgeries. Therefore, we suggest not to perform laparoscopic surgeries during the outbreak until more information is available. However, we suggest surgeons perform the safest technique with the least risk. In borderline conditions, it is suggested to prefer stoma over anastomosis. This lessens the course of hospitalization and probable complication rates.

In an attempt to establish a clean center, we provided some strict protocols in a private hospital and performed over 150 emergency and semi-elective abdominal operations. We followed our patients for 2 months. Only three patients were found to be infected with COVID-19, likely due to nonadherence to our orders. Unfortunately, one of these three patients died. In this study, which is currently under review, we tried to provide a guideline for a good practice at our center. In summary, all patients were screened at the emergency ward by an infectious disease specialist and if the patient was suspected to have COVID-19 infection, he or she was promptly transferred to an adjacent COVID-19 center in case of emergency abdominal operations. However, all patients underwent a low-dose chest CT scan in the emergency ward. For semi-elective conditions, the patient was advised to be quarantined for 2 weeks at home and then admitted. All staff were also examined periodically and COVID-19 antibodies (IgG and IgM) were checked weekly (Unpublished Observations). Therefore, prior to surgery, it will be a good idea to screen for COVID-19, in order to stratify the perisurgical risk and to prevent hospital staff infection.

A recent study published in April 2020 tried to provide some general tips for a good practice for colorectal cancers during the outbreak. They emphasized on telemedicine unless a physical examination or intravenous administrations of drugs was necessary. However, they suggested that intravenous 5-fluorouracil can be administered at home, but still oxaliplatin, irinotecan, bevacizumab, anti-EGFR agents and others, should be administered with caution by an expert healthcare provider. They also insisted on chemotherapy regimens with least myelosuppression. They

10.2217/crc-2020-0014

believe that postponing surgery should be decided based on a multidisciplinary decision in accordance to hospital resources and patient risk/preferences [10].

Finally, COVID-19 has made some challenges for general surgery practice. We suggest performing large sample size cohort studies to assess the impact of COVID-19 infection in details and prepare guidelines for the general surgery team members to lessen the risk for patients and healthcare providers moving forward.

Executive summary

- COVID-19 has affected many aspects of general surgery practice such as surgeons' protective measures during practice in corona centers or some perioperative diagnostic dilemmas regarding surgical complications overlapping COVID-19 signs or symptoms.
- Many elective or semi-elective operations including gastrointestinal malignancies have been postponed which could endanger patients' health to a great extent.
- Several questions remained unclear whether neoadjuvant therapy should be continued or how to perform semi-elective or emergent operations in the COVID-19 centers.
- The question remains whether Hartman pouch with end colostomy is safer than primary anastomosis during the outbreak.
- When a patient is re-admitted due to fever or leukopenia in such circumstances, anastomosis leakage or abdominal sepsis could not be distinguished from another infectious process like the COVID-19 during the outbreak.
- We suggest not to hurry the transfer of suspected patients to the COVID-19 special wards, until the diagnosis is confirmed by chest computed tomography scan or PCR.
- Patients might benefit the most if elective and semi-elective operations are performed under strict conditions at clean centers.
- However, there is still no evidence regarding the presence of Covid-10 in laparoscopy aerosols, advantages of minimally invasive techniques such as shorter hospital stay could not be ignored and balanced against the risk of virus spread to other patients and the operating room staff.

Acknowledgments

We would like to thank all the staff of Firoozgar General Hospital, as a primary COVID-19 center who are trying to treat patients in the recent outbreak.

Financial & competing interests disclosure

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.

No writing assistance was utilized in the production of this manuscript.

Ethical conduct of research

The authors state that they have obtained appropriate institutional review board approval or have followed the principles outlined in the Declaration of Helsinki for all human or animal experimental investigations. In addition, for investigations involving human subjects, informed consent has been obtained from the participants involved.

Informed consent disclosure

The authors state that they have obtained verbal and written informed consent from the patient/patients for the inclusion of their medical and treatment history within this case report.

References

1. Hu XH, Niu WB, Zhang JF *et al.* Treatment strategies for colorectal cancer patients in tumor hospitals under the background of corona virus disease 2019. *Chinese J. Gastrointestinal Surg.* 23(3), 201–208 (2020).
2. Tao KX, Zhang BX, Zhang P, Zhu P, Wang GB, Chen XP. Recommendations for general surgery clinical practice in 2019 coronavirus disease situation. *Chinese J. Surg.* 58(3), 170–177 (2020).
3. Hogan BV, Peter MB, Shenoy HG, Horgan K, Hughes TA. Surgery induced immunosuppression. *Surgeon* 9(1), 38–43 (2011).

4. Kang D-H, Weaver MT, Park N-J, Smith B, Mcardle T, Carpenter J. Significant impairment in immune recovery after cancer treatment. *Nurs. Res.* 58(2), 105–114 (2009).

5. Di Saverio S, Pata F, Gallo G *et al.* Coronavirus pandemic and Colorectal surgery: practical advice based on the Italian experience. *Colorectal Dis.* (2020). https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=Di+Saverio+S%2C+Pata+F%2C+Gallo+G+et+al.+Coronavirus+pandemic+and+Colorectal+surgery%3A+practical+advice+based+on+the+Italian+experience.+Colorectal+Dis&btnG=#d=gs_cit&u=%2Fscholar%3Fq%3Dinfo%3A_GUNCsmenOcJ%3Ascholar.google.com%2F%26output%3Dcite%26scirp%3D0%26hl%3Den

6 . Di Saverio S, Pata F, Khan M, Ietto G, Zani E, Carcano G. Convert to open: the new paradigm for surgery during COVID-19? *British J. Surg.* 107(7), e194 (2020).

7. Di Saverio S, Khan M, Pata F *et al.* Laparoscopy at all costs? Not now during COVID-19 and not for acute care surgery and emergency colorectal surgery: Apractical algorithm from a hub tertiary teaching hospital in Northern Lombardy, Italy. *J. Trauma Acute Care Surg.* 88(6), 715–8 (2020).

8 . Collaborative C. Global guidance for surgical care during the COVID-19 pandemic. *Br. J. Surg.* doi:10.1002/bjs.11646 (2020).

9. Van Doremalen N, Bushmaker T, Morris D *et al.* Aerosol and surface stability of HCoV-19 (SARS-CoV-2) compared to SARS-CoV-1. *medRxiv* doi:10.1101/2020.03.09.20033217 (2020).

10. Marshall JL, Yarden RI, Weinberg BA. Colorectal cancer care in the age of coronavirus: strategies to reduce risk and maintain benefit. *Colorectal Cancer* 9(1), CRC17 (2020).