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ELECTIVE COLORECTAL SURGERY DURING THE COVID-19 PANDEMIC

CHOU TS[1], JANUGADE HB[2] AND KATKAR A[3]

1: Junior Resident, Department of Surgery, Krishna Institute of Medical Sciences Deemed To Be University, Karad, Maharashtra (India)

2: Professor, Department of Surgery, Krishna Institute of Medical Sciences Deemed To Be University, Karad, Maharashtra (India)

3: Asst. Professor, Department of Surgery, Krishna Institute of Medical Sciences Deemed To Be University, Karad, Maharashtra (India)

***Corresponding Author: Dr. Teh Shin Chou: E Mail: richardchou4@gmail.com**

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ABSTRACT

Aim

The current COVID-19 pandemic is giving a challenge to the healthcare systems at a global position **[1]**. We discuss a method to re-evaluate protocols for performing colorectal surgery during the COVID-19 pandemic, both elective and emergency cases.

Method

Authors from various areas affected by the COVID-19 emergency, define the vital- points to be discussed and evaluated. Investigations were carried out, regarding aspects specific to colorectal surgery at the time of the COVID-19 pandemic, including the administrative management of the pandemic in India. The information (based on limited experience and evidence available) were evaluated and summarized.

Results

The knowledge of the mode of transmission of COVID-19 is still limited, but it has shown a swift person to person spread **[2]**. It's wise to temporarily hold non-cancer procedures and give more priority to critical cancer treatment. It's prudent to perform endoscopy and proctological procedures only for selected patients. Currently it's advisable to follow a

conservative approach in patients with colorectal emergencies requiring treatment. Selected procedures ought to be performed before and while performing surgery on COVID-19-patients, the use of dedicated personal protective equipment (PPE) kits ought to be mandated and specific rules and safety protocols ought to be followed. There are some policies which outline the safety protocols for patients undergoing colorectal surgery which includes minimally-invasive surgery. Entry and Exit into operating theatres and operating building should be strictly regulated and recommendation on how to perform minor procedures safely should be given thus minimising the spread of infection. It has become obvious that a reorganization of health system is needed, both at central and local levels. An outline is provided about the strategy that India has developed to combat the COVID-19 pandemic.

Conclusion

Recommendation for the management of patients requiring surgery for colorectal conditions during the COVID-19 pandemic is currently inadequate. Hence based on experiences from healthcare professionals that have managed large quantities of surgical patients during the pandemic lessons were learnt that could be useful if adopted by the healthcare system, thus making the system better at reducing the risks and reduce exposure to other patients, public and healthcare staff.

INTRODUCTION

The outbreak of SARS-CoV2 infection, accountable for the clinical manifestations termed Corona Virus Disease 2019 or COVID-19 by the World Health Organisation, became a pandemic on the 12th March 2020. A combination of unreadiness in containing the initial cases along with the highly contagious nature of the virus itself, and an underestimation of the problem during the early phases of the outbreak, resulted in the extremely swift dissemination of COVID-19 globally, before effective measures to contain the infection had been developed.

Colorectal cancer is one of the most common cancers worldwide and in India. The onset of SARS-CoV-2 pandemic worldwide had led to a lockdown in many parts of the world, with more than 1.2 million people affected and 65,000 deaths reported at the time of writing this article. The pandemic is expected to spread further affecting most of the countries. The treatment protocol of patients affected with colon cancer needs to be re-evaluated without overburdening the existing health-care resources. The advantages of anti-cancer treatment ought to be weighed against the risk of infection with covid-19

virus due to hospital visits. Cancer patients are at greater risk of adverse outcomes (need for hospitalization, admission to intensive care units) and death from SARS-CoV-2. The presence of comorbidities such as cardiovascular diseases, hypertension, diabetes mellitus, chronic respiratory illness worsens the outcome of SARS-CoV-2 infection. We have made an attempt to re-evaluate existing evidence and create a treatment protocol in colorectal cancer to decrease risk of infection during this pandemic without compromising oncological outcomes **[8]**.

The aim of the authors, who were involved in the response to the pandemic in their own country of practice, was to provide the readers with practical information and recommendations on how to manage COVID-19 patients from a surgeon's perspective, with particular focus on colorectal surgeries.

COVID-19 consequences on elective management of colorectal cancer and inflammatory bowel diseases

COVID-19 pandemic is affecting every aspect of different healthcare systems worldwide. Although the greatest priority is currently the treatment of COVID-19 cases, the population continues to suffer from all the same diseases that existed prior to the COVID-19 outbreak. In colorectal surgery, the most affected patients are those diagnosed with cancer and inflammatory bowel diseases (IBD) **[5]**. Whether patients with gastrointestinal malignancy are more at risk to be infected with COVID-19 compared with healthy individuals, remains to be evaluated. An analysis was from China, 18 (1%) of 1590 COVID-19 cases had a history of cancer; among these 18 cases, three (16.7%) had a history of colorectal cancer. Patients with COVID-19 and history of or ongoing treatment for malignancy seemed to have more serious adverse events.

Several measures have been implemented in India to optimize the management of colorectal cancer patients. In severely affected areas, due to the overwhelming amount of COVID-19 positive patients requiring medical attention and the shortage of healthcare workers in emergency department, COVID-19 dedicated wards and ICU has necessitated the relocation of surgeons. All elective non-cancer procedures and outpatient clinics were put on hold **[9]**.

In patients who were operated and were supposed to receive adjuvant treatment, therapy was postponed when possible. In COVID-19-positive patients, it would be wise to delay elective surgery, even if asymptomatic, due to the expected risk of worse prognosis in the event of postoperative complications. In areas with

the highest infection rate, patients needing surgery are strictly being screened for COVID-19 infection. Extra precautions are encouraged for each patient, including wearing a surgical mask and social distancing.

Patients suffering from IBD have excessive immunological responses and inflammation, often needing immune modulating or immunosuppressive drugs. Such therapy exposes patients to an increased risk of infections and potentially increases their susceptibility to COVID-19. It is recommended to all patients under immunosuppressive therapies who are living in areas with high density of COVID-19 cases, to strictly follow protective measures such as social distancing, frequent hand washing and disinfection with hydroalcoholic gel, while continuing their usual treatment. Considering that viral infections (e.g. EBV, CMV) could worsen IBD, it might be prudent to consider re-evaluate patients and modulate biological treatment as necessary. It is extremely important to consider the possible implications associated with stopping treatment, especially in regards to IBD flares – which might have more severe consequences than COVID-19. The International Organization for the Study of Inflammatory Bowel Diseases (IOIBD) advice to continue treatment with mesalamine and taper steroids whenever possible. For patients receiving thiopurines or JAK inhibitors treatment, due to the long-standing immunomodulator effect, discontinuing them would not be beneficial in the short term. There is also no indication to stop biologic therapies, provided that patients adhere to the recommendations. According to information coming from the seven largest IBD referral centres in China with more than 20 000 IBD cases, at present no patients with IBD were infected with SARS-CoV-2. Moreover, no patient with IBD and COVID-19 have been reported from the three largest tertiary IBD centres in Wuhan. Moreover, in a recent report from Wuhan, 318 patients were recently contacted and followed self-preventative measures and had their treatment modified to reduce the risk of COVID-19 infection. Hence, none of the patients reported symptoms suggestive of COVID-19 and none tested positive for the virus, implying that such pro-active methods were effective in the short-term.

International collaborations and big data analysis could give a more detailed picture. A promising initiative of an international registry including paediatric and adult IBD cases with SARS-CoV-2 infection has been recently launched: the SECURE-IBD Coronavirus reporting registry

(https://covidibd.org). The aim is to discuss and evaluate the effect of COVID-19 on Inflammatory Bowel Disease and how factors like age, comorbidities, and Inflammatory Bowel Disease treatments impact COVID-19 results. All cases of confirmed COVID-19 in Inflammatory Bowel Disease patients, are reported in this registry, regardless of severity.

COVID-19 consequences on endoscopic procedures

Endoscopy implies a high risk of COVID-19 transmission. Close proximity among patients and healthcare providers, aerosolization and aspiration of digestive fluids, may contribute to the unrecognized spread of the disease, especially from asymptomatic patients. In addition, ACE-2 receptor, binding site for SARS-CoV-2, is highly expressed in the digestive system and viral RNA has been detected in saliva and stools, suggesting oral-faecal transmission as a potential alternative route of contagion **[4]**.

Patients infected with COVID-19 can also present with GI symptoms. In a recent study, among 73 patients hospitalized for COVID-19 pneumonia, 39 (53.4%) tested positive for viral-RNA in the stools, with results still positive in 17 (23.3%) patients after virus clearance in the respiratory samples **[3]**. Zhang *et al*. suggested that the virus is detectable in the faecal samples of all positive patients, regardless of the severity of illness and remains much longer in the stool than in other specimens such as nasopharyngeal swabs and deep throat sputum. Therefore, it was concluded that stool sample analysis may be useful in diagnosing asymptomatic COVID-19-positive patients. However, knowledge of the virus is still limited, and many recommendations are based on assumptions derived from previous SARS or MERS outbreaks **[6]**.

COVID-19 has affected procedures in the Gastrointestinal department hugely, specially endoscopic procedures across India. In comparison to situations before this pandemic, 75.3% of departments reported a decrease in <10% endoscopy procedures only. The number of procedures performed was 10% to 25% and 25% to 50% before the pandemic in 22% and 2.4% of units, respectively. The government mandated national lockdown stands to be the major reason for a considerable decrease in patients coming to the OPD along with health care workers themselves reducing the number of procedures during the pandemic due to the latest guideline for limiting routine endoscopies (324 responses), reducing direct contact with patients thus reducing the exposure (127 responses), due to the national lockdown the availability of healthcare workers has

been reduced significantly thus making it difficult to manage the usual number of patients (57 responses), and in at least 33% cases (108 responses), endoscopic procedures reduced due to recommendations from hospital management, which were in a stand-by mode for the potential surge and therefore were limiting any elective procedures. The involved healthcare workers reported that at present the prime indications for performing endoscopies in their respective units were gastrointestinal bleeding (311 responses), cholangitis (302 responses), suspected malignancy (229 responses), obstructive jaundice (128 responses) and common bile duct (CBD) calculi (106 responses). Endoscopies for non-emergency indications like dyspepsia and gastroesophageal reflux disease were still performed in 7% of centres.

Personnel ought to be strategically assigned, in the perspective of an infection spread among hospital staff. The minimum staff level strictly necessary to perform urgent or undeferrable procedures ought to attend the department. Students and trainees ought to not be allowed to access the department to avoid unnecessary exposure and overuse of the limited personal protective equipment (PPE).

Concomitant exposure of individuals with specialist set skills needs to be avoided to preserve service continuity**.** In areas with limited resources, endoscopy procedures may be limited to only life-threatening conditions like massive GI bleeding, removal of foreign objects, obstruction of food bolus, and ascending cholangitis**.**

Risk stratification of patients is paramount. We recommend telephone interview the day before the procedure, asking for symptoms such as fever, cough and dyspnoea. It is recommended that, all patients ought to be scanned for fever (temperature> 37°) before entering the endoscopy department, and undergo a triage questionnaire to stratify the risk associated with the procedure**,** "low risk" patients are classified as those with no symptoms, no contact with COVID-19 patients, no history of stay or travel to areas at risk during the previous 14 days. "Intermediate risk" was described as those with symptoms such as fever, cough, dyspnoea, diarrhoea but without any contact with COVID-19 or travel or stay in high risk areas, or without symptoms but with exposure to COVID-19 or stay in risk areas. "High risk" patients were described as those with at least one symptom and at least one of the following: contact with COVID-19 or travel and stay in areas at risk during the past 14 days.

Standard precautions such as surgical or n95 mask, gloves in high risk patient are

mandatory for patients and caretakers. Relatives/caretakers must wait outside the department. For low-risk patients and intermediate risk patients undergoing lower GI endoscopy, surgical mask, single-use gown, hairnet and eye protection (e.g. goggles) will suffice. For high-risk patients (and intermediate risk patients undergoing upper GI endoscopy) filtering face -piece (FFP) respirators, such as N95, FFP2/FFP3, double-gloves, water-resistant gown and eye protection gear such as goggles must be used.

A specialised COVID route, completely separated from non-COVID-19 patients, must be clearly identified. A negative pressure vestibule is recommended outside the endoscopy department for COVID-19 confirmed or suspected COVID-19 patients needing endoscopy. Utmost caution must be paid when disposing of PPE, scrubs and shoes used in the endoscopy ward. In a study by Ong *et al*. regarding environmental contamination by SARS-CoV-2, positive samples were found on the shoes of staff members. Therefore, dedicated shoes worn in endoscopy wards or disposable shoe covers are advised.

In regions with highest peaks of COVID-19 outbreak, endoscopy services have been centralized in few specialised COVID-19 centres with the aim to the reduce workload and to maximise the local response to the continued increase in number of COVID-19 cases.

COVID-19 consequences on proctology

Proctology is another investigation required before colorectal surgery that has almost completely ceased during the current pandemic. Every outpatient proctology centers, with the exception of oncological and patients requiring immediate attention, have been put on hold and are planned to be restarted gradually.

However, several proctology disorders presents a serious social and financial burden for the patients, sometimes it can be compared to a malignant disorder. Rectovaginal and rectourethral fistulas certainly come under this category, not to mention pre-cancerous lesions and malignancies of the anal canal. The inability to perform diagnostic procedures (including imaging and biopsy) raises ethical concerns because their life expectancy and prognosis, if not timely treated, could be seriously affected. Patients with sexually transmitted diseases require special attention; managing them during the pandemic could increase postoperative complications due to a compromised immune system.

Digital rectal examination and proctoscopy make an important part of proctology examination, but the current pandemic situation forces surgeons to use them with

discretion, as these procedures hold a risk of contagion.

Since elective outpatient appointments are withheld, most healthcare workers are conducting telephonic consultation after reviewing the charts of the patients, and only those who require urgent attention are invited to attend the hospital. Implementation of telemedicine into daily practice is something to be considered after resolution of the pandemic, as can prove to be an effect way to avoid physical attendance of the hospital, unless absolutely necessary**.** It has indeed been proven that telemedicine reduces healthcare costs by preventing unnecessary hospital admissions and re-admissions. The importance of telemedicine during disasters has been validated and proven multiples times.

Anorectal emergencies are quite common and involves the management of thrombosed external haemorrhoids, haemorrhoids causing bleeding, anorectal abscesses, and Fournier's gangrene. Such conditions require immediate attention and treatment, even if surgery is not always necessary. Any attempt if possible ought to be made to manage the patients conservatively, especially if the suspicion of COVID-19-positivty is high or the patient is already affected. Conservative management is possible and effective for thrombosed haemorrhoids, whereas anorectal septic conditions require prompt management with surgical drainage. Fournier's gangrene is relatively rare and has an estimated incidence below 1% of all anorectal sepsis, but its mortality rate ranges between 25% and 73%, thereby demanding immediate diagnosis and treatment as a priority. Regarding proctology procedures during the pandemic, outpatient procedures under local anaesthesia is recommended.

COVID-19 and emergency colorectal surgery with perioperative protocols on how to safely scrub and protective measures/equipment to be adopted

Patients requiring emergency colorectal surgery can be distinguished into COVID-19-postive confirmed cases and COVID-19 suspected cases. Both cases ought to be managed as positive until proved otherwise. Nasopharyngeal swabs and diagnostic tests ought to be performed at the time of admission but obtaining results ought to not delay definitive surgical management.

It is recommended that only those colorectal emergencies that pose an immediate threat on the life of the patient ought to be treated (i.e. hollow viscus perforation, intestinal obstruction and hemorrhage), in order to spare crucial resources for the management of the pandemic. Covid 19 virus may potentially and inadvertently be released in the form of

aerosol with CO2 circulation in the abdominal cavity, thus increasing the chance of nosocomial infections.

Laparoscopic use in proven COVID-19 positive patient needing colorectal surgery ought to be carefully considered as it imposes a risk of contagion among surgeon. One of the major drawbacks of minimally-invasive surgery includes aerosolization of virus that might increase viral spread, favoured by intra-abdominal positive pressure during laparoscopy, while for some procedures longer operative time prolongs anaesthesia. However, laparoscopy has lesser chance to disseminate the virus in the form of aerosol compared to open surgery, especially when using electrocautery. Precautions ought to be taken and attention paid which can help limit the leak of gas from the port sites. In order to minimise risk of contamination several methods have been suggested. Trocars with self-sealing type Hasson are recommended and to make the incision as small as practicable can help reduce the spread the virus. The trocar trephine is recommended to be connected to a negative pressure suction with a water seal. Before emptying the pneumoperitoneum or making an extraction incision it is recommended to turn off the CO2 insufflator and the pneumoperitoneum ought to be reduced by negative pressure connected to a water seal.

The choice on whether to use laparoscopy ought to be decided on a case-by-case basis and be based on patient- and disease-related factors, as well as surgeon expertise. In COVID-19 positive patients requiring emergency surgery, it is recommended to adopt a selective use of laparoscopic management and only if the appropriate equipment is available and all precautions are followed. Planning of the surgery with the anaesthesia team and the operation theatre staff is of utmost importance **[14]**.

COVID-19-positive patients with upper gastrointestinal bleed with haemodynamic stability ought to be managed conservatively unless endoscopy is absolutely necessary because such procedures cause aerosol generation which pose a great risk of contagion and spread of the virus. Such procedures ought to be risk-assessed in COVID-19 positive patients and deferred or delayed if possible. If deemed essential, then full PPE are required. In a vitally stably patient interventions other than endoscopy with lower GI bleeding include angiography, with or without angioembolization. Patients who are hemodynamically unstable or patients with ongoing GI bleed ought to be considered for laparotomy; however, prognosis is likely to be poor.

Standard surgical protocols must be followed while managing a patient with

hollow viscus perforation, and an open approach method is recommended.

The management algorithm of complicated diverticulitis ought to also not change, with a focus on exhausting conservative options e.g. antibiotics before a surgical management is contemplated. Procedures like percutaneous drainage ought to be risk-assessed. Laparoscopic lavage ought to be avoided and definitive surgery preferred and the source control whenever required. Open abdominal surgery ought to be avoided, and a one stage definitive procedures and end stomas is preferred. If a emergency sigmoidectomy is required and open procedure is advised and Hartmann procedure is preferred over an anastomosis in this particular situation.

It is recommended to use caution when performing resection and anastomosis in the emergency setting in patients with suspected or confirmed COVID-19, both because of the high risk of complications (e.g. anastomotic leaks, intra-abdominal collections and infection) and for the subsequent need of healthcare resources following an anastomotic leak. Patients with COVID-19 infection might be at increased risk of post-operative morbidity and mortality and ultimately a worse prognosis **[10]**.

Management of appendicitis ought to follow simple algorithm:

Perforated appendix with peritonitis in a proven COVID-19 patient needs emergency surgery and an open approach is recommended. Only in institutes where the above mentioned precautions and devices are installed, can laparoscopic procedures be preformed.

Patients with radiologically-proven non-perforated appendicitis ought to be consented regarding an initial conservative approach with antibiotics and ambulatory care where appropriate. It is already been proven multiple times that the outpatient management of uncomplicated appendicitis with regular telephonic (or remote) follow up is both safe and effective even before this COVID-19 pandemic. Patients can be followed up with telephone conversation at any time, and readmission is considered if symptoms are not resolving or are deteriorating.

All patients requiring emergency surgery ought to be tested for COVID-19 without delay. However, while awaiting results emergency surgical management ought to not be delayed with the rationale that all patients during the pandemic ought to be considered to be COVID-19 positive and precautions taken appropriately.

In this context, the surgical theatre staff must be properly trained to use personal protection equipment (PPE) and all the preventive measures must be clearly

defined and standardized. The pandemic does not eliminate the need to adhere to perioperative surgical checklist and ought to be emphasized to improve communication specially during a high stress environment. Patients ought to be reviewed, intubated and extubated within the theatre to prevent spread and to restrict contamination to just one room; the pathway to the theatres must be the shortest possible on a previously defined route, ensuring minimal contact with others. The number of staff involved in the surgery ought to be limited and the traffic in theatres ought to be kept to a minimum.

The preventing and protective measures adopted in Northern Italian surgical departments are summarized in following **Table**:

Table 1: SETTING OF COVID SURGICAL THEATRE

- **2 teams: 1 inside, 1 outside the theatre**
- **Outside team: circulating nurse, scrub nurse, HCW**
- **Inside team: circulating nurse, scrub nurse, HCW, anaesthetist, surgical team**

Level 2 Personal PPE in the theatre:

Pre-room: double hair cap, N95 mask, shoe cover, neck guard or surgical balaclava, use of eye protective gear like goggles or a silicone whole face mask/ face shield if using eyeglasses, sterile gown and gloves

ORDER OF ENTRANCE IN THEATRE

1. **Scrub nurse/ HCW**
2. **Anaesthetist/ anaesthetic nurse**
3. **Patient (who is transferred directly to the operation theatre on the surgical bed with the help of Surgical Ward personelle from the COVID wards, through dedicated COVID path separate from the normal pathway) entrance in the Theatres Block from the emergency door adjacent to the Operating Theatre**
4. **Surgical team**

Inside the Theatre:

Second sterile gown, second pair of gloves

EXIT FROM SURGICAL THEATRE

- **The dedicated COVID ward or ICU of destination is alerted via Phone and the bed is prepared; OUTSIDE personelle physically goes and takes the bed in the ward and brings it to the Operating Block**
- **INSIDE staff takes the bed into the operating room, and transfer the patient from the table to the bed**

Procedure to leave the theatre

When leaving the operation theatre, all the staff undresses in a special filter area, and follows a dedicated path. It is paramount to remove the theatre gown very carefully in order to not spread the virus and the removal of facemask ought to be done as a last procedure and immediately new clean mask must be put on. The team heads towards the changing room, where a whole-body bath is mandated, followed by a change in uniform and finally exits.

Table 1: SETTING OF COVID SURGICAL THEATRE

ORDER OF EXIT FROM THE THEATRE

1. **Surgical team**
2. **Scrub nurse**
3. **Anaesthetist along with Anaesthetic Nurse without changing wear, from where the patient is taken to the dedicated COVID ward (or ICU) following the pathway dedicated for COVID patients (fully sanitization of this pathway after operations are completed is mandated) along with the OUTSIDE HCW and Nurse who precede them and act as "forerunners" opening the doors, pushing for the lift and making sure that the path is isolated.**
4. **INSIDE HCW make sure that the operation theatres are properly sanitized, they then follow the same protocols as the surgical team when they exit and change their scrubs.**

HCW: Health Care Workers (porters - cleaners - assistants i.e. non nursing theatre staff)

ODP: Operating Department Practitioners

PPE: personal protective equipment

CONCLUSIONS

COVID-19 pandemic is a serious threat to the structure of healthcare systems globally, and many interventions will be needed to deal with the new scenario after the crisis has been controlled. Hopefully, the necessity will drive innovation. The current recommendations were designed to provide an overview on how some aspects of colorectal surgery can be modified during the emergency. Far for being a definitive and official guideline, the contents of this document are to be considered as advice and guidance during a period of unprecedented demand on global healthcare systems.

For those enduring the crisis, it would be helpful to consider an in-depth modification of the colorectal management at a central and local level. The limited resources of surgical theatres, the staff members being small in number, the limited hospital beds and resources, make it necessary to perform only prioritized colorectal procedures. As far as possible the conservative management of COVID-19-positive patients with diseases of surgical interest ought to carried out without exposing the patients to unnecessary risks.

The surgical team ought to follow strict perioperative protocols and must receive adequate training and instructions. Rules ought to be followed but with common sense in mind and decisions ought to be taken swiftly but based on effective team-work and cross-specialty collaboration.

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