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Deeply reconsidering elective surgery: worldwide concerns regarding colorectal surgery in a COVID-19 pandemic and a Singapore perspective

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INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic crisis in Singapore crossed a milestone on 1 April 2020 with 1,000 infections and four deaths.⁽¹⁾ For the rest of the world, the surge of cases has been unprecedented. While the first 500,000 cases occurred in almost three and a half months, the next 500,000 patients were infected in less than two weeks, with the total number of infected individuals having just exceeded one million as of 3 April 2020.⁽²⁾ It is, however, important to acknowledge that reported cases may represent the tip of an iceberg, and true infection rates may be much higher.⁽³⁾ In this climate, surgical safety has emerged as a topic of immense interest.

Multiple guidelines from Europe and the United States have been issued between 18 March and 31 March 2020,⁽⁴⁻⁷⁾ crafted in anticipation of worsening case numbers based on the experience in Italy and China. These guidelines largely advocate to cease most elective general surgeries and only perform emergency work. The aim is mainly to avoid the risks of viral transmission, as well as to conserve valuable personal protection equipment resources. In addition, manpower is needed to augment healthcare workers at the front line. The recommendations are summarised in Table I.⁽⁴⁻⁷⁾

Table I. Recommendations of various professional societies on surgical procedures during the COVID-19 pandemic.

Professional society (date)	Endoscopy	Surgery
SAGES and EAES (29 March 2020)	All elective cases to be postponed	All elective cases to be postponed. Surgical care limited to those whose needs are imminently life-threatening
Gastroenterology professional society guidance from ASGE, AGA, ACG, AASLD (31 March 2020)	All elective procedures to be delayed. To proceed with evaluation for patients with time-sensitive diagnosis	NA
European Society of Gastrointestinal	Strongly consider postponing elective, non-urgent procedures	NA

Endoscopy (18 March 2020)		
Intercollegiate General Surgery Guidance (27 March 2020)	Only emergency procedures to be performed. No diagnostic work to be done	Largely confined to emergency surgery. Stoma formation to be considered rather than anastomosis
American College of Surgeons (24 March 2020)	NA	Tiered approach for cancer cases

AASLD: American Association for the Study of Liver Diseases; ACG: American College of Gastroenterology; AGA: American Gastroenterological Association; ASGE: American Society for Gastrointestinal Endoscopy; COVID-19: coronavirus disease 2019; EAES: European Association for Endoscopic Surgery; NA: not applicable; SAGES: Society of American Gastrointestinal and Endoscopic Surgeons

WHAT WE UNDERSTAND SO FAR

Colorectal surgery exists as a separate subspecialty in several countries,⁽⁸⁾ while the key concerns of COVID-19 specific to gastrointestinal surgeons mainly revolve around the dangers of viral transmission. Previous experiences with the severe acute respiratory syndrome coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV) suggest similar concerns with COVID-19. Both SARS-CoV and MERS-CoV have clinical presentations of diarrhoea with evidence of faecal excretion.^(9,10) These viruses are also found to be viable in environmental conditions that facilitate faecal-oral transmission, with reports of SARS-CoV RNA found in the sewage water of hospitals that treated SARS-CoV patients.⁽¹¹⁾ COVID-19 transmission is largely similar and includes respiratory droplets, fomites, contact and the faecal-oral route.^(12,13) It was proposed that the mechanism of gastrointestinal tract infection in SARS-CoV patients is via the angiotensin-converting enzyme 2 (ACE2) cell receptor; initial reports of COVID-19 not only confirm ACE2 as a host receptor but also that the virus uses human ACE2 more efficiently, possibly suggesting higher infectivity.⁽¹⁴⁾ Like SARS-CoV and MERS-CoV, there is also evidence of prolonged presence of SARS-CoV-2 in the environment, which can facilitate faecal-oral transmission from environmental contamination.⁽¹⁵⁾

While there has been no conclusive evidence of airborne transmission of COVID-19, past experience shows that SARS-CoV can be transmitted via aerosol-generating procedures (AGPs).⁽¹⁶⁾ Intubation was the independent risk factor for super-spreading nosocomial outbreaks affecting many healthcare workers in Hong Kong and Guangzhou, China.⁽¹⁷⁾ Recent experimental evidence suggests that SARS-CoV-2 has aerosol stability of up to three hours.⁽¹⁸⁾

Pertinent to colorectal surgeons is the high volume of diagnostic and screening endoscopy procedures performed daily. Laparoscopic surgery is also commonly performed. There is currently scant evidence regarding the relative risks of virus transmission of minimally invasive surgery as compared to open surgery. Data does indicate that laparoscopy can lead to aerosolisation of blood-borne viruses, although the applicability to SARS-CoV-2 remains unknown.^(19,20) In laparoscopic colorectal surgery, as compared to the commonly performed laparoscopic appendectomies and cholecystectomies, there is bowel handling during retraction and dissection, with some risk of inadvertent bowel perforations. While bowel preparation is often done preoperatively, it is not used by many surgeons in this era of enhanced recovery, and hence there may be risks of faecal spillage into the pneumoperitoneum. Furthermore, there are patients who are on long-term steroids for conditions such as inflammatory bowel disease and those on immunosuppressant drugs for other autoimmune conditions. It is also not uncommon for the Asian population to consume herbal remedies and traditional medicine for health supplementation, some of which contain steroids. While all these conditions may provide an increased risk of bacterial translocation, there is no evidence to suggest that there is a concurrent higher viral load in the pneumoperitoneum during laparoscopic surgery.⁽²¹⁾ Despite the lack of definitive conclusions in the literature, published guidelines have advised caution in view of the theoretical risks.

CURRENT SITUATION AND CRISIS PLANNING CONSIDERATIONS FOR COLORECTAL SURGERY IN SINGAPORE

For colorectal surgery in the current COVID-19 situation, there is considerable overlap with the principles for general surgery laparoscopy and endoscopy procedures. We have advised the following key measures: (a) mandatory pre-surgery risk stratification with deliberate postponements; (b) AGP procedures being performed with adequate personal protective equipment (PPE) and eye protection; and (c) judicious and controlled use of PPE.⁽²²⁾ These measures are summarised in Box 1. For colorectal surgery specifically, transanal procedures may have to be approached with the same caution as an AGP, especially in transanal minimally invasive surgery and transanal total mesorectal excision procedures.

Box 1. Proposed measures for procedures during COVID-19 pandemic:

Pre-procedure risk stratification of patients undergoing endoscopy or surgery

- History of fever or respiratory symptoms
- Family members or close contacts with the above symptoms
- Any contact with a suspicious or confirmed case of COVID-19
- Any recent travel history, especially to high-risk areas
- Procedure to be rescheduled for high-risk patients with no clinical urgency
- Cases deemed clinically urgent to proceed with appropriate personal protective equipment (PPE) protection

PPE for all endoscopy procedures and laparoscopic cases

- Face shields/eye goggles
- N95 respirator masks
- Gloves
- Waterproof gown

PPE for proctology and open colorectal cases

- Face shields/eye goggles
- Surgical mask
- Gloves
- Waterproof gown

PPE for high-risk cases (based on pre-procedure risk stratification) or COVID-19-positive patients

- Face shields/eye goggles
- Powered air-purifying respirator
- Gloves
- Waterproof gown

There are, however, warning signs that the disease outbreak is not contained or fully understood. Worryingly, reports of pre-symptomatic transmission have been documented in China and lately confirmed in Singapore.⁽²³⁻²⁵⁾ This creates a whole new dimension in risk stratification of patients and suggests that clinical history may be insufficient. While our local data indicates that pre-symptomatic transmission can occur in 6.4% of all patients, it has been reported to occur at a rate of 12.6%.⁽²⁶⁾ As case numbers continue to rise, the utility of valuable intensive care unit beds with ventilators as well as PPE consumption needs to be better rationalised. There has to be a reduction in non-essential surgeries. With these considerations in mind, we herein propose five principles of management of colorectal surgery during the crisis:

- (a) Consider performing two COVID-19 swabs at least 3–5 days apart preoperatively for all elective colorectal surgery. This addresses the higher theoretical risk of faecal-oral transmission and avoids missing pre-symptomatic patients.
- (b) Cancer surgery can continue, but consider performing open surgery to reduce risks.
- (c) Consider bowel preparation for all elective colorectal surgeries.
- (d) Cases to be deferred include perianal procedures, pelvic floor procedures, polyposis and inflammatory bowel disease prophylaxis surgeries. Stoma closures can be deferred if no complications arise from the stoma.
- (e) Consider alternative/non-operative treatment approaches (assuming resources permit), especially for benign colorectal disease (e.g. percutaneous drain for early stage complicated diverticular disease)

There must be stringent considerations for colorectal surgery in a pandemic crisis due to heightened theoretical risks of viral transmission in both diagnostic and therapeutic procedures. Nonetheless, due to the high volume of patients, the specialty cannot afford to stop work abruptly. Social distancing considerations for our patients and patient support groups, as

well protection for our stoma therapists, have to be planned. This ensures optimal care in this difficult period that may potentially be protracted.

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