

# COVID-19 pandemic and its impact on emergency surgery in colorectal cancer: A single centre experience

Ng Gaik Huey, MSurg<sup>1</sup>, Philip Ding Hsin Loong, MBBS<sup>1</sup>, Leow Yeen Chin, MSurg<sup>1</sup>, Umasangar A/L Ramasamy, MSurg<sup>1</sup>, Ang Chin Wee, CCT UK<sup>2</sup>

<sup>1</sup>Department of Surgery, Taiping Hospital, Perak, Malaysia, <sup>2</sup>Mahkota Medical Centre, Melaka, Malaysia

## ABSTRACT

**Introduction:** The COVID-19 pandemic has led to major changes in the provision of surgical services and also affected patients' health-seeking behaviour. This contributes to delayed presentation of many surgical conditions resulting in poorer outcomes. Colorectal cancer (CRC) patients who present with acute surgical emergencies such as complete bowel obstruction, perforation, bleeding or sepsis often require immediate intervention. This study aimed to assess the impact of COVID-19 pandemic on the proportion of emergency surgery in CRC patients.

**Materials and Methods:** This is a retrospective cohort study. All CRC patients who underwent elective and emergency surgery from January until December 2019 (pre-COVID era) and September 2020 until August 2021 (COVID era) were included. Patient demographics, presentation, tumour stage, surgery performed and waiting time for surgery were collected. Data were then compared.

**Results:** Seventy-seven and 76 new cases of CRC underwent surgery before and during COVID-19, respectively. The proportions of emergency surgery before and during COVID-19 are 29% vs 33% ( $p=0.562$ ). Of those who required emergency surgery, the proportions of patients who required stoma formation are 59% vs 72% ( $p=0.351$ ). There was no difference in median waiting time for patients requiring elective surgery ( $p=0.668$ ).

**Conclusion:** The proportion of emergency surgery for CRC patients is not statistically higher during the pandemic.

## KEYWORDS:

Colorectal cancer; COVID-19; emergency surgery

## INTRODUCTION

Worldwide, colorectal cancer (CRC) is the second most commonly diagnosed cancer in women and the third most in men.<sup>1</sup> The survival of CRC patients depends largely on the stage of disease upon diagnosis.<sup>2</sup> In addition, patients who present with acute surgical emergencies such as obstruction, perforation and bleeding are more likely to have locally advanced tumour and distant metastasis, thus conferring them poorer prognosis.<sup>3</sup>

Following the COVID-19 pandemic, changes in the pattern of general surgery admission have been observed. Patients tend to be older, more ill with organ dysfunction and have higher

rates of bowel obstruction, perforation or incarcerated hernia.<sup>4,5</sup> In addition, an increased rate of large bowel obstruction and more T4 CRC have been reported in the United Kingdom during the pandemic.<sup>6</sup>

Malaysia, which is among the countries that are severely hit by the pandemic, has daily number of COVID-19 cases per 1 million population that ranks top ten worldwide in August 2021.<sup>7</sup> An increase in acute surgical emergencies (bowel obstruction, perforation, bleeding and sepsis) as initial presentation of CRC has been anecdotally observed. The primary aim of this study is to compare the proportions of surgery performed in emergency manner for all CRC patients that underwent surgery before and during COVID-19 pandemic.

## MATERIALS AND METHODS

### Study Design and Setting

This is a retrospective cohort study performed at a secondary hospital in Malaysia. All CRC patients that underwent surgery are divided into pre-covid and covid cohort. Pre-covid population is defined as patients operated on before the pandemic from January until December 2019. Covid population is defined as patients operated on from September 2020 until August 2021.

World Health Organization (WHO) declared the novel coronavirus (COVID-19) outbreak as a global pandemic on 11 March 2020.<sup>8</sup> Soon after, the Federal Government of Malaysia implemented a series of movement control orders which includes lockdown and quarantine. However, the sudden and exponential rise of daily confirmed cases, hospitalisations and deaths due to COVID-19 in Malaysia occurred during the latter half of the year 2020.<sup>7</sup> Thus, in this study, the Covid population was taken as patients operated on during September 2020 until August 2021. This is to allow the full impact of COVID-19 during the height of the pandemic to be captured.

### Inclusion and Exclusion Criteria

All patients with new diagnosis of CRC including carcinoma in situ and anorectal carcinoma that underwent elective and emergency surgery during the study time period were included. Emergency surgery are surgery performed for CRC patient who presents with acute surgical emergencies such as obstruction, perforation, bleeding and sepsis that require immediate surgical intervention.

This article was accepted: 23 November 2022

Corresponding Author: Ng Gaik Huey

Email: gaikhuey@gmail.com

Table I: Patient characteristics (n=?)

Patient characteristics	Pre-COVID (77)	COVID (76)	p value
Age (years)			
Mean (SD)	61 (13)	60 (14)	0.560 <sup>a</sup>
Gender			
Male n (%)	52 (69)	52 (68)	0.906 <sup>b</sup>
Female n (%)	25 (31)	24 (32)	
Race n (%)			
Malay n (%)	51 (66%)	51 (67)	0.893 <sup>b</sup>
Chinese n (%)	23 (30%)	21 (28)	
Indian n (%)	3 (4%)	4 (5)	
Duration of symptoms (days)			
Median (IQR)	56 (84)	56 (84)	0.851 <sup>c</sup>
Charlson Comorbidity Index			
0	10 (14%)	13 (17.5%)	0.779 <sup>b,d</sup>
1	18 (24%)	13 (17.5%)	
2	18 (24%)	17 (23%)	
3	14 (19%)	13 (18%)	
≥4	14 (19%)	18 (24%)	
Tumour location			
Right-sided	13 (16%)	12 (16%)	0.697 <sup>b</sup>
Left-sided	32 (42%)	35 (46%)	
Anorectal	32 (42%)	28 (37%)	
Synchronous (right and left)	0	1 (1%)	
Pathological staging			
pT1/T2	9 (15%)	11 (19%)	0.568 <sup>a,d</sup>
pT3/T4	52 (85%)	48 (81%)	
pN0	25 (41%)	31 (53%)	0.204 <sup>a,d</sup>
pN1/N2	36 (59%)	28 (47%)	

<sup>a</sup>Independent Student's t test. <sup>b</sup>Pearson's chi-squared test. <sup>c</sup>Mann-Whitney U test. <sup>d</sup>There were data missing for some variables. The percentages were derived by excluding the missing data from the variables.

Table II: Comparison of surgery performed (n=?)

	Pre-COVID	COVID	p value
Elective surgery	55 (71)	51 (67)	0.562 <sup>a</sup>
Emergency surgery	22 (29)	25 (33)	
Acute intestinal obstruction	19	23	
Bowel perforation	3	2	
Formation of stoma in emergency surgery			
Yes	13 (59)	18 (72)	0.351 <sup>a</sup>
No	9 (41)	7 (28)	

<sup>a</sup>Pearson chi-squared test.

Table III: Waiting time for elective surgery

	Pre-COVID (30)	COVID (40)	p-value
Waiting time (days)			
Median (IQR)	8.5 (10)	9 (15)	0.668 <sup>a</sup>

<sup>a</sup>Mann-Whitney U test.

Operating theatre log and histopathological log were used to identify the cases. Outpatient clinic notes and inpatient admission notes were then retrieved from the hospital record office. Patients with high-grade dysplasia, neuroendocrine tumour, gastrointestinal stromal tumour and small bowel malignancy were excluded.

#### Statistical Analysis

Continuous variables were compared using Student's t test or Mann-Whitney U test; categorical variables using Pearson's chi-squared test. A *p* value of < 0.05 was considered statistically significant. Data analyses were performed using IBM SPSS Statistics for Windows (Version 23.0. Armonk, NY: IBM Corp.).

## RESULTS

A total of 153 patients with newly diagnosed CRC underwent surgery during the study period, with an almost equal number of cases during the pre-COVID era, *n*=77 and COVID era, *n*=76. The patient demographics in terms of age, gender, race, Charlson Comorbidity Index, and tumour location and staging were comparable with all *p* value > 0.05 (Table I).

The proportions of CRC patients who underwent emergency surgery before and during COVID-19 are 29% vs 33%, *p*=0.562. The majority of them had complete large bowel obstruction. Among patients who underwent emergency surgery, the proportion of patients who required stoma formation is 59% vs 72%, *p*=0.351 (Table II).

The waiting time for patients that underwent elective surgery was also collected. Waiting time for surgery was calculated from the time decision was made for surgery until the day of surgery. There is no difference in median waiting time for elective surgery between the two groups of patients (Table III).

## DISCUSSION

Across the world, various surgical services were heavily disrupted and significantly reduced during the COVID-19 pandemic. This includes clinic consultations, cancer screening programs, elective endoscopy procedures and surgeries. These are part of the strategies to channel the financial, personal protective equipment and manpower resources to combat the spread of COVID-19. At the same time, changes in healthcare-seeking behavior have also taken place. Some patients tend to dismiss their symptoms and are reluctant to seek earlier healthcare for fear of contracting COVID-19 from the hospital.<sup>9,10</sup>

In this study, similar numbers of CRC patients underwent surgery (77 vs 76) before and during the pandemic. There was no statistically significant difference in the proportions of emergency surgery (29% vs 33%,  $p=0.562$ ). The majority of emergency surgery were due to bowel obstruction which requires immediate intervention. All patients were not previously diagnosed as having CRC. As part of the limitations of the retrospective design of this study, it is not possible to explore factors that could lead to delayed presentation in these group of patients.

A higher proportion of CRC patients with stoma-forming procedures has been reported in the UK during the pandemic.<sup>11</sup> In our local setting, comparing the proportions of stoma creation in emergency setting before and during the pandemic, the difference is not significant. However, we observed that during the pandemic, we tend to adopt staged surgery strategy in patients who had complete bowel obstruction. Emergency trephine diversion transverse or sigmoid colostomy were performed for CRC patients who had complete large bowel obstruction without peritonitis. Diversion stoma is a relatively shorter and lower risk surgery which can be performed even under local anesthesia. Patients were then scheduled for an elective tumour resection after they have returned to their physiological baseline and their medical condition optimised. Scarcity of ICU beds, ventilators and blood products during the COVID-19 pandemic has deterred us from performing upfront major tumour resection in these acutely ill patients. Nevertheless, in tertiary centres with available colonic stenting services, colonic stenting is suggested as the first treatment option in suitable intestinal obstruction cases during the COVID-19 pandemic.<sup>12,13</sup>

The waiting times for elective CRC surgery were similar (8.5 days vs 9 days,  $p=0.668$ ). This is made possible by strongly adhering to both national and international guideline of prioritising malignant cases during the pandemic.<sup>14</sup> Benign non-urgent cases were postponed or referred to other hospitals. Interestingly, we also found a patient who chose to postpone surgery to complete COVID-19 vaccination. No complications occurred during the waiting period.

## CONCLUSION

There was no statistically significant difference in the proportion of emergency surgery in CRC patients before and during the pandemic. Nevertheless, in the midst of heavy focus on combating the pandemic, both patients and healthcare providers should consider CRC diagnosis and make prompt surgical referral for patients with suspicious gastrointestinal symptoms.

## REFERENCES

1. Dekker E, Tanis PJ, Vleugels JL, Kasi PM, Wallace MB. Colorectal cancer. *Lancet* 2019; 394 (10207): 1467-80.
2. Sant M, Aareleid T, Berrino F, Lasota MB, Carli PM, Faivre J, et al. EUROCARE-3: survival of cancer patients diagnosed 1990-94—results and commentary. *Ann Oncol* 2003; 14: v61-118.
3. Baer C, Menon R, Bastawrous S, Bastawrous A. Emergency presentations of colorectal cancer. *Surg Clin*. 2017; 97(3): 529-45.
4. McLean RC, Young J, Musbahi A, Lee JX, Hidayat H, Abdalla N, et al. A single-centre observational cohort study to evaluate volume and severity of emergency general surgery admissions during the COVID-19 pandemic: is there a "lockdown" effect?. *Int J Surg* 2020; 83: 259-66.
5. Cano-Valderrama O, Morales X, Ferrigni CJ, Martín-Antona E, Turrado V, García A, et al. Reduction in emergency surgery activity during COVID-19 pandemic in three Spanish hospitals. *J Br Surg* 2020; 107(8): e239.
6. Shinkwin M, Silva L, Vogel I, Reeves N, Cornish J, Horwood J, et al. COVID-19 and the emergency presentation of colorectal cancer. *Colorectal Dis* 2021; 23(8): 2014-9.
7. Malaysia: Coronavirus Pandemic Country Profile [cited August 2022]. Available from : <https://ourworldindata.org/coronavirus/country/malaysia>
8. Cucinotta D, Vanelli M. WHO declares COVID-19 a pandemic. *Acta Bio Medica: Atenei Parmensis* 2020; 91(1): 157.
9. Solis E, Hameed A, Brown K, Pleass H, Johnston E. Delayed emergency surgical presentation: impact of corona virus disease (COVID-19) on non-COVID patients. *ANZ J Surg* 2020; 90: 1482-3.
10. Lazzerini M, Barbi E, Apicella A, Marchetti F, Cardinale F, Trobia G. Delayed access or provision of care in Italy resulting from fear of COVID-19. *Lancet Child Adolesc Health* 2020; 4(5): e10-1.
11. Morris EJ, Goldacre R, Spata E, Mafham M, Finan PJ, Shelton J, et al. Impact of the COVID-19 pandemic on the detection and management of colorectal cancer in England: a population-based study. *Lancet Gastroenterol Hepatol* 2021; 6(3): 199-208.
12. Ren X, Chen B, Hong Y, Liu W, Jiang Q, Yang J, et al. The challenges in colorectal cancer management during COVID-19 epidemic. *Ann Transl Med* 2020; 8(7): 498.
13. Chen YH, Peng JS. Treatment strategy for gastrointestinal tumor under the outbreak of novel coronavirus pneumonia in China. *Chin J Gastrointestinal Surg* 2020; 23(2): 1-5.
14. SAGES and EAES Recommendations Regarding Surgical Response to COVID-19 Crisis, published on 30th March 2020. [cited August 2022]. Available from: <https://www.sages.org/recommendations-surgical-response-covid-19/>