

Impact of COVID-19 on the Diagnosis and Surgical Treatment of Colorectal Cancer: A National Perspective

Noel E. Donlon, M.D.^{1,2} • Conall Hayes, M.D.¹ • Maria Davern, M.Sc.¹
 Jarlath C. Bolger, Ph.D., F.R.C.S.I.¹ • Shane C. Irwin, M.Ch.³ • Waqas T. Butt, F.R.C.S.¹
 Deborah A. McNamara, M.D.^{2,3} • Kenneth Mealy, M.D.^{2,4}

1 Department of Surgery, St. James's Hospital, Dublin, Ireland

2 National Clinical Programme in Surgery, Royal College of Surgeons in Ireland, Dublin, Ireland

3 Department of Surgery, Beaumont Hospital, Dublin, Ireland

4 Department of Surgery, Wexford General Hospital, Wexford, Ireland

INTRODUCTION

The COVID-19 pandemic has had a profound impact on all aspects of Irish society, causing unprecedented economic, social, and infrastructural disruptions—in addition to significant interruptions in healthcare delivery. On this latter point, it is important to recognize that, although the burden of non-COVID-19 morbidity and mortality has not diminished, access to healthcare services has. Annually, 22,321 cases of cancer are diagnosed (2015–2017 estimated averages), resulting in 8987 deaths (2012–2014 averages) according to the National Cancer Registry of Ireland.¹

In a publication from a French national registry, a decrease in hospital admissions for acute myocardial infarctions was observed after the lockdown, irrespective of patient characteristics and regional prevalence of COVID-19, with similar reductions noted for acute stroke in a US multicenter study.² Multiple questions remain: where has this pathology disappeared to and what will be the future impact of these prevailing trends?

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Correspondence: Noel E. Donlon, M.D., Department of Surgery, Trinity Translational Medicine Institute, Trinity College Dublin, St James's Hospital, D08 W9RT, Dublin, Ireland. Email: donlonn@tcd.ie

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In the context of cancer care, there was an enormous impact on the detection and diagnosis of cancer. International data showed declines of 60% to 80% in the number of urgent general practitioner referrals for cancer during March to May 2020, and this trend was mirrored in Ireland as suspected cancer case referrals reduced by >50%, with an estimated 150,000 fewer people undergoing screening for breast, cervical, and colorectal cancer in the first half of 2020 compared with the corresponding period in 2019.³

Cancer treatment was similarly impacted. Decisions on whether to proceed with chemotherapy, radiotherapy, or immunotherapy were taken on a case-by-case basis, although anecdotal evidence exists that disruption occurred.^{4,5} A recent survey of German colorectal surgeons demonstrated a concerning decrease in surgical resections early in the pandemic.⁶ Evidence of poorer outcomes in patients with perioperative COVID-19 undergoing surgery also may have played a role in delays to surgery: a multicenter study of 1128 patients who had COVID-19 confirmed within 7 days before or 30 days after surgery reported high rates of pulmonary complications (51.2%) and an overall 30-day mortality of 23.8% when compared with accepted rates of up to 10% and 3%, respectively.⁷ Such findings are highly relevant, because the impact of even short delays to surgery for patients with cancer can be significant.⁸

When surgeries could take place, personal and protective equipment shortages, as well as new guidelines around limiting numbers of staff in the operating department and rigorous cleaning between operations, manifested in a hugely decreased volume of surgeries performed.⁹ Notwithstanding the improved reality attributed to the COVID-19 rollout in returning to capacity, the purpose of the current study is to evaluate the impact of COVID-19 on cancer diagnosis and surgical provision nationally over a 1-year period since its inception.

ANALYSIS OF COLORECTAL CANCER PATIENT DIAGNOSIS AND TREATMENT

Patient data were extracted from the Hospital Inpatient Enquiry database for the period March to March 2018–2019, 2019–2020, and 2020–2021; all patient episodes of care were included if they had a colorectal cancer–related procedure or endoscopic diagnosis of colorectal cancer. Information about the patient sex, age, day of admission and discharge, primary diagnosis, model of hospital in which the patient was admitted, and the length of stay in the hospital were all recorded. For the purposes of this study we also evaluated patients who underwent endoscopy and those who were diagnosed with a colorectal malignancy. Each patient episode is coded using the International Classification of Disease, 10th Edition, Australian Modification for diagnosis, and the Australian Classifications for Health Interventions for procedures performed in hospital.

Statistical analysis data were analyzed using SPSS (version 23.0) software (SPSS Inc, Chicago, IL). One-way ANOVA testing was used for statistical comparison between groupings. A significance level of 0.05 was used for all of the analyses.

CHANGES IN COLORECTAL CANCER DIAGNOSIS AND TREATMENT

Endoscopic Diagnosis of Malignancies

There has been a 36% reduction in the number of lower GI malignancies in the period March to August and, of concern, although this trend improved during September and November with 14% less malignancies being diagnosed, there was a significant deterioration during the third wave, with 36% less cancers diagnosed when compared with the same period for the previous 2 years. This equates to 22% less rectal cancers, 53% less rectosigmoid tumors, and 32% less sigmoid tumors diagnosed in the study period. The full breakdown of tumor location is available in Supplemental Digital Content Table 1 (<http://links.lww.com/DCR/B668>).

Procedures

There has been a significant reduction in the volume of cancer surgery nationally for all specialties, with 35,991 procedures performed between March 2020 and March 2021, compared with 54,648 and 56,335 for the same period in 2018 and 2019. This equates to a 43% reduction in cancer-related procedures for the year since COVID commenced (see Supplemental Digital Content Figure 1A, <http://links.lww.com/DCR/B667>). In terms of colorectal cancer–specific procedures, there was a 30% decrease in elective and an 18% reduction in emergency procedures in 2020 compared with 2018 and 2019

(see Supplemental Digital Content Figure 1B, <http://links.lww.com/DCR/B667>).

In the context of colorectal cancer surgical procedures this represents a 42% reduction during the height of the COVID-19 crisis and lockdown between March and May 2020. During the apparent recovery phase of COVID-19 between June and August, elective colorectal cancer care was still 35% below that of 2018 and 2019. The best period of recovery was represented by the September to November period, with elective cancer surgery reduced by 17%. However, colorectal cancer care provision during the third and most severe wave since the beginning of the pandemic, was 59% of surgeries performed during the same time points in 2018 and 2019 (Fig. A). In terms of emergency colorectal cancer provision, there are also significant reductions in volume for March to May, June to August, and December to February of 19%, 34%, and 19% when compared with 2018 and 2019 data (Fig. B).

Operative Approaches

There was a large shift from laparoscopic techniques during the initial 3 months of COVID-19 in Irish surgical departments with open right and extended right hemicolectomies increasing by 23% and 20% (Table). However, when the entire 12-month period is interrogated, there was an overall reduction in open approaches for right-sided tumors, with a 35% reduction in open extended right hemicolectomies and a 22% reduction in open right hemicolectomies. Throughout the entire COVID-19 period, there has been a significant reduction in operative procedures, with a reduction of 39% in anterior resections, ($p < 0.01$) and, of note, there was no increase in temporizing stomas.

DISCUSSION

The COVID-19 pandemic has unquestionably impacted on all domains of healthcare provision in Ireland; however, to date the consequences for the delivery of cancer care have not been robustly quantified. Therefore, characterizing the extent of the disruption and identifying strategies to address and mitigate current and further damage are warranted. We used colorectal cancer as a cancer-specific example to illustrate the troubling, reduced rates of cancer diagnoses and surgical care that have occurred in the context of the Irish response to the COVID-19 pandemic.

Nationally, we found a substantial decrease in the number of lower GI cancers diagnosed: the period from March to August 2020 saw a 34% reduction, which was continued in September to November (14% lower), and 36% lower for December to February, compared with the corresponding timeframes in 2018 and 2019. Similarly, surgical services were severely impacted. Overall the volume of colorectal cancer surgical procedures carried out

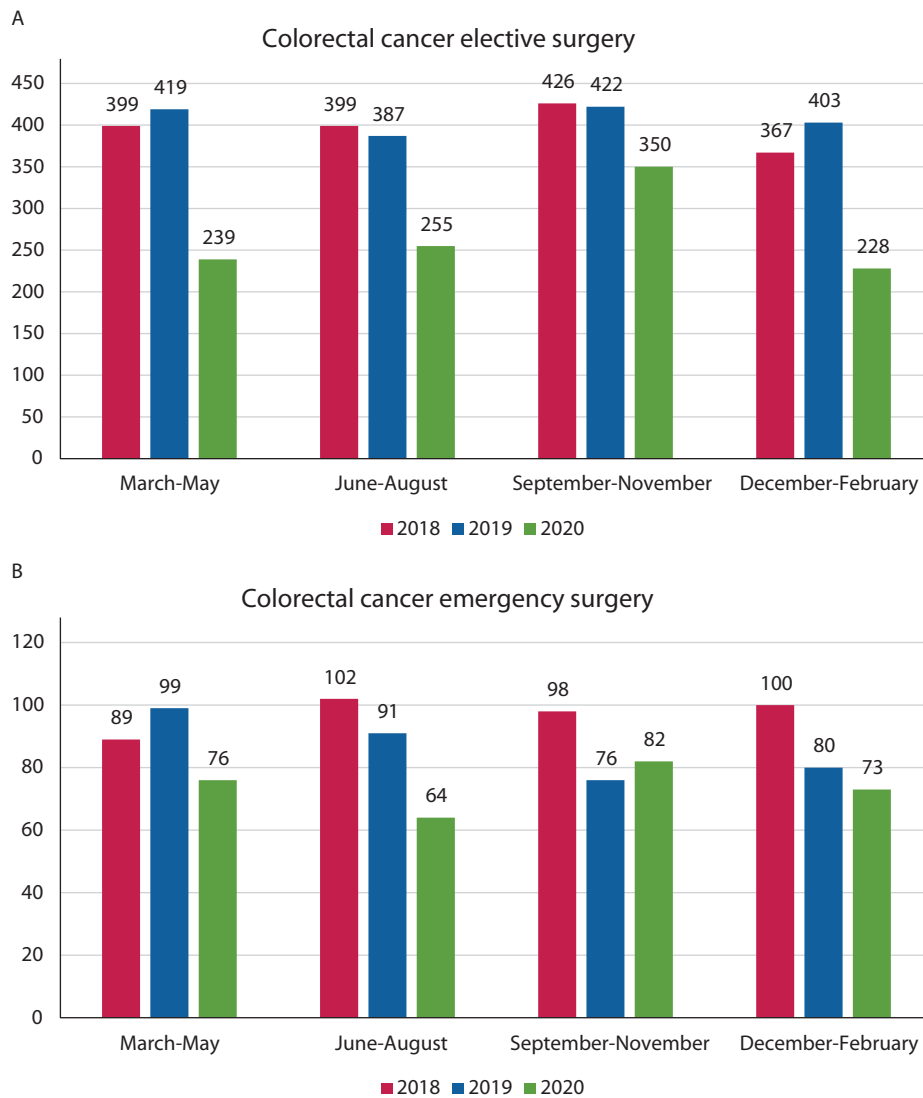


FIGURE. A, Elective surgery during the different periods of COVID-19. B, Emergency surgery during the periods of COVID-19.

between March and May 2020 was 42% below the same periods in 2018 and 2019.

Worryingly, although public health interventions reduced the volume of COVID-19 cases to negligible levels during June to August 2020, constituting the “recovery” phase of the initial pandemic surge, the provision of cancer care was less quick in its recovery. In this period there was no improvement in the rate of cancer diagnosis (persistent reduction of 34%), whereas elective colorectal cancer care was still 35% below that of 2018 and 2019. For the most recent period available for analysis (December 2020 to February 2021), elective cancer care provision remained 59% of the corresponding period for the previous 2 years.

The reasons for these findings are multifactorial. Hesitancy and fear of contracting the virus likely played a role in the reduced GP consultations and, thus, referrals for suspect cancers. In concert with the cessation of screening services, these 2 factors, in addition to reduced capacity in most endoscopy units, may account for the decreased numbers of malignancies diagnosed. Moreover, evidence suggesting an increased susceptibility of patients with cancer to COVID-19 infection, together with a raised risk of mortality in patients undergoing surgery with perioperative COVID-19 infection, may have raised the threshold for intervention in some cases.

When operations went ahead, there were noteworthy changes to the types performed. Open surgery was favored

TABLE. Operative approach and procedures during the study period

Operation	March 2020–March 2021 cancer surgical provision				p
	2018 (n = 1591)	2019 (n = 1631)	2020 (n = 1093)	% change (–32)	
APR	79	80	71	(–11)	
AR NOS	89	75	57	(–30)	<0.01
HAR	141	137	83	(–40)	
UL AR	42	33	17	(–55)	
LAR	211	197	126	(–38)	
Open extended right hemicolectomy	31	34	21	(–35)	
Laparoscopic extended right hemicolectomy	38	32	12	(–66)	<0.01
Open right hemicolectomy	183	182	142	(–22)	0.18
Laparoscopic right hemicolectomy	218	254	132	(–72)	
Limited excision of large colon with anastomosis					
Laparoscopic	53	61	34	(–40)	0.16
Open	36	51	36	(–17)	
Left hemicolectomy with anastomosis					
Laparoscopic	35	33	21	(–38)	0.01
Open	40	41	25	(–38)	
Rectosigmoidectomy with stoma	25	13	16	(–16)	
Temporary colostomy	34	30	27	(–16)	0.53
Temporary ileostomy	25	29	25	(–7)	

Statistical analysis used 1-way ANOVA.

APR = abdominoperineal resection; AR NOS = anterior resection not otherwise specified; HAR = high anterior resection; LAR = low anterior resection; ULAR = ultra low anterior resection.

in initial stages of the pandemic, likely as a consequence of recommendations surrounding the risks of aerosol-type formation and infection during laparoscopic resections.¹⁰ This is reflected by our data showing a dramatic reduction in this latter modality during March to May 2020, despite a lack of evidence to date for the transmission of COVID-19 by laparoscopic surgery.¹⁰ Furthermore, there was a reduction in the number of procedures with no apparent increase in defunctioning stomas suggesting that temporizing obstructing tumors with colostomies or ileostomies was not used.

The finding of this study are not unique to Ireland. International focus now needs to consider ways of ameliorating the disruption to cancer care. Minimizing further delays to diagnosis and treatment are imperative, because a recent meta-analysis found a 6% to 8% increased chance of death for each 4-week delay for 7 cancer types (bladder, breast, colon, rectum, lung, cervix, and head and neck).¹¹ In addition, delayed diagnoses are likely to increase cases of advanced malignancies with important sequelae for surgical case complexity and patient prognosis.

There are a number of guidelines concerning the sustainability of cancer surgery in the continuing pandemic, including pooled operating department capacity/lists/surgical teams, weekend operating, or ring-fenced elective hospital beds for cancer care. Appropriate triaging of patients with cancer to appraise the risk of COVID-19 infection against the urgency of care will be critical to assuring equitable and safe access to treatment. Addressing capacity issues should include not only expansion of both hospital and intensive care unit bed numbers but also

diagnostic endoscopy and screening services to clear the anticipated backlog.

The continued roll out of COVID-19 vaccination programs has undoubtedly improved cancer screening and surgical provision with frameworks on returning to norms established; however, this cannot offset the significant reduction in screening, cancer diagnosis, and surgery that has resulted from COVID-19.

CONCLUSION

This study clearly shows the profound impact of COVID-19 on colorectal cancer care, with a significant reduction in cancer diagnoses and surgical treatment. The results of this study are unlikely to be unique to Ireland and challenge all health services to focus on maintaining non-COVID health services and clearing waiting lists to minimize the potential growth of delayed cancer diagnoses with poorer outcomes.

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