

# Can we improve the efficiency of care in patients with colorectal cancer from the time of their initial referral for colonoscopy to surgical resection?

Nicole Kloos, MD\*  
Daniela Keren, MD\*  
Sean Gregg, MD  
Anthony R. Maclean, MD  
Elijah Dixon, MD  
Rachid Mohamed, MD  
Ryan Rochon, MD, MSc  
Chad G. Ball, MD, MSc

This manuscript was presented at the American Society of Colon and Rectal Surgeons Annual Scientific Meeting, Nashville, TN, May 9–23, 2018.

\*These authors contributed equally to this work.

Accepted Sept. 28, 2018

## Correspondence to:

C.G. Ball  
Foothills Medical Centre  
1403 – 29 St NW  
Calgary AB T2N 2T9  
ball.chad@gmail.com

DOI: 10.1503/cjs.008818

## SUMMARY

Delays in the diagnosis and treatment of colon adenocarcinoma are distressing to patients and clinicians alike. Of 224 patients with resected colon cancer identified via a province-wide administrative database, 170 (76%) received their colonoscopy from a gastroenterologist (GI). Patients waited significantly longer between their colonoscopy and surgical resection when the colonoscopy was performed by a GI within an urban city (43 v. 27 d;  $p = 0.02$ ). The total time from family practice referral to colonoscopy to surgical resection was shorter when a surgeon performed colonoscopy within an urban setting (105 v. 114 d;  $p = 0.03$ ). In community settings, there were no significant differences in any interval, regardless of which service performed the colonoscopy.

More than 25 000 Canadians receive diagnoses of colorectal cancer each year.<sup>1</sup> It is clear that when colorectal cancer is identified at an earlier stage, patients have high disease-specific survival.<sup>1</sup> Although complete pathological responses following systemic therapy occur, it is generally accepted that surgical resection is the dominant potentially curative treatment modality. As a result, individuals with suspected colorectal cancer require prompt referral to a surgeon for consideration of resection.

Preoperative tests should be limited to those with the ability to influence subsequent clinical decisions. The gold standard diagnostic test for colorectal cancer remains a colonoscopy with synchronous biopsy. Staging is then completed via computed tomography (CT) of the chest, abdomen and pelvis. Additional tests, such as positron emission tomography, anorectal ultrasonography, pelvic magnetic resonance imaging (MRI), and contrast-enhanced ultrasonography and/or MRI of the liver may be required on an ad hoc basis depending on the tumour location on the CT scan.

The time interval between the index colonoscopy and subsequent operative resection is a quality metric in many health systems.<sup>2–5</sup> Although unlikely to alter the resectability of a given colonic lesion, potential delays in meeting the ultimate decision-maker (i.e., the surgeon) as well as the wait time for surgical resection represent significant psychological challenges for most patients.

We identified all adult patients who underwent a resection for colorectal cancer in Southern Alberta over a 1-year period. Specific time points for analysis included the dates of the initial family practitioner referral for colonoscopy, the index colonoscopy and the surgical resection. We excluded patients who presented to the emergency department and received a colonoscopy without a formal outpatient referral, including those with colonic obstruction and/or perforation ( $n = 66$ ); required neoadjuvant therapy for either rectal cancer (chemotherapy and radiation) or other scenarios, such as synchronous colorectal liver metastases ( $n = 54$ ); underwent colonic resections, but whose primary cancers were not colorectal cancer ( $n = 28$ ); and patients whose clinical course deviated from the typical pattern (e.g., diagnostic colonoscopy performed in another country, large polypectomies found to have adenocarcinoma) ( $n = 48$ ). Patients

whose initial referral dates were not attainable were also excluded ( $n = 31$ ). Ethics approval was obtained via the University of Calgary.

Of the 224 patients across southern Alberta who had a colorectal cancer resected, 170 (76%) received their preceding colonoscopy by a gastroenterologist (GI) and 54 (24%) by a general or colorectal surgeon. Patient characteristics were similar, irrespective of who performed the colonoscopy. Gastroenterologists performed 86% and 23% of the colonoscopies within and outside of metropolitan Calgary (i.e., community setting), respectively; surgeons completed 14% and 77%, respectively.

The specific results for wait times within the city of Calgary are presented in Table 1. Although patients within metropolitan Calgary underwent colonoscopies slightly faster when they were performed by a surgeon than when they were performed by a GI (41 v. 50 d), a statistically significant difference was not identified ( $p = 0.19$ ). Patients waited significantly longer for surgical resection when a GI

performed their colonoscopy (27 v. 43 d;  $p = 0.02$ ). The overall time between family practitioner referral for colonoscopy and surgical resection was also shorter when a surgeon performed the colonoscopy (83 v. 105 d;  $p = 0.03$ ).

Although most colonoscopies within Calgary were performed by GI (86%), most colonoscopies conducted within the community settings of southern Alberta (outside of metropolitan Calgary) were completed by surgeons (77%). Within this community practice there were no significant differences in any interval wait times, regardless of which service performed the colonoscopy (Table 2). This pattern was also present when analyzing all patients within southern Alberta (i.e., both within and outside of metropolitan Calgary; Table 3).

When the specific indications for the index colonoscopy referral were evaluated (i.e., screening v. diagnostic), there were no alterations in the findings described previously. Only patients who underwent a colonoscopy performed by a surgeon in metropolitan Calgary had shorter times between

**Table 1. Wait times for patients in metropolitan Calgary**

Interval	Group; median		Difference in medians	<i>p</i> value
	GI as colonoscopist ( $n = 162$ )	General surgeon as colonoscopist ( $n = 27$ )		
Time between family physician referral and colonoscopy, d	50	41	9	0.193
Time between colonoscopy and surgery, d	43	27	16	0.018
Total time between family physician referral and surgery, d	105	83	22	0.03

GI = gastroenterologist.

**Table 2. Wait times for patients outside of metropolitan Calgary, but within southern Alberta**

Interval	Group; median		Difference in medians	<i>p</i> value
	GI as colonoscopist ( $n = 8$ )	General surgeon as colonoscopist ( $n = 27$ )		
Time between family physician referral and colonoscopy, d	45	48	3	0.891
Time between colonoscopy and surgery, d	41	57	16	0.504
Total time between family physician referral and surgery, d	96	105	9	0.479

GI = gastroenterologist.

**Table 3. Wait times for patients both inside and outside of metropolitan Calgary, and within southern Alberta**

Interval	Group; median		Difference in medians	<i>p</i> value
	GI as colonoscopist ( $n = 170$ )	General surgeon as colonoscopist ( $n = 54$ )		
Time between family physician referral and colonoscopy, d	50	48	2	0.196
Time between colonoscopy and surgery, d	43	36	7	0.57
Total time between family physician referral and surgery, d	103	98	5	0.123

GI = gastroenterologist.

the colonoscopy itself and the subsequent surgical resection. The median wait time between the referral request and date of colonoscopy was longer for patients whose colonoscopies were for screening than those whose colonoscopies were diagnostic ( $p = 0.02$ ). Wait times for a GI varied from 1 to 726 days. This compared with 6 to 327 days for surgeons.

Although the specific challenges in achieving expedited cancer care vary among types of cancer, there is a broad understanding among clinicians of the required diagnostic and management pathway for colorectal cancer (accurate identification of patients at risk for colorectal cancer, expedient colonoscopy, urgent referral to a surgeon for consideration of potential resection versus neoadjuvant/palliative).

It is evident that patients who underwent a colonoscopy by a surgeon in an academic centre had an overall faster time from referral for colonoscopy to subsequent surgical resection. Although there was a trend toward shorter wait times from initial referral to the time of colonoscopy, the dominant reason for an overall shorter pathway was a significantly more rapid movement from the date of colonoscopy to surgical resection among surgeons. It was interesting to note that this did not vary based on whether or not the same surgeon was responsible for both the colonoscopy and the resection.

We suspect that there are multiple underlying reasons for the delay in referral between urban GIs and surgeons, including waiting for final pathology confirmation and/or staging CT studies before referral to a surgeon, failing to obtain preoperative staging CT imaging at the time of the index colonoscopy/diagnosis, and a more intimate setting between clinicians in nonurban community settings. This efficient and rapid care among our rural and community patients is both reassuring and encouraging.

## CONCLUSION

Patients who were referred by their family practitioners for colonoscopy and subsequent surgical resection within a large metropolitan area received more efficient and timely care by surgeons. Targeted improvements should focus on improving communication strategies between urban GIs and surgical colleagues.

**Affiliations:** From the Department of Surgery, Cumming School of Medicine, University of Calgary, Calgary, Alta. (Kloos, Keren, Gregg, Dixon, Rochon, Ball); and the Department of Medicine, Cumming School of Medicine, University of Calgary, Calgary, AB (Mohamed).

**Competing interests:** None declared.

**Contributors:** All authors contributed substantially to the conception, writing and revision of this article and approved the final version for publication.

## References

1. Patel P, De P. Trends in colorectal cancer incidence and related lifestyle risk factors in 15–49-year-olds in Canada. *Cancer Epidemiol* 2016; 42:90-100.
2. Sey MS, Gregor J, Adams P, et al. Wait times for diagnostic colonoscopy among outpatients with colorectal cancer: a comparison with Canadian Association of Gastroenterology targets. *Can J Gastroenterol* 2012;26:894-6.
3. Maida M, Macaluso FS, Ianiro G, et al. Screening of colorectal cancer: present and future. *Expert Rev Anticancer Ther* 2017;17:1131-46.
4. Gills A, Dixon MD, Smith A, et al. A patient-centred approach toward surgical wait times for colon cancer: a population-based analysis. *Can J Surg* 2014;52:94-100.
5. Porter G, Urquhart R, Kendell C, et al. Timely access and quality of care in colorectal cancer: a population-based cohort study using administrative data. *BMC Res Notes* 2013;6:355-62.