



ORIGINAL ARTICLE ARTICLE ORIGINAL

Colonoscopy procedures at a small rural hospital

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Dr. Kirby is a GP-surgeon who has worked in the small town of Wawa in northwestern Ontario for the past 10 years. Prior to that he spent 5 years working as a GP-surgeon in the Northwest Territories, interspersed with 1- to 1½-year terms spent as a surgical resident at McMaster University, Hamilton, Ont., where he obtained basic training in endoscopy.

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Background: Screening for colon cancer by colonoscopy is increasingly recommended in the medical literature. There are few, if any, reports in the medical literature regarding the provision of colonoscopy services in small rural hospitals by non-specialist endoscopists.

Objective: This study, carried out in a small rural hospital in northern Ontario, tracks the development of a colonoscopy service provided by a general practitioner with some basic colonoscopy training. It compares the GP's past and present level of expertise with literature-derived benchmarks and gauges the safety and effectiveness of the procedure.

Methods: A retrospective chart review of 616 colonoscopies performed by this GP between April 1992 and September 2003.

Results: The results of the study support the idea that colonoscopy in a rural setting can be provided safely and effectively.

Conclusion: Colonoscopy has a high safety profile when provided by general practitioners, and training in the procedure should be available to interested family practitioners and family practice residents.

Contexte : Le dépistage du cancer du côlon par coloscopie est de plus en plus recommandé dans les publications médicales. Or, les articles faisant état de services de coloscopie dans les petits hôpitaux ruraux par des non-spécialistes de l'endoscopie sont plus que rares dans les publications médicales.

Objectif : Cette étude réalisée dans un petit hôpital rural du nord de l'Ontario suit l'évolution d'un service de coloscopie fourni par un omnipraticien ayant reçu une formation de base en coloscopie. On compare l'expertise antérieure et actuelle de l'omnipraticien en utilisant des points de comparaison repères tirés des écrits médicaux, et on évalue la sécurité et l'efficacité de l'intervention.

Méthodes : Étude rétrospective des dossiers de 616 coloscopies réalisées par cet omnipraticien entre avril 1992 et septembre 2003.

Résultats : Les résultats de l'étude appuient le concept selon lequel il est possible de dispenser des services sécuritaires et efficaces de coloscopie en milieu rural.

Conclusion : La coloscopie est très sécuritaire lorsqu'elle est effectuée par des omnipraticiens et il faudrait offrir la formation pertinente aux médecins de famille et aux résidents en médecine familiale intéressés.

INTRODUCTION

Over the past 10 years, colonoscopy has been increasingly recommended as an important tool for diagnostic, screening, surveillance and therapeutic purposes.¹⁻⁵ The vast majority of colonoscopies are carried out in secondary and tertiary centres. There are

few if any reports in the literature regarding the use of this procedure in the hands of non-specialists in rural medical facilities.

This study was carried out to review the experience with colonoscopy at the Lady Dunn General Hospital in Wawa, Ont., in order to determine if the procedures were being carried out in a safe

and effective manner. Rates of cecal intubation, detection of polyps and cancers, and rate of complications were compared with literature-derived benchmarks.

It is believed that the results of this audit might be applicable to the provision of colonoscopy services in rural communities where lack of specialists trained in this procedure can lead to unacceptably long waiting lists and patients having to travel long distances to access this service.

METHODS

A retrospective chart review was conducted on all colonoscopy procedures performed at the hospital by the author from April 1992 to September 2003. Patients were referred for colonoscopy on the basis of symptoms such as rectal bleeding, anemia, abdominal pain, change in bowel habit, positive fecal occult blood, or family history of colon cancer.

The colonoscopies were assessed with respect to the following literature-derived parameters, which have been widely employed as measures of competence.

1. Complications: The incidence of complications, such as bleeding or perforation related to the procedure itself, and complications related to sedation. Bleeding complications were defined as any amount of post-procedure bleeding that required the patient to return to hospital for assessment. The occasional patient exhibited a transient drop in blood pressure to the 70–90 mm Hg systolic range after sedation, but these

episodes were not considered complications because they did not require treatment and there were no adverse sequelae.

2. Cecal intubation rate: Cecal intubation was confirmed by visualizing the typical anatomy of the cecum and by seeing the light transilluminating the right lower quadrant.

3. Prevalence of cancers and adenomas identified.

RESULTS

Table 1 shows the results by year and the additive results for all the years in terms of total number of colonoscopies performed, complications related to the procedure or to sedation as well as the rate of cecal intubation and the percentages of cancer or polyps diagnosed.

Table 2 groups the patients by indication for colonoscopy and shows the number of cancers discovered in each group.

Cecal intubation

These results show a cecal intubation rate of 60% to 70% for most years between 1992 and 1999, rising to well over 90% during the last 3 years of the study.

Identification of polyps and cancers

In the present study the overall mean age of patients

Year	No. of procedures performed	No. of cecal intubations achieved, %	No. of adenomatous polyps discovered, %	No. of cancers found	No. of complications*
1992	26	62	4	0	0
1993	33	67	6	2	0
1994	22	73	14	1	0
1995	30	50	13	1	0
1996	32	66	19	2	0
1997	52	72	12	2	0
1998	52	71	6	0	0
1999	80	74	14	2	0
2000	79	87	23	2	0
2001	76	93	14	1	0
2002	69	97	21	0	0
2003†	67	100	34	2	0

*Complications related to bleeding, perforation or sedation.
†January to September

was 58 years. The polyp identification rate ranged from 4% to 34% (Table 1) depending on the year and tended to increase over the years of the study. Overall, it was 16.6%. The overall rate of cancer detection was 2.4%.

DISCUSSION

These results indicate that over the 11 years that colonoscopy was performed at the study hospital by the author, it has been conducted in a safe manner.

Bleeding, perforation and sedation complications

In this study there were no complications related to bleeding, perforation or to sedation for the procedure (Table 1).

In general, bleeding complications occur in approximately 1% of patients, and perforations or complications of conscious sedation in 0.2%.⁶ An overall complication rate of 0.3% has been demonstrated in the hands of experienced gastroenterologists.^{5,7} Overall death rate from colonoscopy has been estimated to be 1–3/10 000.⁷

Similar low complication rates have been noted in the hands of general practitioners.^{8–10}

Cecal intubation

With respect to effectiveness, for the early years of this study cecal intubation rates were well below the 80% to 90% level expected for the average endoscopist (Table 1). Rates of cecal intubation over 80% were not achieved by the author until over 300

colonoscopies had been performed.

Studies have shown a rate of cecal intubation of approximately 81% to 94% achieved by gastroenterologists and colorectal surgeons in a community hospital setting.^{10,11}

General practitioners performing colonoscopy have reported cecal intubation rates of 54% to 92%.^{8–10} Most studies of colonoscopy training programs have demonstrated a learning curve reaching the 80% to 90% cecal intubation level after 100 to 200 supervised colonoscopies.^{12–16}

Identification of polyps and cancers

The rate of cancer and polyp discovery of 2.4% and 16.6% respectively over 616 colonoscopies performed is within the range of all of the studies reviewed by Rex.¹⁷ That author made the point that the prevalence of adenomatous polyps is best predicted by demographic features such as increasing age and male gender, and cancer prevalence at endoscopy varies considerably according to the indication for the procedure. Rex conducted a broad search of the literature for published reports of colonoscopic studies dealing with the prevalence of adenomatous polyps and carcinomas grouped according to the indication for the procedure (Table 3). He reviewed from 4 to 12 studies in each category.

The percentage of adenomatous polyps discovered varied between a low of 5% and a high of 63%, with the higher rates tending to be found in the studies where the indication for colonoscopy was rectal bleeding, positive family history of colon cancer or prior personal history of colonic polyps.

Table 2. Indication for colonoscopy and number of cancers discovered in each group

Indication	No. of patients with this indication	No. of cancers discovered
Rectal bleeding	158	5
Positive test for fecal occult blood	17	2
Anemia	40	4
Abdominal pain	83	4
Previous colon cancer	56	0
Change in bowel habit	21	0
Diarrhea	36	0
Previous colonic polyp	47	0
Colitis	14	0
Screening	144	0
Totals	616	15

Table 3. Prevalence of adenomatous polyps and carcinomas grouped according to the indication for the procedure¹⁷

Indication	No. of patients	Adenomas, %	Cancer, %
Positive fecal occult blood test	14 994	17–43	2.2–22
Rectal bleeding	1 655	14–61	3–33
Iron deficiency	274	5–9	2–11
Abdominal pain / Altered bowel habit	641	6–31	0–5
Screening: positive family history for colon cancer	1 268	11–63	0–4
Surveillance: prior adenoma	3 155	12–60	0–2.3
Surveillance: prior colon cancer	1 855	6–40	0.7–11.7
Screening: no increased risk	856	13–41	0–1.7

A paper by Neugut and colleagues¹⁸ reviewed 6 colonoscopy studies performed on patients selected for screening because of age over 50, because of 1st-degree relatives with colon cancer or because they were spouses of cancer patients. This revealed adenomatous polyps in 8.4% to 54.9%, with the higher percentages in those studies with the higher mean ages.

A case series reported by Pierzchajlo and coworkers⁹ is the most similar to the present study in terms of demographics, indications for colonoscopy and mean age. In that study of 751 procedures the cecum was intubated in 91.5% of cases, and the mean age of the patients was 53.8 years. The prevalence of adenomas was 17.8%.

Overall mean age in the present study was 58 years. The polyp identification rate ranged from 4% to 34%, depending on the year. It tended to increase over the years of the study, with an overall rate of 16.6%.

With respect to cancer discovery rates, the overall rate for this study was 2.4%. In the review by Rex¹⁷ these also varied quite significantly depending on the indication for the procedure. The rates varied from a low of 0% to 1.7% for screening colonoscopy to a high of 4% to 38% when positive fecal occult blood was the indication for colonoscopy. The rates were 3% to 33% when rectal bleeding was the indication, 2% to 11% for iron deficiency anemia and up to 11.7% where the patient had a prior history of colon cancer.

Pierzchajlo and coworkers⁹ found a prevalence of colon cancer of 0.4% in their study (751 patients), and Neugut and colleagues¹⁸ found that prevalence rates ranged between 0% and 2.2% in their review of 6 colonoscopy studies (1242 colonoscopies).

Limitations

Several factors could lead to errors in the statistics developed in the present study.

Charts of patients who underwent colonoscopy could have been missed. In addition, there could be patients whose complications were not picked up by the review. However, in a small town (4000 people) that is 230 km from the nearest referral centre, a patient who developed a complication would almost certainly return to the hospital where he or she had had the procedure.

Cecal intubation could have been misinterpreted, especially in the early years of the study.

The relatively small sample size in relation to the expected low incidence of complications diminishes the accuracy of the results in this regard.

Summary

The results of this study suggest that at the present time colonoscopy procedures are being carried out effectively, as judged by the rates of cecal intubation and identification of colonic adenomas and cancers, compared with results from other studies in the medical literature.

During the first 7 or 8 years of the study time-frame the colonoscopy service in the community was looked upon mainly as an investigative and diagnostic procedure. Because the author did not have extensive training in the procedure (about 30 supervised colonoscopies as an element of 2½ years of a general surgery training program and an interval of about 4 years from the time of this training to the initiation of the colonoscopy procedures documented in this study), more emphasis was placed on safety than attempting to reach a high rate of cecal intubation. Instead, any patient in whom cecal intubation was not easily achieved and who was felt to be at risk of harbouring a significant proximal lesion was referred for air contrast barium enema, a procedure that was readily available in the community.

Experience with colonoscopy was gained, newer equipment was purchased and synergies developed when a colleague (who spent time with a fellowship gastroenterologist in a nearby city) became interested in learning the procedure. Cecal intubation rates began to climb, and the overall approach changed from a diagnostic/investigative service to that of a screening and therapeutic service (by eliminating all polyps found).¹⁹⁻²¹

The results also suggest that a partially-trained individual working alone takes longer to develop competence (i.e., in my case, over 300 colonoscopies to approach the 80% to 90% cecal intubation rate) as compared to the 100 to 200 colonoscopies required to reach a similar benchmark in a teaching setting.

CONCLUSION

The goal in our community at the present time is to offer screening colonoscopy to all individuals aged 50 to 75 years in the community. These study results provide evidence that the author's present level of competence with the procedure is sufficient to be able to provide this service safely and effectively.

Colonoscopy services provided by general practitioners in smaller centres could contribute greatly to fulfilling the demand for this procedure in a timely manner and to saving patients in rural communities

the inconvenience of having to travel to another centre. This could also provide considerable savings to the health care system.

Interested family practice residents should be encouraged to develop skill in this procedure (as well as gastroscopy) during their family practice training programs. (Recently, a family practice resident undergoing rural training in our community was able to carry out over 50 colonoscopies as the principal operator.)

These results should lend support to doctors in smaller communities who have an interest in developing skills with this procedure or in initiating colon cancer screening programs utilizing colonoscopy or fecal occult blood testing.

Competing interests: None declared.

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