

Rate of serious complications of colonoscopy in Quebec

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BACKGROUND: The rate of serious complications is one marker of the quality of colonoscopy services.

OBJECTIVE: To estimate the rate of serious complications of colonoscopy according to colonoscopy indication and polypectomy status.

METHODS: A prospective cohort study of patients scheduled for colonoscopy who were recruited from seven endoscopy facilities across Montreal (Quebec) was conducted. Before colonoscopy, patients completed a brief questionnaire and provided their health insurance numbers. Colonoscopy indication was based on patient-reported medical history. Polypectomy status was obtained from provincial physician billing records (*Régie de l'assurance maladie du Québec*). Diagnoses and procedures associated with hospitalization in the 30 days following colonoscopy were obtained from the provincial hospitalization database (MedEcho).

RESULTS: Of the 2134 patients enrolled (mean age 60.9 years, 50.1% male), 33 (1.55% [95% CI 1.06% to 2.16%]) were hospitalized within 30 days. One patient experienced bleeding following a colonoscopy that involved polypectomy and was diagnosed with carcinoma *in situ* of the rectum. Based on self-reported rectal bleeding in the previous six months, the colonoscopy was nonscreening. The provincial hospitalization data showed no occurrences of perforation, diverticulitis, myocardial infarction/stroke or death; thus, the rate of serious colonoscopy complications was 0.05% (95% CI 0.00% to 0.26%).

DISCUSSION: The rate of serious colonoscopy complications requiring hospitalization was low and comparable with what is reported in the literature. The serious complication occurred subsequent to polypectomy and in a nonscreening colonoscopy.

CONCLUSION: The findings support the relative safety of screening colonoscopy in persons without large bowel diseases and symptoms. However, future research to determine the rate of serious complications not requiring hospitalization is warranted to reassure decision makers of the safety of colonoscopy for colorectal cancer screening.

Key Words: Colonoscopy; Complications; Screening

Colonoscopy is the only screening modality for colorectal cancer (CRC) that enables detection and removal of precancerous and cancerous lesions throughout the colon (1-5). However, colonoscopy is not readily available, inexpensive or easy to administer, and results are not reliable or reproducible because endoscopist and practice setting characteristics are associated with postcolonoscopy CRC (6). Importantly, colonoscopy is not completely safe, and serious complications of colonoscopy are no longer uncommon events due to the increased number of colonoscopies performed annually (7,8). In one Canadian study, pooled rates from British Columbia, Alberta,

Les taux de graves complications de coloscopie au Québec

HISTORIQUE : Le taux de graves complications sont un marqueur de la qualité des services de coloscopie.

OBJECTIF : Évaluer le taux de grave complication de la coloscopie d'après l'indication de coloscopie et le statut de polypectomie.

MÉTHODOLOGIE : Les auteurs ont mené une étude de cohorte prospective auprès des patients devant subir une coloscopie recrutés dans sept installations d'endoscopie de Montréal (au Québec). Avant la coloscopie, les patients ont rempli un bref questionnaire et fourni leur numéro d'assurance maladie. L'indication de coloscopie se fondait sur les antécédents médicaux des patients. Les auteurs ont obtenu le statut de polypectomie dans les dossiers de facturation des médecins de la province (Régie de l'assurance maladie du Québec). Ils ont obtenu les diagnostics et les interventions associés à l'hospitalisation dans les 30 jours suivant la coloscopie dans la base de données d'hospitalisation de la province (MedEcho).

RÉSULTATS : Sur les 2 134 patients inscrits (âge moyen de 60,9 ans, 50,1 % de sexe masculin), 33 (1,55 % [95 % IC 1,06 % à 2,16 %]) ont été hospitalisés dans les 30 jours. Un patient a subi une hémorragie après la coloscopie, laquelle incluait une polypectomie, et il a reçu un diagnostic de carcinome *in situ* du rectum. D'après l'hémorragie rectale autodéclarée dans les six mois précédents, la coloscopie n'avait pas été effectuée pour des besoins de dépistage. Les données d'hospitalisation provinciale n'ont révélé aucune occurrence de perforation, de diverticulite, d'infarctus du myocarde ou d'accident cérébral vasculaire ou de cancer. Ainsi, le taux de graves complications des coloscopies s'élevait à 0,05 % (95 % IC 0,00 % à 0,26 %).

EXPOSÉ : Le taux de graves complications de la coloscopie exigeant une hospitalisation était peu élevé et comparable à ce qui est indiqué dans les publications. Ces graves complications se produisaient après une polypectomie et une coloscopie non liée au dépistage.

CONCLUSION : Les observations étayaient la sécurité relative de la coloscopie de dépistage chez les personnes asymptomatiques sans grave maladie inflammatoire de l'intestin. Cependant, de futures recherches en vue de déterminer le taux de graves complications n'exigeant pas d'hospitalisation sont justifiées pour rassurer les décideurs quant à la sécurité de la coloscopie en vue du dépistage du cancer colorectal.

Ontario and Nova Scotia for colonoscopy-related bleeding, perforation and death were 1.64 per 1000, 0.85 per 1000 and 1 per 14,000, respectively (9). Studies of serious complications are heterogeneous and may include flexible sigmoidoscopy and colonoscopy, observation periods that vary from 24 h to one month (10,11-14), and assessment methods that include electronic records (12,13,15), medical chart review (14) and patient self-report (10,11). Nevertheless, the most frequent complications are postbiopsy and postpolypectomy bleeding, colonic perforation, diverticulitis, myocardial infarction and death (10-12,14).

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TABLE 1
Participant characteristics (n=2134)

Characteristic	
Age, years, mean \pm SD	60.9 \pm 7.1
Male sex	1070 (50.1)
History of gastrointestinal conditions	627 (29.4)
Abdominal symptoms in the past 6 months	853 (40.0)
Anemia in the past 12 months	227 (10.7)
Positive fecal occult blood test in the past 12 months	60 (2.8)
Colonoscopy in the past 10 years	991 (46.4)
Family history of colorectal cancer	505 (23.7)
Polypectomy performed at index colonoscopy	548 (25.7)

Data presented as n (%) unless otherwise indicated

Although the rates of serious complications are very low, the proportion that results from screening colonoscopy is unclear. Thus, the purpose of the present study was to determine the rate of serious complications of colonoscopy requiring hospitalization in the 30 days postcolonoscopy according to colonoscopy indication (screening/nonscreening) and polypectomy status.

METHODS

Data from two prospective studies, conducted between 2007 and 2009, of individuals 50 to 75 years of age who underwent outpatient colonoscopy and were covered by the provincial health insurance plan (*Régie de l'assurance maladie du Québec* [RAMQ]) were combined. The first cohort was part of a study to develop algorithms to identify screening colonoscopies in administrative data; the second cohort was assembled to augment the sample size of the first cohort to examine colonoscopy quality and safety issues. The same data collection methods were used in both studies.

Participants were recruited from seven university-affiliated hospitals in Montreal (Quebec); they were approached by the research assistant before colonoscopy and explained the purpose of the study. Individuals who provided written informed consent were interviewed on demographics and gastrointestinal conditions and symptoms. Colonoscopy indication was derived from patient questionnaires. Nonscreening was defined as having any of the following: history of gastrointestinal disease, lower abdominal symptoms in the previous six months, anemia or positive fecal occult blood test in the past year. Screening was defined as the absence of these criteria. Polypectomy status was obtained from RAMQ using the polypectomy billing code, which has been shown to be adequately accurate (16). Hospitalization data on study subjects were obtained from MedEcho (*Maintenance et exploitation des données pour l'étude de la clientèle hospitalière*), the Quebec health administrative hospitalization database, and individuals who were hospitalized for any reason in the 30 days postcolonoscopy were identified. The lag time (in days) between the index colonoscopy and first hospitalization, as well as the total length of hospital stay, were estimated. The main outcome, serious complications requiring hospitalization, was defined as an event of bleeding, perforation, diverticulitis, myocardial infarction, stroke or death (10-12,14) that occurred up to 30 days postcolonoscopy and identified using diagnostic *International Classification of Diseases, Tenth Revision* and Canadian Classification of Health Interventions procedure codes that were associated with each colonoscopy complication; these were defined a priori based on expert opinion and discussion with RAMQ technicians.

RESULTS

In total, 2134 patients (mean age 60.9 years, 50.1% male) underwent colonoscopy: 689 from cohort 1 and 1445 from cohort 2. Of all the patients, 548 (25.7%) had one or more polyps removed (Table 1). Of all participants, 33 (1.55% [95% CI 1.06% to 2.16%]) were hospitalized for any reason at least once during the 30-day time window; two patients (0.09%) had two hospitalizations. The median total length of

stay for each patient was three days, (range one to 22 days) and the median time lag time between the index colonoscopy and first hospitalization was 13 days (range 0 to 30 days). Of the hospitalized patients, six (17.14% [95% CI 6.56% to 33.65%]) were diagnosed with CRC. Of the serious complications examined, one individual experienced bleeding as a result of a medical procedure; no records were found for perforation, diverticulitis, myocardial infarction, stroke or death (rates 0% [95% CI 0.00% to 0.17%]). This one participant was >65 years of age, had a family history of CRC and self-reported rectal bleeding before colonoscopy, indicating that the colonoscopy was not for screening purposes. Polypectomy had been performed at the index colonoscopy and the participant was hospitalized for one day three weeks postcolonoscopy. The diagnoses associated with this hospitalization were carcinoma in situ of the rectum, bleeding during a medical procedure and misadventures during endoscopic examination. Thus, the rate of serious complications was 0.05% (95% CI 0.00% to 0.26%) for all colonoscopies and 0.18% (95% CI 0.00% to 1.01%) for colonoscopies with at least one polypectomy. A total of 860 and 1274 colonoscopies were classified as screening and nonscreening, respectively. The rates of serious complications according to indication were 0% (95% CI 0.00% to 0.43%) for screening and 0.08% (95% CI 0.00% to 0.44%) for nonscreening.

DISCUSSION

In a cohort of 2134 patients undergoing colonoscopy in Montreal between 2007 and 2009, the rate of serious complications of colonoscopy was 0.05%. This rate is comparable with that reported in a Canadian study of persons 50 to 75 years of age who underwent outpatient colonoscopy between 2002 and 2003 (9). The single complication in the present study occurred following polypectomy, which is a known risk factor for serious complications (12) because serious complications occurred in 7.0 per 1000 colonoscopies with biopsy/polypectomy compared with 0.8 per 1000 colonoscopies without. This one bleeding episode occurred three weeks postpolypectomy and may have been due more to the follow-up treatment than to the index colonoscopy. This individual reported rectal bleeding in the six months before the index colonoscopy, indicating that it was a nonscreening colonoscopy. Screening colonoscopies in asymptomatic patients tend to have low complications rates. In one study of asymptomatic individuals 50 to 75 years of age without colonic examination in the previous 10 years (11), no perforations or deaths were attributed to colonoscopy; however, major morbidity occurred in nine of 3196 (0.3%). Our findings suggest that complication rates are lower in screening compared with nonscreening colonoscopies.

Study strengths and limitations warrant discussion. The main strength was the prospective study design, which permitted assessment of patient CRC risk factors, colonoscopy indication and polypectomy status before serious complications, reducing the potential for information bias. The main limitations were small sample size and the lack of power to detect serious complications (especially death), and the use of administrative data, the accuracy of which has not been assessed. The rate of serious complications may have been underestimated because diagnostic codes in administrative data tend to have imperfect sensitivity (17). Furthermore, serious complications not requiring hospitalization, such as bleeding that is treated in the emergency room, were not captured.

CONCLUSION

The rate of serious colonoscopy complications requiring hospitalization in our patient sample was very small, associated with polypectomy and not associated with CRC screening. Our findings support those of others showing the relative safety of screening colonoscopy in persons without large bowel diseases and symptoms. Future research aimed at determining the rate of serious complications not requiring hospitalization is recommended to reassure decision makers of the safety of colonoscopy for CRC screening.

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