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To cite this article: Bjarki T. Alexandersson, Johann P. Hreinsson, Tryggvi Stefansson, Jon Gunnlaugur Jonasson & Einar S. Bjornsson (2014) The risk of colorectal cancer after an attack of uncomplicated diverticulitis, *Scandinavian Journal of Gastroenterology*, 49:5, 576-580, DOI: [10.3109/00365521.2014.886717](https://doi.org/10.3109/00365521.2014.886717)

To link to this article: <https://doi.org/10.3109/00365521.2014.886717>



Published online: 13 Mar 2014.



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ORIGINAL ARTICLE

## The risk of colorectal cancer after an attack of uncomplicated diverticulitis

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### Abstract

**Objective.** According to clinical guidelines, a colonoscopy is recommended after an attack of diverticulitis in order to exclude colorectal cancer (CRC). This is based on studies prior to the use of computerized tomography (CT) for confirmation of the diagnosis. We aimed to investigate the findings of a subsequent colonoscopy after an attack of uncomplicated diverticulitis. **Material and methods.** The study cohort consisted of all patients with the diagnosis of uncomplicated diverticulitis, who underwent a subsequent colonoscopy 6–8 weeks later during a 6-years period in the National University Hospital of Iceland. The diagnosis of diverticulitis was based on clinical symptoms verified with a CT of the abdomen. Relevant clinical information was obtained from medical records and from the Icelandic Cancer Registry. **Results.** A total of 282 patients had uncomplicated diverticulitis and 199 patients underwent endoscopy. Two patients had CRC (0.7%), diagnosed with diverticulitis but did not recover clinically. All other patients recovered clinically. Colonic polyps were found in 33 of 195 (17%) cases. In 19/33 (58%) cases the histology demonstrated hyperplastic polyps, and in 13/33 (39%) adenoma with mild dysplasia. Only 1/33 (3%) of the colonic polyps were >1 cm in size. **Conclusions.** Among patients experiencing an attack of uncomplicated diverticulitis the frequency of CRC was equal to what might be expected compared to the average risk in the population. In these patients a routine colonoscopy in the absence of other clinical signs of CRC seems hardly necessary, if the clinical course is uneventful and the patient recovers.

**Key Words:** Colorectal cancer, diverticulitis, risk, uncomplicated

### Background

According to previous studies, all patients presenting with acute diverticulitis should undergo colonoscopy 4–6 weeks later to exclude CRC [1]. However, these studies are more than 20 years old, and are from the time when diverticulitis was often diagnosed clinically without the aid of CT scan of the abdomen. CT of the abdomen, by contrast, reliably confirms the diagnosis diverticulitis with or without complications and is, therefore, used

to diagnose this condition [2]. Some previous studies have shown increased risk of CRC after an attack of diverticulitis [3,4], whereas others have not [5–7]. Most studies have analyzed all cases of diverticulitis but not only those with uncomplicated diverticulitis. Little data are available on the risk of finding CRC in patients who experience an attack of uncomplicated diverticulitis.

A recent study found that the risk of CRC was not increased after an attack of uncomplicated diverticulitis [8]. We aimed to investigate the findings of a

subsequent colonoscopy after an attack of uncomplicated diverticulitis.

## Materials and methods

The study was retrospective and population based and carried out at the National Hospital of Iceland (population 238 000 adult inhabitants) with additional information from the population-based Icelandic Cancer Registry. From a computerized diagnoses database at the National Hospital of Iceland, we identified patients with the diagnosis K 57.3 "Diverticular Disease of large intestine without perforation or abscess" from the years 2006 to 2011. Patients' records and CT of the abdomen were examined, and those with uncomplicated diverticulitis were included in the study. The diagnostic criteria of diverticulitis were the following: (1) abdominal pain; (2) abdominal tenderness; and (3) CT of abdomen with signs of diverticulosis and either thickening of the colonic wall ( $\geq 5$  mm), inflammation of the surrounding fat, or both [9,10]. Complicated diverticulitis was defined as the presence of pericolonic or abdominal abscess, localized or free extra luminal gas or contrast, obstruction, fistula formation, or the presence of an associated mass lesion. CT in the current study utilized modern multidetector CT technology. For patients with recurrent diverticulitis only the first episode was included.

For all patients previously diagnosed with diverticulitis during the study period, who underwent a colonoscopy at the National Hospital of Iceland, we registered the following information: the presence of CRC, the number of polyps, their size, location, and histological type. If a patient had undergone more than one colonoscopy, then only the first one closest to the date of the diagnosis was used. Also, blood tests, such as hemoglobin, mean corpuscular volume, serum iron and iron binding capacity, white blood cells, and CRP, were registered. All patients fulfilling the criteria for uncomplicated diverticulitis during the 6-years study period were matched with the Icelandic Cancer Registry to find out if any of these patients had been diagnosed with CRC, up until at least 1 year after the colonoscopy.

Person-years at risk were counted, starting at date of uncomplicated diverticulitis diagnosis. The endpoint was date of colorectal cancer diagnosis, date of death or December 31, 2012, whichever came first. The observed numbers of cancers were stratified by 5-years birth cohorts and gender. Standardized incidence ratios (SIRs) were calculated as ratios of observed number of cancer cases to those expected from the national cancer incidence rates, by sex, age, and at the same calendar years.

This study was approved by Bioethics Committee of Iceland, Data Protection Authority of Iceland, and the Icelandic Cancer Registry.

## Statistical analysis

General data were processed in Microsoft Office Excel 2010<sup>®</sup> and IBM SPSS statistics<sup>®</sup>. STATA Statistical Software Stata 10 for Windows was used for person-year analysis. The results are presented as medians and interquartile ranges. Expected number of CRC for this cohort was identified in the Icelandic Cancer Registry and standard incidence ratio (SIR) calculated.

## Results

During the study period a total of 805 patients were found to have the diagnosis of K57.3 (Diverticular disease of large intestine without perforation or abscess). Overall, 297/807 (37%) fulfilled the predetermined clinical and radiological criteria for diverticulitis (Figure 1). In all, 15/297 (5%) of patients had complicated diverticulitis on the CT and were therefore excluded. The remaining 282 patients had uncomplicated diverticulitis and were included in the analysis (Figure 1). Eight individuals went directly to surgery without prior endoscopy. In the vast majority of patients, 234/282 (83%) a subsequent colonic examination had been performed, in most cases, colonoscopy (Table I), whereas some patients had undergone endoscopy during the previous 2 years and did not undergo further endoscopic evaluation. In 15 patients no follow-up data were available, but by search of the Icelandic Cancer Registry none of these patients had been diagnosed with CRC during the study period.

Only 2/282 (0.7%) patients diagnosed with diverticulitis were found to have CRC, including a 70-years-old woman, who went straight to surgery without previous colonoscopy, and a 71-years-old woman, who underwent colonoscopy. Both had Stage II B (T4, N0, M0) adenocarcinoma of the sigmoid colon. Both of these patients differed from the rest of the patients who all recovered clinically and were discharged from the hospital before the colonoscopy was performed. However, none of these two patients recovered, and had persistent abdominal symptoms until they were diagnosed with CRC.

Expected number of CRC for this cohort was identified in the Icelandic Cancer Registry and SIR was calculated. The expected number of cases in the study cohort was only 0.83, and therefore the SIR was  $2/0.83 = 2.40$  (0.29–8.66). Thus, the observed

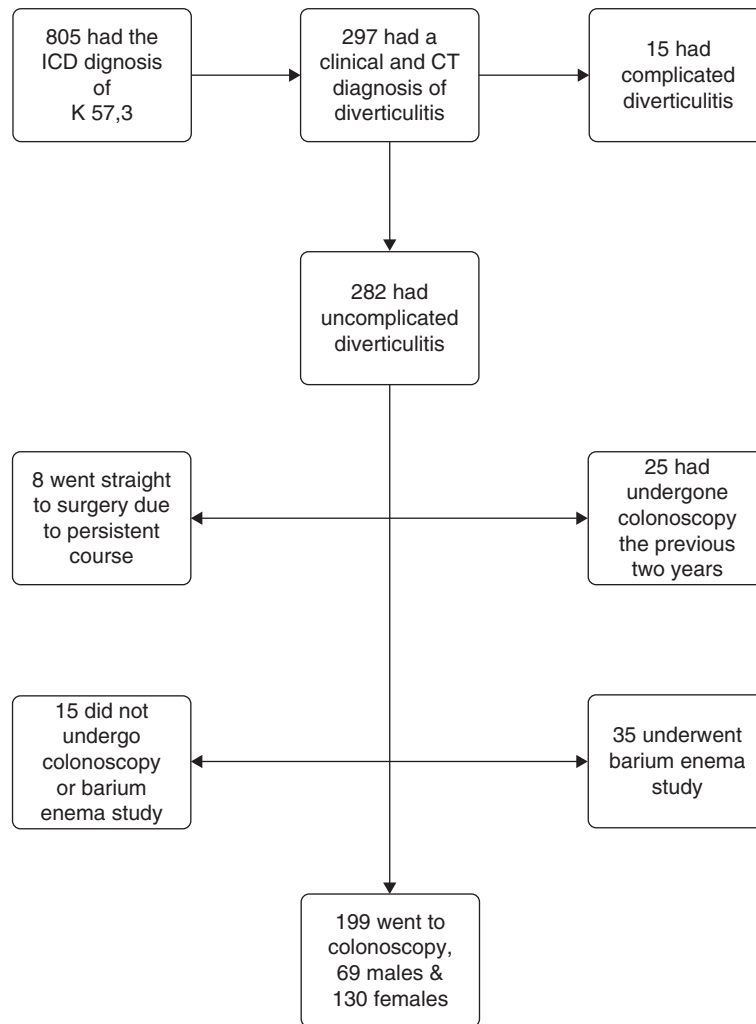


Figure 1. Patient selection.

number of CRC cases was not significantly higher than the expected CRC cases.

The number and type of polyps in those that underwent colonoscopy are listed in Table II. Two patients had macroscopic signs of inflammation; one had normal histology and the other had signs of active but mild inflammation, considered associated with diverticular disease but no signs of inflammatory bowel disease.

Table I. General information.

<i>n</i> = 199	
Male	69 (34%)
Female	130 (66%)
Median age	58 (IQR 50–67)
Full Colonoscopy	188/199 (94%)
Sigmoidoscopy	11/199 (6%)
Complete colonoscopy to cecum	181/188 (96%)

Gender, age and type of endoscopy.

During the attack of diverticulitis the median hemoglobin value was 135 (IQR 125–145) (normal values 118–165), white cell count 12 (9.6–13.8) (normal values 4–10), and CRP 73 (49–118) (normal value <10).

### Discussion

Our results do not suggest an increased incidence of CRC or number of colonic polyps in those who had

Table II. Endoscopic results.

<i>n</i> = 199	
Total	33/199 (16.6%)
Hyperplastic	19/33 (57.5%)
Adenomas	13/33 (39.4%)
Normal Histology	1/33 (3.0%)
Size >10 mm	1/33 (3.0%)

The number and types of polyps.

experienced an attack of uncomplicated diverticulitis. This is at variance with the studies behind clinical guidelines, recommending a following colonoscopy to exclude CRC [1]. The frequent use of abdominal CT nowadays enables physicians to confirm the clinical diagnosis of diverticulitis. Since diverticulitis is not considered a causal factor for CRC, the practice of performing a colonoscopy after an attack of diverticulitis is to make sure that the diagnosis was correct by excluding CRC, the main differential diagnosis. Evidence for these recommendations in the current era, where a clinical suspicion of diverticulitis is usually confirmed with a multidetector CT is limited as concluded in a recent review [11]. The authors of this systematic review concluded that insufficient data exist to support the recommendation to do a colonoscopy for all cases of diverticulitis, and a more refined criteria are needed to decide who should undergo colonoscopy [11].

The observed number of CRC cases was not significantly higher than expected from the population-based Icelandic Cancer Registry. A recent meta-analysis involving 68,324 asymptomatic individuals with a mean age of 54 years showed that the yield of colonic adenomas from colonoscopy screening of a heterogeneous population of high- and average-risk asymptomatic individuals was 19% [12]. In the present study, in patients with a radiological diagnosis of acute uncomplicated diverticulitis, 13/195 (7%) had adenomatous polyps. Therefore, the incidence of colonic polyps in our cohort is similar or even less than what might be expected in the general population.

The prognosis of patients with uncomplicated diverticulitis is generally very favorable and most patients become asymptomatic after initiation of therapy [11]. The clinical course of the two patients diagnosed with CRC followed a different course than the rest of the patients. All the other patients were asymptomatic at the time of the subsequent colonoscopy. Both of the patients subsequently diagnosed with CRC had persistent clinical course, which has been defined as having symptoms over 1 week of conventional treatment with IV antibiotics or the recurrence of symptoms within 1 month of discharge [13]. Both of these CRC patients had abdominal pain and elevated inflammatory markers until they underwent a sigmoid resection undertaken to remove their inflamed part of their colon. Most patients with this type of clinical course do not undergo colonoscopy but are considered good candidates to undergo a surgical intervention [14]. A persistent course of diverticulitis seems to increase the likelihood of having CRC as an underlying cause of the symptoms. A recent study by Lahat et al., which included 224 patients with diverticulitis, found that out of

23 patients with a prolonged course, three (13%) had CRC [15].

Two recent studies did not find an increased risk for CRC after an attack of diverticulitis [8,16]. A study from New Zealand demonstrated that out of 205 patients diagnosed with uncomplicated diverticulitis, only one (0.5%) had CRC [8], and from the Netherlands 2/307 (0.7%) patients with complicated and uncomplicated diverticulitis had CRC [16]. Both patients in the previously mentioned study had persistent pain following the diverticulitis [16]. These results are remarkably similar to the findings of the current study showing a 0.7% rate of CRC in this patient population. In another study from the Netherlands, out of 516 cases of both complicated and uncomplicated diverticulitis, eight cases (2.1%) of CRC were found [17]. Six out of those eight patients had other signs of CRC, such as rectal bleeding, significant weight loss, or persistent course of the disease [17].

In contrast to most studies of patients undergoing colonoscopy following diverticulitis, in the current study, the National Cancer Registry was searched for the evidence of CRC, information that might be missing from medical records. All patients with CRC are treated within the National University Hospital and by matching our diverticulitis patients with the Cancer Registry we are pretty certain that we have not missed any patient diagnosed with CRC within at least 1 year after the colonoscopy.

All patients undergoing endoscopy were included in this study to try to minimize the selection bias. This includes 11/195 (6%), who underwent sigmoidoscopy, and 10/184 (5%), who had incomplete colonoscopies. These incomplete results might increase the chance of underreporting number of polyps in the population. But since the Cancer Registry of Iceland was searched for the diagnosis of CRC the likelihood of underreporting the number of cancer cases is very little.

In many countries there is a gap between provision and demand for diagnostic colonoscopy [18,19]. The majority of patients diagnosed with CRC have bleeding-related symptoms and these should have a colonoscopy without delay [20–23]. Therefore, patients with greater risk of CRC need somehow to be identified as suggested in previous studies [8,11]. It is well established that patients undergoing colonoscopy because of positive fecal occult blood test results have a much higher rate of colon cancer, ranging from 6.4% to 9.4% in separate studies [22,24,25]. In a recent study, it was reported that 80–90% of unselected CRC had either bleeding-related symptoms (74%) or presented acutely with obstructive symptoms (8%) [23]. Persisting symptoms of acute diverticulitis also seem to be predictive of a high risk being due to CRC. In the study by Lahat et al., 13% of patients with persistent diverticulitis had CRC [15]. In

another study, only two cases of CRC were found in 307 patients with diverticulitis, and both had a prolonged course of the disease [16]. Our results support these findings as the only two cases of CRC in our cohort had a prolonged course of diverticulitis. Also, a complicated diverticulitis, abscess, perforation, or fistula seems to increase the risk of CRC [4]. Our results and results from other studies suggest that those in need for colonic evaluation after an attack of diverticulitis are (1) with complications on CT and (2) those who have a prolonged course of diverticulitis.

In conclusion, it does not seem necessary to perform a colonoscopy in all cases of uncomplicated diverticulitis if the patient recovers clinically. Our data suggest that a prolonged course of diverticulitis increases the odds of having CRC. These results are important in determining the need for colonoscopies in asymptomatic subjects, and together with results from other similar studies, these might decrease the work load in endoscopy units.

### Acknowledgments

Special thanks to Elínborgar Ólafsdóttur Icelandic Cancer Registry, Icelandic Cancer Society, Reykjavik, Iceland.

**Declaration of interest:** The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

### References

- [1] Stefánsson T, Ekblom A, Sparén P, Pahlman L. Increased risk of left sided colon cancer in patients with diverticular disease. *Gut* 1993;34:499–502.
- [2] Ambrosetti P, Jenny A, Becker C, Terrier TF, Morel P. Acute left colonic diverticulitis—compared performance of computed tomography and water-soluble contrast enema: prospective evaluation of 420 patients. *Dis Colon Rectum* 2000;43:1363–7.
- [3] Stefánsson T, Ekblom A, Sparén P, Pahlman L. Association between sigmoid diverticulitis and left-sided colon cancer: a nested, population-based, case control study. *Scand J Gastroenterol* 2004;39:743–7.
- [4] Lau KC, Spilbury K, Farooque Y, Kariyawasam SB, Owen RG, Wallace MH, et al. Is colonoscopy still mandatory after a CT diagnosis of left-sided diverticulitis: can colorectal cancer be confidently excluded? *Dis Colon Rectum* 2011;54:1265–70.
- [5] Meurs-Szojda MM, Terhaar sive Droste JS, Kuik DJ, Mulder CJJ, Felt-Bersma RJF. Diverticulosis and diverticulitis form no risk for polyps and colorectal neoplasia in 4,241 colonoscopies. *Int J Colorectal Dis* 2008;23:979–84.
- [6] Krones CJ, Klinge U, Butz N, Junge K, Stumpf M, Rosch R, et al. The rare epidemiologic coincidence of diverticular disease and advanced colonic neoplasia. *Int J Colorectal Dis* 2006;21:18–24.
- [7] Lam TJ, Meurs-Szojda MM, Gundlach L, Belien JAM, Meijer GA, Mulder CJ, et al. There is no increased risk for colorectal cancer and adenomas in patients with diverticulitis: a retrospective longitudinal study. *Colorectal Dis* 2010;12:1122–6.
- [8] Westwood DA, Eglinton TW, Frizelle FA. Routine colonoscopy following acute uncomplicated diverticulitis. *Br J Surg* 2011;98:1630–4.
- [9] Hulnick DH, Megibow AJ, Balthazar EJ, Naidich DP, Bosniak MA. Computed tomography in the evaluation of diverticulitis. *Radiology* 1984;152:491–5.
- [10] Doring E. Computerized tomography of colonic diverticulitis. *Crit Rev Diagn Imaging* 1992;33:421–35.
- [11] Sai VF, Velayos F, Neuhaus J, Westphalen AC. Colonoscopy after CT diagnosis of diverticulitis to exclude colon cancer: a systematic literature review. *Radiology* 2012;263:383–90.
- [12] Niv Y, Hazazi R, Levi Z, Fraser G. Screening colonoscopy for colorectal cancer in asymptomatic people: a meta-analysis. *Dig Dis Sci* 2008;53:3049–54.
- [13] Lahat A, Yanai H, Menachem Y, Avidan B, Bar-Meir S. The feasibility and risk of early colonoscopy in acute diverticulitis: a prospective controlled study. *Endoscopy* 2007;39:521–4.
- [14] Kourtesis GJ, Williams RA, Wilson SE. Surgical options in acute diverticulitis: value of sigmoid resection in dealing with the septic focus. *Aust N Z J Surg* 1988;58:955–9.
- [15] Lahat A, Yanai H, Sakhnini E, Menachem Y, Bar-Meir S. Role of colonoscopy in patients with persistent acute diverticulitis. *World J Gastroenterol* 2008;14:2763–6.
- [16] Van de Wall BJM, Reuling EMBP, Consten ECJ, van Grinsven JHJ, Schwartz MP, Broeders IAMJ, et al. Endoscopic evaluation of the colon after an episode of diverticulitis: a call for a more selective approach. *Int J Colorectal Dis* 2012;27:1145–50.
- [17] Schout PJC, Spillenaar Bilgen EJ, Groenen MJM. Routine screening for colon cancer after conservative treatment of diverticulitis. *Dig Surg* 2012;29:408–11.
- [18] Parry S, Richardson A, Green T, Marshall B, Bisset I, Bloomfield A, et al. Prospects for population colorectal cancer screening in New Zealand. *N Z Med J* 2007;120:U2633.
- [19] Bowles CJA, Leicester R, Romaya C, Swarbrick E, Williams CB, Epstein O. A prospective study of colonoscopy practice in the UK today: are we adequately prepared for national colorectal cancer screening tomorrow? *Gut* 2004;53:277–83.
- [20] Thompson MR, Perera R, Senapati A, Dodds S. Predictive value of common symptom combinations in diagnosing colorectal cancer. *Br J Surg* 2007;94:1260–5.
- [21] Lasson A, Kilander A, Stotzer P-O. Diagnostic yield of colonoscopy based on symptoms. *Scand J Gastroenterol* 2008;43:356–62.
- [22] Morikawa T, Kato J, Yamaji Y, Wada R, Mitsushima T, Shiratori Y. A comparison of the immunochemical fecal occult blood test and total colonoscopy in the asymptomatic population. *Gastroenterology* 2005;129:422–8.
- [23] Hreinsson JP, Jonasson JG, Björnsson E. Bleeding-related symptoms in colorectal cancer: a 4-year nationwide population-based study. *Aliment Pharmacol Ther* 2013;39:77–84.
- [24] Paimela H, Malila N, Palva T, Hakulinen T, Vertio H, Järvinen H. Early detection of colorectal cancer with faecal occult blood test screening. *Br J Surg* 2010;97:1567–71.
- [25] Van Rossum LG, van Rijn AF, Laheij RJ, van Oijen MG, Fockens P, van Krieken HH, et al. Random comparison of guaiac and immunochemical fecal occult blood tests for colorectal cancer in a screening population. *Gastroenterology* 2008;135:82–90.