Digestive and Liver Disease xxx (2018) xxx–xxx

Contents lists available at ScienceDirect

Digestive and Liver Disease

journal homepage: www.elsevier.com/locate/dld

Digestive Endoscopy

Number of advanced adenomas on index colonoscopy: Important risk factor for metachronous advanced colorectal neoplasia

Soo-Kyung Park, Hyo-Joon Yang, Yoon Suk Jung, Jung Ho Park, Chong Il Sohn, Dong Il Park*

Division of Gastroenterology, Department of Internal Medicine and Gastrointestinal Cancer Center, Kangbuk Samsung Hospital, Sungkyunkwan University School of Medicine, Seoul, Republic of Korea

ARTICLE INFO

Article history:
Received 10 October 2017
Received in revised form 28 February 2018
Accepted 1 March 2018
Available online xxx

Keywords:
Adenoma
Cancer
Colon polypectomy
Surveillance

ABSTRACT

Background/Aims: Although the patients with multiple advanced adenomas (AA) in index colonoscopy may have an increased risk for subsequent advanced colorectal neoplasia (CRN), the current guidelines do not consider this factor. We aimed to compare the risk of metachronous advanced CRN according to the number of AAs.
Methods: A total of 2250 patients with ≥1 adenoma at index colonoscopy were included. The patients were divided according to the number of AAs (1, 2 and ≥3 AAs). The relative and 3-year absolute risk of metachronous advanced CRN was compared between the AA groups.
Results: The relative risk of metachronous advanced CRN was higher in the patients with ≥3 AAs than in the patients with one AA (16.7% vs. 6.8%, p = 0.004). The 3-year absolute risk of metachronous advanced CRN was higher in the patients with ≥3 AAs than in the patients with 1–2 AA (19.4% vs. 6.9%, p = 0.04). Having ≥3 AAs (odds ratio, 5.42; 95% confidence interval 1.75–16.83) was a significant risk factor for developing advanced CRN.
Conclusions: The risk of metachronous advanced CRN in the patients with ≥3 AAs was higher than that in the patients with one or two AAs. More intensive surveillances might be needed for these patient groups.

1. Introduction

Colorectal cancer (CRC) is the third most common cancer in western countries [1], and the prevalence of CRC is rapidly increasing in Asian countries [2]. Colonoscopic screening with polypectomy is an effective strategy to reduce the incidence and mortality of CRC [3,4]. After the removal of colorectal neoplasms (CRNs, adenomas or CRCs) via polypectomies, colonoscopy surveillance has been recommended for the increased risk of metachronous CRN during follow-up [5–7].

The current guidelines recommend surveillance intervals based on the findings of index colonoscopy [5–7]. Advanced adenoma (AA; adenomas ≥1 cm in diameter, villous component, and/or high-grade dysplasia [HGD]) on index colonoscopy is a well-known risk factor for metachronous advanced CRN [8–11]. Thus, a consensus by the United States Multi-Society Task Force on Colorectal Cancer [5] recommended surveillance at 3 years in patients with AA, and guidelines of the British Society of Gastroenterology [7] recommended a 1-year surveillance interval in patients, who have 3 adenomas with at least one ≥10 mm, and 3-year surveillance interval who have 1–2 adenomas with at least one ≥10 mm. Along with AA, the number of adenomas is also considered in the risk stratification for surveillance interval [5,7]. However, the current guidelines do not consider the number of AAs or the number of AA characteristics. One AA could have ≥2 characteristics (e.g., larger than 1 cm and with a villous component), and patients with multiple AAs or multiple AA characteristics may have an increased risk for subsequent advanced CRNs compared with those with only one of them. To date, only a few studies have investigated the effect of the number of AAs or number of AA characteristics on the incidence of metachronous advanced CRNs [12,13]. Thus, we aimed to compare the risk of metachronous advanced CRN according to the number of AAs or number of AA characteristics.

* Corresponding author at: Division of Gastroenterology, Department of Internal Medicine and Gastrointestinal Cancer, Kangbuk Samsung Hospital, Sungkyunkwan University School of Medicine, 29 Saemunan–ro, Jongno–gu, Seoul 03181, Republic of Korea.
E-mail address: diksmc.park@samsung.com (D.I. Park).

https://doi.org/10.1016/j.dld.2018.03.001
1590-8658/

2. Methods

2.1. Study population

This retrospective, single-center cohort study included patients who underwent ≥1 polypectomy between January 2009 and December 2012 and had undergone a follow-up colonoscopy at an interval of ≥1 year until December 2016. All colonoscopies with polypectomies were performed using a high-definition colonoscopy (CF-H260AL and CF-H290AL colonoscope, EVIS Lucera Spectrum System, and OEV-191H HDTV monitor; Olympus Optical, Tokyo, Japan) by six colonoscopists (experience of ≥2 years), and the median adenoma detection rate (ADR) was 35.0 (range, 31.5–44.0).

We excluded patients who had undergone a follow-up colonoscopy only within 1 year after the index colonoscopy. If patients underwent follow-up colonoscopy both within 1 year and 1 or more years after the index colonoscopy, they were enrolled in our study. In these cases, outcomes of index colonoscopy and follow-up colonoscopy within 1 year were summed and regarded as findings of index colonoscopy, to avoid confusing new CRNs with lesions that had only been missed on the initial colonoscopy, and enroll the cases where the polyps have been completely removed at the index colonoscopy. In addition, patients were excluded if they had an CRC in the submucosal layer or deeper invasion, inflammatory bowel disease, polyposis syndrome (e.g., familial adenomatous polyposis, juvenile polyposis, Peutz-Jeghers syndrome, or Cowden syndrome), incomplete colonoscopy (did not reach the cecum), inadequate bowel preparation (according to the Boston bowel preparation scale [BBPS], with <2 segment BBPS score or a total BBPS score of <6), or had undergone surgical resection of the intestines.

According to the findings of index colonoscopy, the patients were divided on the basis of the number of AAs. In addition, as one AA could have more than 1 characteristics among 3 characteristics (larger than 1 cm, villous component or HGD), the subgroup analysis was performed in accordance with the number of AA characteristics. For example, if a patient had one AA, which was larger than 1 cm and had a villous component, the number of AAs was counted as one and the number of AA characteristics as two. This study was approved by the institutional review board of Kangbuk Samsung Hospital (Date of approval Dec/1/2014, IRB number 2014-11-001).

2.2. Data collection and outcome measurement

The patient-, procedure-, and polyp-related data obtained from the colonoscopy cohort of Kangbuk Samsung Hospital were analyzed retrospectively. We have maintained the colonoscopy cohort since 2000 using the electronic medical record-based system. All colonoscopy procedures were entered with the following details: performing endoscopist, age, sex, and polyp findings, including its size and location; more detailed data have been recorded in this database since 2012. The baseline patient demographic and clinical information, including sex, body mass index (BMI), family history of CRC, indication of colonoscopy (any gastrointestinal symptoms, screening, polyp, polyposis, cancer, anemia, positive fecal occult blood test finding, positive tumor marker, etc.), history of operation, history of aspirin or anticoagulation use, and smoking history have also been recorded in this database. Smoking status was categorized as follows: never, former, and current, and the family history of CRC was defined as CRC in ≥1 first-degree relative at any age. For the medication history, regular use (at least twice a week) of aspirin or anticoagulants during the preceding 12 months was assessed. For the procedure-related factors, the total and insertion durations to reach the cecum and bowel preparation have been recorded. Bowel preparation was assessed using the BBPS.

For the polyp-related factors, information on the number, size, and location has been recorded. The polyp size was measured by the endoscopists during colonoscopy, and the locations of the adenomas were classified as follows: right side (cecum, ascending colon, hepatic flexure, and transverse colon), left side (splenic flexure, descending colon, sigmoid, and rectum), or both. Information on the polyp histology was collected from the pathologic results. Three expert pathologists reviewed the histological characteristics of the polyps, and intramucosal carcinoma or carcinoma in situ was considered indicative of HGD. Hyperplastic or inflammatory polyps were considered normal findings, and serrated adenomas (sessile or traditional serrated adenoma) were considered adenomas.

The clinical outcomes were based on the relative and absolute risks of metachronous advanced CRN on the surveillance colonoscopies. Advanced CRN was defined as metachronous CRC or metachronous AA. For the outcome measurements, we analyzed all surveillance examinations if the patients underwent multiple colonoscopies. If these eligible patients underwent multiple follow-up colonoscopies after the index colonoscopy, the timing of the follow-up colonoscopy was considered as the latest study to evaluate relative risk of overall and advanced CRN. To evaluate absolute risk of advanced CRN, the timing of the follow-up colonoscopy was considered as the first advanced CRN detection.

2.3. Statistical analysis

Continuous variables were expressed as means ± standard deviations and discrete data as numbers and percentages. The differences in the baseline characteristics on the index colonoscopy and findings of the surveillance colonoscopy including relative risk of metachronous advanced CRN were compared using the chi-square test for categorical variables and the analysis of variance test for continuous variables. The absolute risk of metachronous advanced CRN was calculated using the Kaplan-Meier method. In the Kaplan-Meier method, the overall risk was compared in accordance with the baseline AA grouping using the log-rank test, and the significance of the 3-year absolute risk difference was assessed using the Z-test. We used the Cox proportional hazard model after adjusting for potentially confounding variables (age, sex, family history of CRC, obesity, smoking status, and aspirin use) to assess the risk factors of advanced CRN. Correlations between potential predictors and outcomes of interest were estimated using odds ratios (ORs) with 95% confidence intervals (CIs). A p-value of <0.05 was considered statistically significant. All statistical analyses were performed using the Statistical Package for Social Sciences Version 18.0 software for Windows (SPSS Inc.).

3. Results

3.1. Baseline characteristics of the patients

A total of 4468 patients underwent colonoscopic polypectomy between January 2009 and December 2012 and had undergone a follow-up colonoscopy until December 2016 at our center. According to the pathologic reports, 1463 patients with non-adenomatous polyp, 356 patients with synchronous CRC, and 6 patients with inadequate pathologic reports were excluded. In addition, 296 patients were excluded because they had inflammatory bowel disease (n = 40), polyposis syndrome (n = 5), history of bowel resection (n = 79), and follow-up colonoscopy only at <1 year (n = 172). To consider the quality of colonoscopy, 90 patients with an inadequate bowel preparation and 7 patients with incomplete examinations

Please cite this article in press as: Park S-K, et al. Number of advanced adenomas on index colonoscopy: Important risk factor for metachronous advanced colorectal neoplasia. Dig Liver Dis (2018), https://doi.org/10.1016/j.dld.2018.03.001