Original Article

Hypertension is an important predictor of recurrent colorectal adenoma after screening colonoscopy with adenoma polypectomy

Chung-Chi Lin [a,b,d,f], Kuang-Wei Huang [a,b,e], Jiing-Chyuan Luo [a,b,*], Ying-Wen Wang [a,b,f], Ming-Chih Hou [a,b,f], Han-Chieh Lin [a,b], Fa-Yauh Lee [a,b], Wan-Leong Chan [a,c,f]

[a] Department of Medicine, National Yang-Ming University School of Medicine, Taipei, Taiwan, ROC
[b] Division of Gastroenterology, Department of Medicine, Taipei Veterans General Hospital, Taipei, Taiwan, ROC
[c] Division of Cardiology, Department of Medicine, Taipei Veterans General Hospital, Taipei, Taiwan, ROC
[d] Department of Medicine, Taipei Municipal Gan-Dau Hospital, Taipei, Taiwan, ROC
[e] Shuang-Ho Hospital and Taipei Medical University, Taipei, Taiwan, ROC
[f] Healthcare and Management Center, Taipei Veterans General Hospital, Taipei, Taiwan, ROC

Abstract

Background: The predictors of recurrent colorectal adenoma have not been fully examined. This study aimed to evaluate the predictors of recurrent colorectal adenoma after initial screening colonoscopy with adenoma polypectomy.

Methods: A retrospective cohort study was conducted at the Taipei Veterans General Hospital from 2003 to 2011. After screening, 356 patients who had undergone two consecutive colonoscopies with colorectal adenoma polypectomy at the initial colonoscopy were enrolled. The recurrence group was patients with recurrent colorectal adenoma at the second colonoscopy, whereas the nonrecurrence group was patients without recurrence. Anthropometric data, biochemical tests, metabolic comorbidities, and adenoma characteristics at initial colonoscopy were compared between the two groups. Cox proportional hazard regression analysis was conducted to identify the predictors of recurrent colorectal adenoma.

Results: During a mean follow-up interval of 3.07 ± 1.42 years, 94 patients (26.4%) were in the recurrence group, 262 patients (73.6%) were in the nonrecurrence group. The recurrence group was older, had a wider waist circumference, higher levels of serum alanine aminotransferase (ALT) and triglyceride, a higher prevalence of smoking, nonalcoholic fatty liver disease, metabolic syndrome, and hypertension, and a higher occurrence of initial multiply-located adenomas when compared with the nonrecurrence group ($p < 0.05$). Cox regression analysis showed that hypertension, smoking, higher ALT level (>40 IU/mL), and multiply-located adenomas were independent predictors for recurrent colorectal adenoma. The risk of recurrent adenoma increased when hypertension was combined with smoking, high ALT level, or multiply-located adenomas.

Conclusion: Hypertension is an important predictor for recurrent colorectal adenoma after screening colonoscopy with polypectomy.
Copyright © 2014 Elsevier Taiwan LLC and the Chinese Medical Association. All rights reserved.

Keywords: hypertension; metabolic syndrome; recurrent colorectal adenoma; smoking

1. Introduction

Colorectal cancer (CRC) is one of the most common malignancies in the world. Although CRC's mortality in the West is declining, it appears to have a rapidly rising trend in Asia among both males and females.[1] According to a report by the Bureau of Health Promotion in Taiwan, CRC is the most common cancer in Taiwan, with an age-standardized incidence

rate of 37.6 per 100,000 people in 2008. It also has the second highest total lifetime health expenditure among all malignancies because of its high incidence rate.[2,3] Based on the concept of the adenoma-carcinoma sequence, colorectal adenoma is considered a precursor of CRC. It has been believed that screening for CRC can reduce mortality and morbidity by detecting cancer at an earlier, curable stage and by removing colorectal adenomas.[4–6] Colonoscopic removal of colorectal adenomas not only decreases incidence of CRC but also significantly reduces the risk of death from CRC, as compared with that in the general population.[4,7] Therefore, several guidelines and consensus were established for clinical CRC screening and surveillance according to different stratified risks.[1,6,8] Current evidence supports the concept that patients who are obese, particularly those with abdominal obesity,[9] diabetes mellitus, or metabolic syndrome, are linked to insulin resistance, which plays an important role in development of CRC.[10–12] Similarly, colorectal adenoma has been closely associated with obesity, diabetes mellitus, metabolic syndrome, and insulin resistance in several studies.[13–15] The identification of risk patients has become important after colonoscopy screening in the general population and before surveillance in patients in whom adenoma has been previously detected. The current study attempted to clarify the predictors of recurrent adenoma after initial screening colonoscopy with adenoma polypectomy.

2. Methods

2.1. Patients

Asymptomatic patients who received two consecutive self-paid health check-ups and colonoscopies with colorectal adenoma polypectomy at first colonoscopy at Taipei Veterans General Hospital, Taipei, Taiwan between January 1, 2003 and December 31, 2010 were enrolled. There were 2255 patients who received two consecutive check-up colonoscopies, and there were 446 with colorectal adenoma polypectomy at first colonoscopy. After excluding patients with a history of CRC, inflammatory bowel disease, nonadenomatous polyp, and long-term use of aspirin or nonsteroidal anti-inflammatory drugs, 356 eligible patients were enrolled. This study complied with the standards of the Declaration of Helsinki and current ethical guidelines. The hospital's Institutional Review Board approved the study (#2011-08-010IC).

2.2. Anthropometric and laboratory measurements

Detailed chart review including smoking, alcohol consumption, and medical and family history, were recorded. Anthropometric measurements (i.e., body height, body weight, waist circumference, and blood pressure) were taken by experienced nursing staff. Waist circumference was measured based on the modified National Cholesterol Education Program Adult Treatment Panel III (NCEP ATP III) definition.[16,17] The body mass index (BMI) was calculated as weight (kg) divided by height (m) squared (kg/m^2). Laboratory data

including sugar, alanine aminotransferase (ALT), gamma-glutamyltransferase (GGT), total cholesterol, low-density lipoprotein (LDL) cholesterol, high-density lipoprotein (HDL) cholesterol, and triglyceride were checked. Metabolic syndrome was diagnosed if three or more of the following criteria were met: (1) abdominal obesity, waist circumference ≥90 cm in males and ≥80 cm in females; (2) high blood pressure, ≥130 mmHg systolic, ≥85 mmHg diastolic, or current medication for hypertension; (3) high serum fasting glucose, ≥100 mg/dL or current use of antidiabetic therapy; (4) low HDL cholesterol level, <40 mg/dL in males and <50 mg/dL in females; and (5) hypertriglyceridemia ≥150 mg/dL. Hypertension was diagnosed as systolic blood pressure ≥140 mmHg, or diastolic blood pressure ≥90 mmHg[18] or patients with hypertension and under antihypertension medication. Liver ultrasound examinations were performed using the Philips HD15 ultrasound system machine (Royal Philips Electronics, North Andover, MA, USA) by experienced radiologists. "Fatty liver" was considered if the contrast between the liver and parenchyma of the right kidney was increased, whereas nonalcoholic fatty liver disease (NAFLD) was diagnosed as the presence of fatty liver without viral (hepatitis B or hepatitis C), autoimmune or other liver diseases, or heavy alcohol consumption (>20 g/day).[3] All anthropometric and laboratory data, metabolic comorbidities, and the findings of screening colonoscopy were taken at the time of the first health check-up.

2.3. Colonoscopy

Colonoscopy was performed by experienced gastroenterologists and colorectal surgeons. The withdrawal time of colonoscopy was at least 6 minutes to minimize any chance of missing lesions. Detailed colonoscopy findings, including polyp size, number, and location and procedure of polypectomy were recorded. A lesion above the splenic flexure was defined as proximal and one in the left colon including the sigmoid and rectum was defined as distal adenoma.[3] Advanced adenoma was defined as adenoma size >10 mm, with villous or tubule-villous architecture, or with high-grade dysplasia.[3] Multiply-located adenomas was defined as at least two adenomas located at different sites (including ascending colon, transverse colon, descending colon, and sigmoid/rectum). Experienced pathologists confirmed the diagnosis of adenoma by histological examination after colonoscopic polypectomy. Among the 356 eligible patients, 94 patients were classified into the recurrence group (adenoma detected at the second colonoscopy after initial screening colonoscopy with adenoma polypectomy), whereas 262 patients were classified into the nonrecurrence group (absence of adenoma at the second colonoscopy after initial screening colonoscopy with adenoma polypectomy). The adenoma detection rate was 19.8% for the first-time colonoscopy and 26.4% for the second-time colonoscopy.

2.4. Statistical analysis

All statistical analyses were performed using SPSS software (version 17.0; SPSS Inc., Chicago, IL, USA). Demographic data