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Nutrition Research 25 (2005) 805–813

NUTRITION RESEARCH

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Research Articles

Relationship of nutrients and food to colorectal cancer risk in Koreans

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Received 30 June 2005; revised 24 August 2005; accepted 29 August 2005

Abstract

To elucidate possible associations between dietary factors and colorectal cancer in the context of the Korean diet, a case-control study was conducted in Seoul, Korea. Cases (n = 136) were patients either newly diagnosed with colorectal cancer or with large bowl adenomatous polyps. Control patients (n = 134) included those with no history of cancer and conditions potentially unrelated to nutritional status and digestive tract diseases from the same hospitals. Intakes of nutrients and food groups were assessed by a semiquantitative food frequency questionnaire and analyzed by the logistic regression model adjusted for possible confounding variables. Significant trends of decreasing risk of colorectal cancer emerged with more frequent intakes of vitamin A (odds ratio [OR] = 0.32, 95% confidence interval [CI] = 0.15-0.65 for the highest tertile), β-carotene (OR = 0.25, 95% CI = 0.12-0.52), and vitamin C (OR = 0.29, 95% CI = 0.14-0.61). The protective associations were also observed for calcium (OR = 0.43, 95% CI = 0.21-0.86) and fiber (OR = 0.51, 95% CI = 0.25-1.05). Energy consumption was associated with an increased risk in the highest tertile of consumption (OR = 2.04, 95% CI = 1.01-4.12). The highest tertiles of rice, cake, and fish intakes were related to higher colorectal cancer risk (OR = 3.12, 95% CI = 1.41-6.91; OR = 2.39, 95% CI = 1.13-5.03; OR = 2.52, 95% CI = 1.21-5.26, respectively). Inverse associations of risk were found for milk (OR = 0.29, 95% CI = 0.15-0.58), kimchi (OR = 0.41, 95% CI = 0.20-0.84), vegetable (OR = 0.34, 95% CI = 0.16-0.71), and fruit (OR = 0.49, 95% CI = 0.24-1.02) intakes. This study further supports the protective effects of antioxidant

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0271-5317/$ – see front matter
doi:10.1016/j.nutres.2005.08.007

vitamins and calcium associated with vegetable and milk consumptions and confirms a relevant role of dietary intake against colorectal cancer risk for Koreans.

Keywords: Colorectal cancer; Calcium; Fiber; β-carotene; Vitamin A; Vitamin C; Koreans

1. Introduction

Colorectal cancer is the fourth leading cause of malignancy in Korea, an estimated 11,986 cases were diagnosed in 2002 [1]. Colorectal cancer is the fastest growing cancer in Korea, showing a 200% increase in registered malignancies during the last 15 years [1]. Moreover, the average age of onset of colorectal cancer was reported to be 10 years younger in Korea as compared with Western countries [2].

Diet has been well known to play a major role in the development of colorectal cancer. Diet has been thought to account for as many as 90% of colon cancer deaths in the United States [3]. Dietary factors related to colorectal cancer risk include low intakes of fruit and vegetables, calcium, and antioxidant vitamins, as well as high intakes of animal fat and sugar. However, conflicting findings among studies are not unusual [4-6]. The continuing controversy regarding the effect of diet in colorectal cancer appears to be linked to the design of the studies because findings in case-control studies and those in cohort studies have not provided consistent results [4,7]. Furthermore, culturally specific dietary patterns are likely to play a role. Most studies on the role of diet in colorectal cancer were conducted on Western populations, yet this issue has not been fully investigated for Koreans whose dietary patterns are quite unique.

The fast-growing incidence of colorectal cancer in Korea is thought to be closely associated with a rapid shift of dietary structure during the last 20 years. The major dietary change includes a substantial increase in consumption of animal food products and a fall in cereal intake. Fat-derived energy intake increased from 13.7% in 1985 to 19.5% in 2001; daily cereal intake dropped from 384 to 310 g in the same period [8]. However, fat intake is still lower in Koreans than in many other Asian countries and most Western countries. Vegetable intake fluctuated over the same period, but overall consumption changed little. The per capita vegetable intake level (>280 g) is still among the highest in Asia [9,10]. Therefore, it is plausible to assume that the unique aspects of the diet transition in Korea might show a distinct pattern of association of diet with colorectal cancer risk. We conducted a case-control study to determine the role of diet at the food and nutrient levels associated with colorectal cancer risk in Koreans.

2. Methods and materials

2.1. Participants

Cases in the present study included Korean adults either with histologically diagnosed colorectal cancer (ICD-9:153 and 154) within the previous 6 months before interview or with large bowl adenomatous polyps, which are well-established precursor lesions for colorectal cancers, during a colonoscopy procedure within the same period. Cases were recruited from three university-affiliated hospitals in Seoul, Korea. Controls were those (1) admitted either to