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ORIGINAL ARTICLE

Subclinical hypothyroidism as an independent risk factor for colorectal neoplasm[☆]



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Summary

Background and objective: Recently, the prevalence of colorectal neoplasm is increasing sharply. It has been reported that both colorectal neoplasm and cardiovascular disease share similar common risk factors. Subclinical hypothyroidism (SCH) occurs in 4–20% of the adult population and is an independent risk factor for cardiovascular disease. However, no study has yet explored the relationship between SCH and colorectal neoplasm. Our objectives were to clarify the association between the two conditions.

Methods: This is a case-control study. A total of 273 cases of colorectal neoplasm were first identified, and a 1:3 matched random sample of 819 controls was then collected using strata according to age, and gender. The medical records of all these patients were retrieved. Blood pressure, body mass index, and thyroid function were determined. Colonoscopies were performed by experienced gastroenterologists. A logistic regression analysis was carried out to explore the relationship between SCH and colorectal neoplasm.

Results: Remarkably, the prevalence rate of SCH was significantly higher in colorectal neoplasm (+) group, compared with colorectal neoplasm (–) group ($P < 0.01$). Colorectal neoplasm was found in 67 (34.9%) subjects in SCH group, which was more than that in euthyroid group ($P = 0.002$). Moreover, patients with SCH were more likely to have advanced colonic lesion

[☆] This study was carried out in Weihai Hospital affiliated to Medical School of Qingdao University, Weihai, China.

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and colorectal cancer compared with euthyroid subjects ($P=0.028$ and 0.036 , respectively). After adjusting for the factors of blood pressure, body mass index, history of hypertension and smoking, an association still existed between colorectal neoplasm and SCH (OR = 1.689, 95% CI: 1.207–2.362, $P=0.002$).

Conclusion: A strong association between SCH and colorectal neoplasm was firstly identified. SCH was found to be an independent risk factor for colorectal neoplasm.

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Introduction

Following rapid economic growth, an increase in life expectancy, and changes in lifestyle, the prevalence of colorectal neoplasm is increasing sharply in a number of Asian countries [1,2]. Colorectal cancers, mostly arising from colorectal neoplasm, currently are among the leading cause of deaths [3]. The 5-year survival rate is 90% when the cancer is diagnosed at a localized stage; however, only 39% of cases are diagnosed early [4]. Thus, the identification of risk factors for colorectal neoplasm is helpful for screening purposes, modifying risks and preventing colorectal cancer.

It has been reported that both colorectal neoplasm and cardiovascular disease share similar common risk factors: such as diabetes mellitus; smoking; hyperlipidemia; sedentary lifestyle; high-fat, low-fiber diet; visceral obesity; and hypertension [5–10].

Subclinical hypothyroidism (SCH), defined by an elevation of serum thyroid-stimulating hormone (TSH) concentration and normal serum free thyroxine (FT4) concentration, is an independent risk factor for cardiovascular disease [11,12]. SCH occurs in 4–20% of the adult population and the prevalence increases with age which has reached epidemic proportions and aroused continuing interest [13]. It is reported that SCH can lead to a poor lipid profile and cardiac dysfunction [14–16]. Furthermore, SCH is associated with many metabolic disorders, such as weight gain, insulin resistance, and metabolic syndrome [17,18].

Therefore, we hypothesized that SCH might also be associated with colorectal neoplasm development. However, no study has as yet explored the relationship between SCH and colorectal neoplasm. Consequently, we performed the current case-control study to clarify the association between the two conditions. Our results may have important implications in prevention and the screening strategy of colorectal cancer.

Subjects and methods

The local ethics committee approved the retrospective review of the participants' medical records and licensed the records for research purposes only.

Subjects

This is a cross-sectional case-control study and the data were retrospectively reviewed. All subjects recruited in our study

are from the individuals who received colonoscopy examinations in the outpatient department of Gastroenterology from Weihai hospital affiliated to Qingdao University between April 2008 and December 2012. The indications for the recruited colonoscopies were abdominal pain, altered bowel habit, iron deficiency anemia, constipation, diarrhea, inflammatory bowel disease, melena, positive fecal occult blood and per rectal bleeding. Subjects aged between 40 and 70 years were included. The following exclusion criteria were applied:

- age > 70 years or < 40 years;
- a history of colorectal disease, such as colorectal adenomatous polyps, cancer, and bowel resection;
- history of myocardial infarction or revascularization;
- hypothalamus and/or pituitary gland diseases, diabetes mellitus or other endocrine diseases.

Ultimately, 273 cases of colorectal neoplasm were first identified, and a 1:3 matched random sample of 819 controls was then collected using strata according to age, and gender. The medical records of all these patients were retrieved.

A standard questionnaire was administered by trained staff to obtain information on medication and a history of previous medical or surgical diseases. The blood pressure (BP) values were presented as the mean of two measures taken in the sitting position according to a standardized protocol. Patients were classified as having hypertension if their baseline blood pressure was 140/90 mmHg or higher, or they had a recorded diagnosis of hypertension, or they received repeat prescriptions (at least two monthly packs) for blood pressure-lowering drugs. Body weight and height were measured with the use of standard methods, as described previously.

Laboratory analysis

Blood samples were collected from all of the participants between 8:00 A.M. and 10:00 A.M. after a minimum of a 10-h fast. Chemiluminescent procedures (Cobas E610; Roche, Basel, Switzerland) were employed to determine the thyroid function of the patients, TSH, free triiodothyronine (FT3), FT4. The laboratory reference ranges were 0.27–4.2 mIU/L for TSH, 3.1–6.8 pmol/L for FT3, and 12–22 pmol/L for FT4. Subclinical hypothyroidism was classified as a TSH level above 4.2 mIU/L and FT3 and FT4 levels in the reference ranges.

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