



The Combination of Ct Colonography and Abc Classification was Developed as A Screening Tool

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ABSTRACT

CT colonography is effective for the detection of colorectal neoplasia. The combination of serum *Helicobacter pylori* antibody and pepsinogen levels may provide a good predictive marker for the development of gastric cancer. Both of these methods are less costly than optical endoscopy and suitable for the health check of a large general population. We developed a screening system using CT colonography and serological tests for *Helicobacter pylori* and pepsinogen. 39 individuals were enrolled (male, 16; female, 23; mean age, 64.5 years), where no malignant lesions were observed. Colorectal polyps measuring 6-mm or larger were demonstrated by CT colonography in 6 cases (15.4%, 6/39) and high risk group of gastric cancer comprised 25% (9/36). The screening systems of CTC combined with serological tests are much simpler and less invasive than those using endoscopy and might be useful to reduce the mortality related with gastric and colorectal cancer.

KEYWORDS

CT colonography; ABC classification system; colorectal cancer; gastric cancer

Introduction

Helicobacter pylori (HP) infection is deeply associated with atrophic gastritis and gastric cancer (1). The combination of serum HP antibody and pepsinogen (PG) level has been reported to provide a good predictive marker for the development of gastric cancer (2). Since ABC classification system by these serological markers is simpler and less invasive than endoscopy, this modality can be suitable for the health check program (3). In addition, CT colonography (CTC) has become an effective tool for colorectal cancer screening because of the recent progress of bowel preparations and mechanical insufflation technique (4, 5). Gastric cancer is the most common in Japan, while colorectal cancer is the second. In order to reduce the cancer-related mortality, we developed a screening system of combined usage of CTC with serological markers.

Methods

A clinical study of CTC using automated CO₂ delivery system (PROTOCO2L; E-Z-Em) and three-dimensional computed analysis (Ziostation2) was conducted to examine its safety and effectiveness for 40 healthy volunteers without any heart disease. The protocol for CTC screening was approved by the ethical committee of Nagoya Memorial Hospital. There were neither adverse effects nor complications in performing CTC and detection rate of 6-mm or larger-sized polyps were satisfactory (4/40; 10.0%). We then combined CTC method with the serological test for HP and PG, aiming at the check-up of the gastrointestinal cancer.

Results

39 individuals were enrolled in this screening test during these 20 months (male, 16; female, 23; mean age, 64.5 years). ABC classification of these participants was described in Table 1 and three individuals were excluded due to total gastrectomy. Group A comprised 63.8% (23/36), including 14 pseudo A, while Group C and D contained 6 and 3 (9/36; 25%), respectively. Since group C and D are regarded as a high risk group of gastric cancer, all of whom subsequently underwent endoscopy, showing no evidence of gastric cancer. Colorectal polyps measuring 6-mm or larger were demonstrated by CTC

in 6 cases (15.4%, 6/39), which is not essentially different from the results of our previous clinical study (Table 2). They were eventually endoscopically resected and diagnosed as adenoma with different degree of dysplasia. None of them contained the components of colorectal cancer. CTC was also useful in detecting the extracolonic lesions; ovarian tumor, 1; myoma uteri, 4; adrenal gland tumor, 1; renal cyst, 6; liver cyst, 4; gallbladder stone, 5 were found in this series. Ovarian tumor was consequently surgically resected, whose pathological diagnosis was teratoma.

Discussion

This screening system may provide cost-effectiveness for detecting the neoplasia in the gastrointestinal tract. Since the serological tests clarify the high risk group of gastric cancer according to the status of PG and anti HP, we can define the population requiring the close endoscopic follow up. However, pseudo A group with atrophic mucosa should be paid attention in ABC classification. In our series, 14 individuals out of group A (14/23) were classified as pseudo A, when the criteria of either PG II level > 12 ng/mL or PG I/II ratio < 4.4 was applied. Eradication of HP may be easily recommended to healthy asymptomatic individuals, because HP has been established as a definite carcinogen for gastric cancer. In fact, seven participants successfully received eradication therapy based on this results of HP status.

CTC showed that positive rate for 6-mm or larger-sized polyps was 10.0-15.4%, which is compatible with the previous reports (5, 6). Approximately 90% of subjects who underwent CTC were not referred for subsequent optical colonoscopy, which implies that CTC should decrease the number of patients who undergo optical colonoscopy. CTC is also useful in screening for extracolonic lesions such as gynecological tumors.

Conclusion: The screening systems of CTC combined with serological tests are much simpler and less invasive than those using endoscopy. These characteristics might enhance the feasibility of screening test, which can reduce the mortality related

with gastric and colorectal cancer.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

KI wrote the manuscript. KI and RF interpreted the radiologic examination findings. KN and AY performed the computed analyses. All authors read and approved the final manuscript.

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Table 1. ABC classification determined by serum *Helicobacter pylori* (HP) antibody and pepsinogen (PG) levels

Group	Status of HP and PG	Number	Rate
A	HP -/ PG -	23	63.8 %
B	HP +/- PG -	2	5.6%
C	HP +/- PG +	6	16.7%
D	HP -/ PG +	3	7.3%
E	post-eradication	1	2.8%

HP +/-: HP antibody > 10.0

PG +: PG I < 70 ng/ ml and PG I/ II ratio < 3.0

Table 2. Detection rate of 6-mm or larger-sized polyps in CT colonography

	Present series (N=39)	Clinical study (N=40)
Occult blood	>6mm	>6mm
positive	35.7% (5/ 14)	22.0% (2/ 9)
negative	4.2% (1/24)	6.5% (2/ 31)
total	15.8% (6/ 38)	10.0% (4/ 40)

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