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Original Research Article

The relationship between colorectal polyps and colon cancer with *Helicobacter pylori* infection

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ABSTRACT

Background: Our aim in this study is to determine the relationship among *Helicobacter pylori* (HP) with colon cancer and colorectal polyps. Thus, colorectal cancers (CRC) can be diagnosed at an early stage, the progression of the disease can be prevented and a contribution can be made to prolonging the life span of the patients.
Methods: The 75 patients as the case group and 150 patients as the control group were included in the study. Patients with family history of CRC and clinical symptoms who had total colonoscopy in a tertiary hospital between 31/09/2021 and 31/03/2022 and underwent gastroscopic gastric biopsy and evaluated for HP were included. The patients were divided into three groups as patients with colorectal polyps, CRC and normal patients.
Results: HP positivity was more common in patients with cancer history than those without cancer history ($p<0.001$). In the analyzes performed, HP positivity was more common in patients with cancer than in patients without cancer ($p<0.001$). Concordantly, more polyps were detected in HP positive patients than in non-HP patients ($p=0.001$). In the analyzes performed, HP infection was significantly higher in patients with CRC and colorectal polyps compared to normal controls.
Conclusions: HP positive patients can be evaluated in terms of CRC and colorectal polyp.

Keywords: HP infection, CRC, Colorectal polyp

INTRODUCTION

Colorectal cancer (CRC) is the third most common cancer in the world and the second leading cause of cancer-related death. The epidemiology of CRC differs significantly in different parts of the world and also regarding different age, gender and racial groups. Many factors are involved in this variation, including risk factor exposure, genetic predisposition, as well as demographic variations and genetic mutations and their impact on prognosis and treatment response.[1] Diagnosing CRC in the early stages prevents the progression of the disease and prolongs the life expectancy of patients. HP is the most common chronic bacterial infection in humans worldwide. The prevalence of HP infection is high (80-90%) in developing countries and lower (10-30%) in developed countries. HP infection risk is related with low socioeconomic status and living conditions (residential density, overcrowding, number of siblings, sharing the same bed and lack of running water, low educational level of parents) in early childhood. Smoking is a risk factor for Hp infection in adults.[2] HP is an important risk factor for gastric cancer.[3] Many studies have been conducted to investigate the relationship of Hp with other cancers. Most CRCs arise from adenomatous polyps. Adenomas are premalignant lesions that partially transform into cancer.[4] Many studies show that HP infection is associated with increased serum gastrin. Endocrinological studies show that hypergastrinemia is

associated with rectal cell proliferation and stimulates the growth of CRC cells and the development of colon adenoma and adenoma-cancer sequence. These results suggest that infection by HP could potentially increase the risk of CRC.[5] Different results have been obtained in studies on the relationship between CRCs and Hp infection. Teimoorian et al found that HP infection could be evaluated as a risk factor for colon cancer and adenomatous polyps in their studies.[6] However, Boyuk et al found no relationship between HP and colorectal neoplasia.[7]

Our aim in this study is to determine the relationship among HP with colon cancer and colorectal polyps.

METHODS

Ethics committee approval

This study was approved by health sciences university, Istanbul training and research hospital (06.05.2022: decision no: 145).

This research was carried out in Istanbul training and research hospital between 31/09/2021 and 31.03/22. This is a retrospective cohort study. Patients with a family history of CRC and clinical symptoms (rectal bleeding, stomach pain, change in bowel habits, vomiting, weight loss, diarrhea, and iron deficiency anemia), who underwent total colonoscopy, who underwent gastroscopic gastric biopsy and were evaluated for HP was included in the study. Patients with inflammatory bowel disease, non-adenomatous polyps, previously diagnosed colon cancer, operated for colon cancer or treated for eradication of HP. pylori infection were excluded from the study. The patients were divided into three groups as colorectal polyps, CRC patients and normal patients. These patients were analyzed according to age, gender, cancer history, or family history of gastrointestinal cancer. Polyps or cancers in the colon were divided into right and left according to their anatomical localization. The border of the right and left colon was determined as splenic flexion. Chi-square test and Fisher's exact test were used for the categorical variables and descriptive statistics in analysis of data.

Statistical analysis

Chi-square test and Fisher's exact test were used for categorical variables as well as descriptive statistics (mean, standard deviation and median) in the analysis of the data. In the chi-square test, where more than two variables were examined, the difference between the groups was determined by the Bonferroni method (Z test, adjust p values). In the analysis of continuous variables, Mann-Whitney U and Kruskal Wallis test were used according to their suitability. Data were analyzed with IBM SPSS (Version 24.0) package program. Statistical significance level was determined as $p<0.05$.

RESULTS

A total of 225 patients were included in the study as the patient and control group. Of these, 75 were patients with cancer or polyps, and 150 were the normal control group. The mean age of the research group was 56.83±12.82 and the median age was 59.0 (48.5-67.0), 51.1% (n=115) of the patients were female and 48.9% (n=110) were male. Cancer history was observed in 9.3% (n=21) of the patients, polyps were observed in 24% (n=54) and 66.7% (n=150) were classified as normal. Cancer and polyps were significantly more in men ($p<0.005$). There was a significant increase in the incidence of cancer and polyps with increasing age ($p<0.005$). Cancer detection rate was significantly higher in patients with a history of cancer ($p<0.005$). There was no significant relationship found between patients with cancer history and patients with polyps ($p>0.05$). Cancer history was significantly lower in the normal study group ($p<0.01$) (Table 1).

HP positivity was significantly higher in men than in women ($p=0.004$). The age of HP positive patients was significantly higher than the age of HP negative patients (<0.05). HP positivity was more common in patients with cancer history than those without cancer history ($p<0.001$). Similarly, the rate of HP positivity is significantly higher in individuals with a family history of HP positivity ($p=0.019$) (Table 2).

Table 1: Demographic characteristics of the cases included in the study.

Variables	Cancer, n (%)	Polyps, n (%)	Normal, n (%)	P value
N	21 (9.3)	54 (24)	150 (66.7)	
Sex				
F: M	7 (33.3): 14 (66.7)	21 (38.9): 33 (61.1)	87 (75.7): 63 (57.3)	<0.05
Age (Years)	63.0±9.1	61.5±10.9	56±13.3	<0.05
Cancer history				
Positive	14	2	3	<0.01
Negative	7	52	147	>0.05
Family history				
Positive	10	8	16	<0.01
Negative	11	46	134	

Table 2: Comparison of HP infection with demographic characteristics.

Variables	HP positive, n (%)	HP negative, n (%)	P value
Sex			
M	68 (61.8)	42 (38.2)	0.004
F	49 (42.6)	66 (57.4)	
Age (Years)	61.0	55.5	<0.05
Cancer history			
Positive	18 (94.7)	1 (5.3)	<0.001
Negative	99 (48.1)	107 (51.9)	
Family history			
Positive	24 (70.6)	10 (29.4)	0.019
Negative	93 (48.7)	98 (51.3)	

A total of 54 patients had adenomatous polyps and 21 patients had colon cancer. 15 (27.8%) of 54 polyps were in the right colon, and 39 (72.2%) were in the left colon. Of 21 colon cancer cases, 7 (33.3%) were found in the right colon, and 14 (66.7%) were found in the left colon. A significant correlation was observed in terms of left-sided localization of adenomatous polyps (p<0.02) and cancer (p<0.05).

HP positivity was detected in 39.3% (n=59) of normal individuals, 72.2% (n=39) of individuals with polyps, and 90.5% (n=19) of patients with cancer. In the analyzes, HP positivity was more common in patients with cancer than in patients without cancer (p<0.001). In parallel, more polyps were detected in HP positive patients than in non-HP patients (p=0.001). In addition, the incidence of HP positivity in normal patients was significantly higher than in non-normal patients (p<0.001) (Table 3).

Table 3: Relationship between cancer, polyp and normal patient groups with HP.

Variables	HP positive, n (%)	HP negative, n (%)	P value
Cancer	19 (90.5)	2 (9.5)	<0.001
Polyps	39 (72.2)	15 (27.8)	0.001
Normal	59 (39.3)	91 (60.7)	<0.001

DİSCUSSİON

In this study, a significant relationship was found between HP and CRC and colorectal polyps. Many studies have been conducted to explain the relationship between CRCs and Hp infection. In their study, Fatemah et al Found out that HP infection (IgA>20 U/mL and IgG >10 U/mL) was significantly more common in patients with colon cancer and adenomatous polyps compared to healthy controls (p=0.003, p=0.039, respectively).[6] Similarly, in our study, HP positivity was found to be higher in patients with cancer and polyps than in patients without them. In addition, the rate of HP positivity in normal patients was significantly higher than in non-normal patients (p<0.001).

Gastric HP infection is more common in the patients with colorectal polyps compared to healthy controls. Polyps ≥1 cm, multiple polyps, and CRC are associated with higher rates of HP infection. Cancer location is unrelated to Hp infection.[8] In our study, Hp infection was significantly higher in patients with CRC (p<0.001) and polyps (p=0.001). It was significantly lower in normal (p=0.001) patients. Unlike this study, in our study, a significant correlation was observed in terms of left-sided location of adenomatous polyps (p<0.02) and cancer (p<0.05).

In a study conducted by Mohamed et al. the results of the detection of HP among different colon polyps and colon cancer patients showed a statistically significant association for HP infection and adenocarcinoma, p=0.028.[9]

Rokkas et al showed a significant relationship between HP and colon cancer in addition to colon polyps [OR 1.3 (1.07-1.59), p=0.01 and OR 1.5 (1.26-1.79), respectively, p=0.000.[10]

According to the study by Nam et al HP infection is an independent risk factor for colon adenomas especially in cases of advanced or multiple adenomas, but not for rectal adenomas.[11]

Boyuk et al found no significant relationship between HP and colorectal neoplasms in their study.[7]

Oset et al did not observe a relationship between gastrin levels and the size, grade, and histological type of polyps although serum levels had elevated in patients with colonic adenoma. The precise role of hypergastrinemia in the process of colon carcinogenesis has not yet been determined.[12]

Our study has some limitations. First of all, we did not measure the gastrin level, which is the key mechanism in the development of colorectal neoplasia secondary to HP. Secondly, multiple biopsies were taken from very few patients, and this decreased the possibility of detecting gastric intestinal metaplasia. Thirdly, this was a single-centre study with a small sample size. Multicentre studies with large sample sizes should be carried out in our country and at the international level.

CONCLUSİON

In our analises, HP infection was significantly higher in patients with CRC ($p<0.001$) and colorectal polyps ($p=0.001$) compared to normal controls. This supports the possibility of a relationship between these diseases.

Recommendations

HP positive patients can be evaluated in terms of CRC and colorectal polyps.

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REFERENCES

1. Baidoun F, Elshiwy K, Elkeraie Y. Colorectal Cancer Epidemiology: Recent Trends and Impact on Outcomes. Current Drug Targets. 2021;22(9):998-1009.
2. Bures J, Kopácová M, Skodová Fendrichová M, Rejchrt S. Epidemiology of *Helicobacter pylori* infection. Vnitrni lekarstvi. 2011;57(12):993-9.
3. Costa L, Corre S, Michel V. USF1 defect drives p53 degradation during *Helicobacter pylori* infection and accelerates gastric carcinogenesis. Gut. 2020;69(9):1582-91.
4. Atkin WS, Edwards R, Kralj-Hans I. Once-only flexible sigmoidoscopy screening in prevention of colorectal cancer: a multicentre randomised controlled trial. Lancet (London, England). 2010;375(9726):1624-33.
5. Fireman Z, Trost L, Kopelman Y, Segal A, Sternberg A. *Helicobacter pylori:* seroprevalence and colorectal cancer. Israel Med Ass J. 2000;2(1):6-9.
6. Teimoorian F, Ranaei M, Hajian Tilaki K, Shokri Shirvani J, Vosough Z. Association of *Helicobacter pylori* Infection With Colon Cancer and Adenomatous Polyps. Iran J Pathol. 2018;13(3):325-32.
7. Boyuk B, Ozgur A, Atalay H, Celebi A, Ekizoglu I, Aykurt E. *Helicobacter pylori* infection coexisting with intestinal metaplasia is not associated with colorectal neoplasms. Przeglad Gastroenterologiczny. 2019;14(2):133-9.
8. Dong YF, Guo T, Yang H, Qian JM, Li JN. Correlations between gastric *Helicobacter pylori* infection and colorectal polyps or cancer. Zhonghua Nei Ke Za Zhi. 2019;58(2):139-42.
9. Mohamed AK, Elhassan NM, Awhag ZA. Prevalence of *Helicobacter pylori* among Sudanese patients diagnosed with colon polyps and colon cancer using immunohistochemistry technique. BMC Res Notes. 2020;13(1):322.
10. Rokkas T, Sechopoulos P, Pistiolas D, Kothonas F, Margantinis G, Koukoulis G. The relationship of *Helicobacter pylori* infection and colon neoplasia, on the basis of meta-analysis. Eur J Gastroenterol Hepatol. 2013;25(11):1286-94.
11. Nam JH, Hong CW, Kim BC. *Helicobacter pylori* infection is an independent risk factor for colonic adenomatous neoplasms. Cancer Causes Control. 2017;28(2):107-15.
12. Oset P, Jasińska A, Szcześniak P. Analysis of serum gastrin levels in patients with adenomatous polyps of the colon. Polski merkuriusz lekarski: organ Polskiego Towarzystwa Lekarskiego. 2009;26(155):458-61.

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