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Fecal Occult Blood Test: Is it Still Worth it for Colorectal Cancer Screening?

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ABSTRACT:

Introduction: One of the most critical factors determining survival in cases of colorectal cancer is diagnosis and treatment at an early stage. Diagnosis at an early stage is possible with screening programs carried out within preventive health services.

Aim: In this study, we aimed to compare the results of patients who underwent colonoscopy because of a positive fecal occult blood test (FOBT) with those over 50 years of age who underwent colonoscopy due to other complaints and to reveal whether an FOBT test is still essential for screening programs.

Methods: This study included patients who underwent colonoscopy between January 2016 and December 2021. The patients were analyzed in two groups, according to the reasons for colonoscopy: Group I (FOBT-positive) and Group II (other reasons).

Results: A total of 3393 patients were included in the study. They were divided into two groups for evaluation: those who underwent colonoscopy after a positive FOBT (Group I) and patients over 50 years of age who underwent colonoscopy for other reasons (Group II). When the colonoscopy findings were compared between the groups, inflammatory bowel disease ($p = 0.03$) was more prevalent in Group I, while normal colonoscopy ($p = 0.03$) was found to be more common in Group II. Polyps, malignancy, diverticulosis, and perianal diseases appeared to be statistically similar between the groups.

Conclusion: FOBT can still be used in colorectal screening because it is inexpensive and widely available, is more acceptable to patients due to its non-invasiveness, and can be applied outside of clinical settings.

KEYWORDS: colonoscopy, colorectal cancer, fecal occult blood test, screening

ABBREVIATIONS

FIT – fecal immunochemical test
FOBT – fecal occult blood test

INTRODUCTION

Every year, colorectal cancer ranks third globally in incidence among newly diagnosed cancers and ranks second in cancer-related deaths [1]. The lifetime probability of developing colorectal cancer is 5.5% in men and 5.1% in women. Therefore, one of the most critical factors determining survival in colorectal cancer is diagnosis and treatment at an early stage. Diagnosis at an early stage is possible with screening programs conducted within the framework of preventive health services.

The colorectal cancer screening programs of most European countries and the USA start with non-invasive stool tests [2]. Non-invasive stool tests include the fecal occult blood test (FOBT) and the fecal immunochemical test (FIT). The Turkish colorectal cancer screening program applies to healthy individuals aged 50 to 70 years, under the supervision of the Cancer Department of the Public Health Institution of Turkey. An FOBT is performed every two years and a colonoscopy every ten years [3]. In addition, the Turkish Colon and Rectal Surgery Association recommends an annual rectal examination and FOBT starting at the age of 40, flexible sigmoidoscopy every five years after the age of 50, or a colonoscopy every ten years at the age of 50 for healthy individuals [4].

The disadvantages of the FOBT are that it cannot distinguish between upper and lower gastrointestinal bleeding and that the test result may be affected by oral intake. However, FOBT is cheap and easy to apply, and is therefore used as the first step in many screening programs.

This study aimed to compare the results of patients who underwent colonoscopy because of a positive FOBT with those over 50 years of age who underwent colonoscopy due to other complaints as well as to reveal whether FOBT is still essential for screening programs.

METHODS

Study Design

The data of patients who underwent colonoscopy in the endoscopy unit of Marmara University Pendik Training and Research Hospital between January 2016 and December 2021 were retrospectively analyzed by reviewing the hospital database system. Patients who were referred to the endoscopy unit for colonoscopy because of a positive FOBT and those who were over 50 years of age and underwent colonoscopy for other reasons were included in this study. Patients were excluded from the study if they were under the age of 50, had a history of colon surgery, or presented with inadequate colon cleansing. Also, patients with missing data files were excluded from the study. Demographic characteristics and endoscopic findings were recorded. All patients were informed about the nature of the procedure

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Tab. I. Demographic characteristics and colonoscopic findings of the study groups.

	FOBT + (N = 437)	Age >50 years (n = 2956)	Total (n = 3393)	P value
Female	205 (46.9%)	1362 (46.1%)	1566 (46.2%)	0.85*
Male	232 (53.1%)	1594 (53.9%)	1827 (53.8%)	
Age	54.6 ± 12.51	62.4 ± 8.54	61.3 ± 9.54	**<0.001****
Colonoscopic Findings	**N (%)**	**N (%)**	**N (%)**	
Polyps	124 (28.4%)	784 (26.5%)	909 (26.8%)	0.41*
Malignancy	29 (6.6%)	212 (7.2%)	241 (7.1%)	0.68*
Inflammatory Bowel Diseases	21 (4.8%)	70 (2.4%)	91 (2.7%)	**0.03***
Diverticulosis	37 (8.5%)	181 (6.1%)	218 (6.4%)	0.06*
Perianal Diseases	91 (20.8%)	641 (21.7%)	732 (21.6%)	0.68*
Normal	135 (30.1%)	1068 (36.1%)	1202 (35.4%)	**0.03***

* Chi-Square, ** Student's t-test; FOBT – Fecal Occult Blood Test

Tab. II. Location of Malignancy.

	FOBT + (N = 29)	Age >50 years (n = 212)	Total (n = 241)	P value
Cecum	2 (6.9%)	30 (14.1%)	32 (13.3%)	0.28*
Ascending Colon	2 (6.9%)	29 (13.7%)	31 (12.9%)	0.31*
Transverse	3 (10.3%)	33 (15.6%)	36 (14.9%)	0.46*
Descending Colon	3 (10.3%)	28 (13.2%)	31 (12.9%)	0.67*
Sigmoid Colon	9 (31.0%)	44 (20.8%)	53 (22.0%)	0.21*
Rectum	10 (34.4%)	48 (22.6%)	58 (24.0%)	0.16*

* Chi-Square, ** Student's t-test; FOBT: Fecal Occult Blood Test

and its risks; written informed consent was obtained in advance. Patients were analyzed in two groups, according to the reason for colonoscopy: Group I (FOBT-positive) and Group II (age >50 years).

The study was approved by the University Scientific Research Ethics Committee on March 4, 2022 (decision number 2022/472). During the study, all procedures were carried out according to the ethical rules and the principles of the Declaration of Helsinki.

Statistical analysis

In the analysis of the data, the mean and standard deviation, the minimum and maximum values of the features, frequencies, and percentage values were used to define the categorical variables while performing the statistics of the continuous data on the scales. Student's t-test was used to compare the means of two independent groups. In addition, chi-square test statistics were used to evaluate the relationship between categorical variables. Statistical significance of the data was set at $p < 0.05$. In the evaluation of the data, e-picos software and the MedCalc statistical package were used.

RESULTS

A total of 3393 patients were included in the study. Of these patients, 1827 (53.3%) were male and 1566 (46.2%) were female, with a mean age of 61.3 ± 9.54 years (Tab. I.). Endoscopic diagnoses were as follows: polyps – 909 (26.8%), colorectal malignancy – 241 (7.1%), inflammatory bowel disease – 91 (2.7%), diverticulosis – 218 (6.4%), perianal disease – 732 (21.6%), and normal colonoscopy – 1202 (35.4%).

The patients were divided into two groups for evaluation: those who underwent colonoscopy because of a positive FOBT test (Group I) and patients over 50 years of age who underwent colonoscopy for other reasons (Group II). The gender distribution was statistically similar between the groups ($p = 0.85$). Because one of the groups was restricted to only patients over 50 years old, a statistically significant difference in the age distribution between the groups was observed ($p < 0.001$). When the colonoscopy findings were compared, inflammatory bowel disease ($p = 0.03$) was more prevalent in Group I, while normal colonoscopy ($p = 0.03$) was observed more often in Group II. Polyps, malignancy, diverticulosis, and perianal diseases appeared to be statistically similar between the groups.

The location of the malignancies was in the cecum (32 [13.3%]), the ascending colon (31 [12.9%]), the transverse colon (36 [14.9%]), the descending colon (31 [12.9%]), the sigmoid colon (53 [22.0%]), and the rectum (58 [24.0%]) (Tab. II.). There was no statistical difference between the groups regarding the location of the malignancies.

DISCUSSION

The incidence of colorectal cancer increases with age. In addition, the most important factor affecting colorectal cancer survival is the stage at which it is diagnosed. When colorectal cancer begins to manifest clinically, it has generally reached the advanced stage. Thus, it is important for survival to diagnose it in the early stages, when it is still subclinical [5]. In addition, screening for colorectal cancer and precancerous lesions can reduce cancer-related mortality [6]. The most accurate method for screening for colorectal cancer is colonoscopy, which allows the entire colorectal lumen to be observed under direct observation [7]. Nevertheless, in places with a large and scattered population, it is impossible to screen everyone through colonoscopy. The FOBT is a method that can detect less than 10 ml of bleeding in the stool thanks to the peroxidase reaction and guaiac paper [5].

The sensitivity of the FOBT ranges from 50% to 70%, and its specificity ranges from 77% to 95% [8, 9]. Administering the FOBT is easy and feasible: it can even be administered via mail. Bjerrum et al. delivered the FOBT test to their participants via mail, and received the test materials via mail after it was administered [10]. In their study, colonoscopy was performed based on the patients' FOBT results. Of the 1741 patients who had a positive FOBT result and underwent colonoscopy, colorectal cancer was reported in 150 (8.6%), polyps were found in 700 (40.2%), and the colonoscopy results were normal in 771 (44.3%). Of the 1281 patients who had negative FOBT results and underwent colonoscopy, colorectal cancer was reported in 33 (2.5%), polyps were found in 169 (13.2%), and the examination results were normal in 923 (72.1%). These results show that in up to 15.6% of the patients who were not further examined after a negative FOBT result, there was a missed diagnosis of pre-cancer and cancerous lesions. In another study, among an FOBT-positive screening group of 53,332 cases, Quyn et al. reported a detection rate of 7.1% (n = 3777) for colorectal cancer and 45.6% (n = 24,345) for polyps [11].

Our study compared the colonoscopies performed after a positive FOBT result against those performed for patients over 50 years old who underwent colonoscopy for reasons other than a positive FOBT result. While the rates of colorectal cancer and polyps were

statistically similar between the groups, it was observed that colonoscopies with normal results were less common in the former group. The use of colonoscopy as a first-line tool in the population of patients over 50 years old who live close to a center where colonoscopy can be performed will help identify patients with FOBT--negative colorectal cancer and polyps. As the colorectal cancer stage progresses, adjuvant chemotherapy is required for treatment [12]. Treating the disease in the early stages eliminates the need for adjuvant chemotherapy, reduces costs, and minimizes the patient's absence from the workforce. Polyps are precursor lesions of colorectal cancer [13]. Adenomas progress to invasive cancer over time [14]. If the disease is diagnosed during colonoscopy, it can be treated in the same session with polypectomy. In patients with FOBT-negative polyps, this lesion progresses to cancer, leading to a surgical procedure that requires resection of the colon. This situation also increases the treatment costs and absenteeism, as well.

One of the problems in applying colonoscopy for screening is the lower participation rate compared to stool sampling tests [15, 16]. However, colonoscopy is more beneficial in terms of mortality, according to retrospective studies comparing screening modalities [17, 18]. This dilemma can be overcome with public health studies to raise awareness of colorectal cancer. The incidence of colorectal cancer increases from the proximal to the distal colon and is most common in the rectal region [19]. Our study observed that the frequency of colorectal cancer increased from the proximal colon to the distal colon in both groups, which is consistent with the literature.

One limitation of our study was its retrospective design, imparting all the known limitations of retrospective studies. Also, it had a limited patient population because it was a single-center study. Therefore, multicenter prospective studies on this subject designed with cost and survival analysis are still needed.

CONCLUSION

The use of colonoscopy in colorectal cancer screenings provides an earlier diagnosis, combines diagnosis and treatment together in a single session, and has a more significant survival advantage. However, the low participation rate due to the nature of the process, the fact that it can only be performed in certain centers, and the difficulties in applying it in rural areas prevent it from being actively used as the first step in screening. Thus, FOBT can still be used in colorectal screening because it is inexpensive, widely available, has better participation due to its non-invasiveness, and can be used outside of clinical settings.

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