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ORIGINAL ARTICLE

The Screening Effectivity of Fecal Occult Blood Test

Ümit Sekmen[1], Ozan Şen[1], Hamit Karayağız[1], Tolga Katmer[2], Resül Altınayak[3], Didem Altay Gazi[4], Merve Mehveş Çelebi[1], Melih Paksoy[1]

[1]Department of General Surgery, Acıbadem Healthcare Group, Acıbadem Fulya Hospital, Istanbul, Türkiye
[2]Department of General Surgery, Haydarpaşa Numune Training and Research Hospital, Istanbul, Türkiye
[3]Department of Medical Laboratory and Biochemistry, Acıbadem Healthcare Group, Acıbadem Fulya Hospital, Istanbul, Türkiye
[4]Department of Check-Up, Acıbadem Healthcare Group, Acıbadem Fulya Hospital, Istanbul, Türkiye

Abstract

Introduction: Fecal occult blood (FOB) test is accepted as an effective screening tool for decreasing colorectal cancer mortality especially after age 50. We aimed to understand its effectiveness among younger age groups, by analyzing the results of control colonoscopy of the patients with FOB test positivity detected during check-up.

Methods: Six thousand six hundred and sixty-five individuals administered to check-up center in Acibadem Fulya Hospital between 2010 and 2020. We retrospectively analyzed the results of those who accepted the FOB test (1432 individuals). We advised colonoscopic examination for patients with FOB test positivity (344 individuals). T understand the predictive role of FOB test, we compared the results according to age, gender, body mass index, and hemoglobin level.

Results: Three hundred and forty-four FOB tests were positive out of all 1432 tests. Out of these, only 126 asymptomatic patients accepted the control colonoscopy. There were 21 adenomatous polyps detected in colonoscopic examinations. Statistically higher number of polyps was found after age 50, but two of the patients had adenomatous polyps at age of 45.

Discussion and Conclusion: FOB test is a crucial screening test after age of 45. In case of positive result, colonoscopy should be advised.

Keywords: Colonoscopy; colorectal cancer; fecal occult blood; screening.

Colorectal cancer (CRC) is the third most common cancer diagnosed in both genders and the fourth among cancer-related deaths in the world[1,2]. About 75% of colon cancers are detected sporadically, whereas the remaining are due to predisposing genetic factors[3]. One of the most important factors affecting prognosis and mortality is early diagnosis of colorectal cancer.

For this reason, screening tests remain the best defense against CRC. Colonoscopy is one of the most important early diagnostic tools. Fecal occult blood (FOB) test is also routinely used by many countries as it is a simple and non-invasive screening test with many economic advantages. In a meta-analysis performed, FOB test sensitivity was detected as 83% (95% confidence interval [CI]: 72–90%) and specificity was detected as 79% (95% CI: 68–86%) in CRC detection in patients with iron deficiency anemia[4]. It has been reported that it provides a 12% (10–21%) reduction in mortality with this efficiency[5]. Although an ideal age cannot be still recommended in the literature, the FOB screening test is recommended, especially for young

Correspondence (İletişim): Merve Mehveş Çelebi, M.D. Acıbadem Sağlık Grubu, Acıbadem Fulya Hastanesi, Genel Cerrahi Departmanı, İstanbul, Türkiye
Phone (Telefon): +90 538 729 83 41 **E-mail (E-posta):** mehvescelebi@gmail.com
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asymptomatic people, who are mostly unwilling to give stool specimen for testing.

For this reason, we tried to determine the effectiveness of this screening, especially in young people under 50, by comparing the further examination results of two groups under age of 50 and over 50. The age limit of 50 was chosen since it is the generally accepted limit in studies investigating screening tests[6,7].

Materials and Methods

Our study consisted of retrospective analysis of 6650 asymptomatic patients' results that were checked in Acibadem Fulya Hospital check-up center between 2010 and 2020 (Istanbul, Turkey). Even though it was advised to all, only 1432 accepted to have FOB test. They had no history of gastrointestinal disease or chronic anticoagulant drug use. We searched the predictive role of FOB test results by comparing FOB (+) and (-) asymptomatic patients' results according to age, gender, body mass index (BMI), hemoglobin (Hgb) level, and colonoscopy results.

FOB test is a lateral flow chromatographic immunoassay test based on the double antibody sandwich technique. The membrane of the cassette test is pre-coated with anti-hemoglobin antibodies in the test line region. During the test, the hemoglobin in the sample moves chromatically forward on the membrane by capillary action, while it reacts with anti-hemoglobin antibodies coated with colloidal gold and creates a colored line. The presence of this colored line in the test region indicates a positive result, while its absence indicates a negative result. A colored control line is also always included as a procedure to demonstrate the adequacy of the sample amount in the cassette test. The efficacy of FOB positivity in predicting gastrointestinal system diseases was investigated with age, gender, Hgb level, and BMI variables in this retrospective study.

This study was approved by the Ethics Committee of Acibadem MAA University in terms of medical ethics with the decision number 2020–08/3.

Statistical Analysis

Statistical analyses were performed using the Statistical Package for the Social Sciences software version 21.0 (SPSS, Inc., Chicago, IL, USA). Independent variables of the two groups were analyzed by t-test (Independent Samples t-test). Pearson's Chi-square test was used to assess the associations between categorical variables. $p<0.05$ was considered significant.

Results

Our study consisted of retrospective investigation of 6650 patients who visited our check-up center between 2010 and 2020, with no known gastrointestinal disease or history of anticoagulant drug use. Among these, 1432 accepted the FOB test and 344 of them were FOB (+). The age, gender, hemoglobin levels, and BMI values of these individuals are summarized in Tables 1–3.

Gastroscopy and colonoscopy were recommended for these 344 patients, but only 126 patients agreed to undergo endoscopic examination. Two colon cancer cases were detected during endoscopic examination, and both were men over the age of 50 (59 and 65).

FOB test and colonoscopic examination acceptance, FOB positivity, and adenomatous polyp detection rates were statistically higher in the group older than 50 (p=0.02, p=0.01, p=0.01, and p=0.01, respectively). No difference in terms of gender, Hgb level, or BMI were found between two age groups (<50 and >50) or FOB test result groups (+ and -) (Tables 4 and 5, respectively).

Table 1. Characteristics of 6650 patients based on age groups

Age	<50	>50	p
Male/Female (ratio)	2415/1545 (1.56)	1580/1110 (1.42)	0.1
Mean BMI (kg/m^2)	22.10 (±2.6)	23.86 (±2.9)	0.2
Mean Hgb (mg/dL)	13.95 (±2.2)	12.87 (±1.8)	0.1
FOB acceptance (%)	15.8	37.4	0.02

BMI: Body mass index; Hgb: Hemoglobin.

Table 2. Characteristics of 1432 patients who accepted FOB test based on age groups

Age	<50	>50	p
Male/female (ratio)	262/163 (1.61)	545/462 (1.18)	0.1
Mean BMI (kg/m^2)	22.65 (±2.8)	23.52 (±3.2)	0.2
Mean HGb (mg/dL)	14.12 (±1.9)	13.17 (±1.6)	0.1
No. of FOB + (%)	81 (19)	263 (26)	0.01

BMI: Body mass index; Hgb: Hemoglobin; FOB: Fecal occult blood.

Table 3. Characteristics of 344 FOB (+) patients based on age groups

Age	<50	>50	p
Male/female (ratio)	46/35 (1.31)	160/103 (1.55)	0.4
Mean BMI (kg/m^2)	22.44 (±2.8)	24.11 (±3.1)	0.1
Mean Hgb (mg/dL)	13.19 (±2.3)	12.15 (±2.1)	0.1
No. of colonoscopy acceptance (%)	25 (31)	101 (38)	0.01

BMI: Body mass index; Hgb: Hemoglobin; FOB: Fecal occult blood.

Table 4. Pathological results of polyps detected during colonoscopy based on age groups

Age	<50	>50	p
No. of hyperplastic polyps (%)	8 (32)	44 (43)	0.04
No. of adenomatous polyps (%)	2 (8)	19 (18)	0.01

Table 5. Characteristics of 1432 patients based on FOB test result groups

FOB test result	(+)	(-)	p
Male/Female (ratio)	262/163 (1.61)	603/404 (1.49)	0.1
Mean BMI (kg/m^2)	23.81 (±3.1)	23.02 (±3.3)	0.1
Mean HGB (mg/dL)	13.88 (±1.7)	14.27 (±1.6)	0.2

BMI: Body mass index; Hgb: Hemoglobin.

Discussion

Early diagnosis and treatment are the most critical factors decreasing mortality in colorectal cancers. It is recommended that beginning at age 50, both men and women at average risk for developing CRC should have a colonoscopy every 10 years[8-10]. Even though the necessity of colonic preparation and sedation for the colonoscopic examination is still drawbacks for many people, the increase in the availability of colonoscopy has enabled many people to have easy access to this examination, and thus increasing the early diagnosis and treatment rates of gastrointestinal system cancers in recent years.

In the case of FOB positivity in asymptomatic people under the age of 50, colonoscopic examination is recommended[11,12]. However, we found the approval rate for colonoscopy is higher among FOB (+) people over age of 50 compared to people under 50.

In parallel with the general literature, we detected higher FOB positivity, as well as higher detection rate of both hyperplastic and adenomatous polyps above the age of 50. Hemmasi et al.[13] found no difference between the polyp detection rates in between the age groups of 40–50 and 50–60. However, our results indicate higher polyp detection rates in the group over 50 years old (Table 4). The adenomatous polyps have malignant transformation tendency[14]. Hence, the early detection and removing of such polyps are crucial for cancer prevention[9]. The age of the youngest person we detected adenomatous changes was 45, thus proving the importance of performing this screening in asymptomatic individuals even younger than 50[15,16]. Although there is no consensus on minimum age to advise FOB test in the literature, we may conclude that 45 might be the minimum ideal age to start FOB test for screening colorectal cancer or precancerous polyps.

Conclusion

Even though the detected cancer cases (aged 59 and 65) were both older than 50, we also found adenomatous changes in polyps of a patient aged 45. Hence, we can suggest that colonoscopic examination should be recommended to all FOB (+), as well as all individuals who are unwilling to perform this test after age of 45.

Ethics Committee Approval: This study was approved by the Ethics Committee of Acibadem MAA University in terms of medical ethics with the decision number 2020–08/3.

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