RESEARCH ARTICLE

Investigation of Hemogram, Endoscopy, Demographic Properties of Patients Applied by Fecal Occult Blood Test Screening

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Abstract

Objective: Colorectal cancer (CRC) is one of the most common cancers in the world. Fecal occult blood test (FOBT) is easy and commonly used test to its screening. The aim of this study was to investigate the demographic characteristics, hemogram results and endoscopy and outcome status of the patients who underwent FOBT on history and clinical suspicion and to contribute to the literature.

Methods: 400 patients who were admitted to the general surgery polyclinic between 01/12/2016 and 12/12/2017 in Ordu University Medical Faculty Training and Research Hospital were evaluated retrospectively. The data of 349 patients who underwent FOBT was reached. Age and sex, hemoglobin, hematocrit, ferritin levels, upper and lower gastrointestinal endoscopy results and pathology results of endoscopic biopsies were recorded.

Results: 38 (10.9%) with FOBT (+) and 311 (89.1%) with FOBT (-) of 349 patients were detected. There was no statistically significant difference between the two groups in terms of the average age (p = 0.27) and gender (p = 0.26). There was a significant difference between the two groups in terms of the rate of upper gastrointestinal endoscopy (p = 0.03). There was a significant difference between the two groups in terms of the rate of colonoscopy (p = 0.001). Malignancy was detected in 22,2% of FOBT (+) and in 1,63% of FOBT (-) group by colonoscopy. There was a statistically significant difference between the two groups in terms of disease diagnoses (p = 0.001). There was no statistically significant difference between the two groups in terms of *Helicobacter Pylori* (*H. pylori*) (p = 0.31) and intestinal metaplasia (p = 0.44). There was a statistically significant difference between the two groups in terms of Hb and Htc value (p= 0.05).

Conclusion: According to the results of FOBT, the application of endoscopy to the patients who are required, provide to detect the precancerous lesions as well as the malignancies of the upper and lower gastrointestinal tract. Good knowledge of the importance of this test will allow early detection of malignancy.

Keywords: Fecal occult blood test, Colorectal cancer, Endoscopy

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DOI: 10.19127/mbsjohs.531631

Introduction

Fecal occult blood test (FOBT) is a current screening method for the colorectal cancer (CRC). İt is based on the concept of detecting blood by the vascularized lesion (Carroll et al., 2014). Colorectal cancer is the third most common cancer in men and the second most common cancer in women worldwide (Torre et al., 2012). Therefore, screening and examination decision is important in early detection of suspected patients. FOBT is available, cheap and noninvasive test. On the other hand, anemia in peptic ulcer and gastric cancer may also be a sign of chronic bleeding, and in this respect, this test is a guide. *Helicobacter Pylori* (Hp) is the most common cause of many gastrointestinal diseases. More than half of the world's population is infected with Hp (Eusebi et al., 2014). İt is involved in the etiology of many gastrointestinal diseases as gastritis, peptic ulcer, functional dyspepsia, stubborn iron deficiency anemia, gastric mucosa-associated lymphoma (maltoma) and gastric adenocarcinoma (Lee et al.,2016; Bae et al., 2018; Adamu et al., 2010). In gastrointestinal system (GIS) diseases, simple complaints such as dyspepsia may be due to benign reasons such as *Helicobacter Pylori* and gastritis, yet dyspepsia, weight loss, secret or overt gastrointestinal bleeding may indicate a serious condition such as a gastric or colorectal malignancy (Ioannou et al., 2002). Symptom-based models have limitations, as they may present only at an advanced stage of the illness; furthermore, patients may ignore or not report symptoms. Therefore, only symptom-based examination and diagnosis are not sufficient. In this study, we aimed to investigate the demographic characteristics, hemoglobin, hematocrit, ferritin levels, *Helicobacter Pylori* existance, endoscopy and endoscopic pathology results in patients who underwent the FOBT on history and clinical suspicion.

Methods

A total of 400 patients who were admitted to the general surgery polyclinic between 01/12/2016 and 12/12/2017 in Ordu University Medical Faculty Training and Research Hospital were evaluated retrospectively. The data of 349 patients who underwent FOBT was reached. Age and sex, hemoglobin, hematocrit, ferritin levels, upper and lower GIS endoscopy results and pathology results of endoscopic biopsies were recorded. Detection of the fecal occult blood is made by the fecal immunohistochemical testing**.** Hemogram parameters were measured by Sysmex XN 1000 device. According to the World Health Organization Guidelines, the hemoglobin level below of 12 g/dl in women and below of 13 g/dl in men, the hematocrit level below of 36% in women and below of 39% in men, the serum ferritin level below of 50 mg/L and serum vitamin B12 level below of 200 pg/ml for both sexes were considered as low. Endoscopies of the patients were performed by the same specialist and biopsy specimens were evaluated by the same pathologist. Pathology specimens were stained with hematoxylin-eosin and modified giemsa method and examined by light microscopy.

The study was approved by Ordu University Ethics Committee.

Statistical Analysis:

İn our study, descriptive statistics were expressed as mean, standard deviation, minimum and maximum values for continuous variables and were expressed as numbers and percentages for categorical variables. Mann Whitney U test was performed for continuous variables. Chi-square test was used to determine the relationship between categorical variables. The statistical significance level was taken as 5% (p = 0.05) and the statistical package program (SPSS) was used for the calculations.

Results

The study included 349 patients which in 38 (10.9%) with FOBT (+) and 311 (89.1%) with FOBT (-). The mean age of the patients was 55.50 ± 14.74 (min 18-max 88). The mean age was 58.89 ± 12.89 (min 39-max 87) in FOBT (+) group and the mean age was 55.08 ± 14.99 (min 19-max 88) in FOBT (-) group. There was no statistically significant difference between the two groups in terms of the average age (p = 0.27).

Of the 349 patients, 239 (68.5%) were female and 110 (31.5%) were male. İn FOBT (+) group 23 (60.5%) were female and 15 (39.5%) were male. İn FOBT (-) group 216 (69.5%) were female and 95 (30.5%) were male. There was no significant difference between the two groups in terms of gender (p = 0.26).

The mean Hb value of the patients was 13.24 ± 1.78 (8.2-17.2) mg/dl. The mean Hb value was found to be 13.35 ± 1.84 (8.2-17.2) mg/dl in the FOBT (-) group and 12.35 ± 0.78 (11.1-13.2) mg/dl in FOBT (+) group. There was a statistically significant difference between the two groups in

terms of Hb value (p <0.05). The mean Htc value was %40,24 ± 4.72 (27.6-51.7). The mean Htc value was found to be % 40.18 ± 4.96 (27.76-51.7) in the FOBT (-) group and % 38.16 ± 2.74 (33.5-45.4) in FOBT (+) group. There was a statistically significant difference between the two groups in terms of Htc value (p <0.05).

When the patients were examined for anemia; it was detected in 49 (20.5%) female and 47 (42.7%) male patients. There was a statistically significant difference between two sexes in terms of anemia (p <0.001). Anemia was detected in 14 (36.8%) patients with (+) FOBT and in 82 (26.4%) patients with (-) FOBT. There was no statistically significant difference between the two groups in terms of anemia (p = 0.17). The mean ferritin value of the patients was 78.22 ± 74.85 (3.10-503) mg/L. There was no statistically significant difference between the groups in term of ferritin values (p> 0.05).

Helicobacter Pylori was detected in 3 patients of FOBT (+) in 15 patients of FOBT (-) group. There was no statistically significant difference between the two groups in terms of *H. pylori* presence (p = 0.31).

Intestinal metaplasia was not detected in any patients of FOBT (+) group but was detected in 7 patients of FOBT (-) group. There was no statistically significant difference between the two groups in terms of the presence of intestinal metaplasia (p = 0.44) (Table 1).

Table 1. Analysis of Age, Gender, Hemoglobin, Ferritin, *H. pylori*, Intestinal Metaplasia

Variables	FOBT (+) (n=38)	FOBT (-) (n=311)	P value
Age (mean ± sd)	58.89 ± 12.89	55.08 ± 14.99	0.27*
Gender			0.26**
Female	23	216	
Male	15	95	
Hemoglobin (g/dl)	12.35 ± 0.78	13.35 ± 1.84	<0.05*
Ferritin (mg/L)	59.54 ± 44.56	80.19 ± 77.18	0.40*
H. pylori	3	15	0.31*
Intestinal metaplasia	-	7	0.44*

*: Mann-Whitney U test was used. **: Chi-square test was used. P <0.05 was considered significant.

103 (29.5%) patients underwent upper GIS endoscopy and 246 (70.5%) did not. The rate of upper GIS endoscopy was 44.7% in patients with FOBT (+) (n = 17) and 27.6% in patients with FOBT (-) (n = 86). There was a significant difference between the two groups in terms of the rate of upper gastrointestinal endoscopy (p = 0.03).

Upper GIS endoscopy in FOBT (+) patients revealed antral gastritis in 7 patients, alkaline reflux gastritis in 1, pangastritis and bulbitis in 7, duodenal ulcers in 1 and normal in 1 patient. Upper GIS endoscopy in FOBT (-) patients revealed antral gastritis in 23 patients, alkaline reflux gastritis in 4, pangastritis in 5, esophagitis, pangastritis and bulbıtis in 18, pangastritis and bulbıtis in 21, alkaline reflux gastritis in 6, duodenal ulcer in 3, malignancy in 1 and normal in 1. There was no significant difference between endoscopic biopsy results between the two groups (p = 0.11) (Table 2).

79 (22.6%) of the patients underwent colonoscopy and 251 (77.7%) were not performed. The rate of colonoscopy was 47.4% in patients with FOBT (+) (n = 18) and 19.5% in patients with FOBT (-) (n = 61). There was a significant difference between the two groups in terms of the rate of colonoscopy (p <0.001).

18 of the patients (47.4%) with (+) FOBT underwent colonoscopy. Hemorrhoidal disease was detected in 12 patients, neoplastic adenoma in 2 patients and malignancy in 4 patients. 61 of the patients (%19,6) with (-) FOBT underwent colonoscopy. Hemorrhoidal disease was found in 23 patients, non-neoplastic adenoma in 4, neoplastic adenoma in 11, colitis in 8, malignancy in 1, diverticulosis in 1 and normal in 13 patients. There was a statistically significant difference between the two groups in terms of disease diagnoses (p <0.001) (Table 3).

Table 2. Comparative pathology results of upper gastrointestinal endoscopy

Pathological outcome	FOBT (+)	FOBT (-)
Antral gastritis	7	23
Alkaline reflux gastritis	1	10
Pangastritis and bulbitis	7	21
Duodenal ulcers	1	3
Normal	1	5
Pangastritis in 5	-	5
Esophagitis, pangastritis and bulbıtis	-	18
Malignancy	-	1
Total	n=17	n= 86
	44.7%	27.6%
		(p = 0.11)

Table 3. Comparative pathology results of the colonoscopy

Pathological outcome	FOBT (+)	FOBT (-)
Hemorrhoidal disease	12	23
Neoplastic adenoma	2	11
Malignancy	4	1
Non-neoplastic adenoma	-	4
Colitis	-	8
Diverticulosis	-	1
Normal	-	13
	18 (47,4%)	61 (19,6%) (p <0.001)

Discussion

Colorectal cancer is the third most common cancer in men and the second most common cancer in women worldwide (Torre et al., 2012). Due to its slow progression from detectable precancerous lesions, initially symptoms may be nospecific and may be far from being diagnostic and early detection by screening test may be significantly life saver. Screening programs can reduce CRC mortality by 15–30% (Mandel et al., 2000; Von Karsa et al., 2013; Qaseem et al., 2012). FOBT is available, cheap and noninvasiv test for the CRC screening. The test sensitivity appears to be about 50 ([Lansdorp-Vogelaar et al.,2009). In our study, 22.6% of patients had colonoscopy. This may be due to the small number of patients with positive FOBT results. In addition, 47.4% of patients with FOBT positive and 19.6% of FOBT negative patients too underwent colonoscopy. It is expected to apply colonoscopy which is invasive but diagnostic, more specific and which allows for biopsy in FOBT positive patients. However, colonoscopy was decided even in up to 20% of patients with negative FOBT too. In this decision, other risk factors for colorectal cancer were taken into consideration by the clinician. To determine the CRC risk ratio, a number of CRC prediction models have been designed and validated in different settings (Williams et al.,2016; Rodriguez-Alonso et al., 2015). Other factors as age, sex and questionnaire-based information were used to make colonoscopy decision beside the FOBT (Joaquin et al., 2017). In our study, the mean age of the patients who underwent colonoscopy with negative FOBT was 54.95 ± and 37 (60.7%) were female and 24 (39.3%) were male of these patients. The mean age of the patients, with other risk factors, may have led to the decision of endoscopy.

In our study, 21 patients with positive FOBT refused to undergo upper gastrointestinal endoscopy. It is certain that this will cause a delay in the diagnosis of patients and a decrease in the percentage of possible malignancy diagnosis. Several complex factors play a role in affecting the patient's participation and sustained adherence. Screening rates have not increased as much as desired and remain at approximately 60% (Sabatino et al.,2015).

Similar and benign diagnoses were detected in upper GIS endoscopy of FOB positive and negative patients. In fact, one malignancy detection is in the FOB negative group. Already, it is known that clinical suspicion is more prominent than FOB in the suspicion of stomach and duodenal cancer. However, as known that atrophic gastritis and intestinal metaplasia are precancerous, early detection of these patients is important in terms of prognosis and mortality (Vannella et al., 2011).

In our study, *Helicobacter Pylori* (Hp) was detected in some of patients in FOBT (+) and both in FOBT (-). Hp is the causative agent of chronic gastric infections, and it has been estimated that at least half of the world's population is infected. A recent meta-analysis on the global prevalence of Hp infection has shown an overall prevalence of 44.3% (Zamani M et al., 2018). Socio-economic status, together with the level of urbanization and sanitation conditions, likely reflects the differences of Hp prevalence from country to country (Hooi et al., 2017). İt is involved in the etiology of many gastrointestinal diseases as gastritis, peptic ulcer, functional dyspepsia, stubborn iron deficiency anemia, gastric mucosa-associated lymphoma (maltoma) and gastric adenocarcinoma (Lee et al., 2016; Bae et al., 2018; Adamu et al., 2010). Hp as the main cause of gastritis confined to the antral mucosa and causes duodenal ulcer (Marshall. et al.,1984). Moreover, it has become clear that oxyntic atrophy is essential for gastric cancer (Testoni et al. 1987) including the carcinogenic effect of Hp infection (Uemura N et al., 2001).

Conclusion

Colorectal cancer is one of the most common cancers in the world. Therefore, importance should be given to its screening and detection. The FOBT is a useful and simple guide in colorectal cancer screening also in peptic ulcer or gastric cancer which can be followed by chronic bleeding. On the other hand, Hp should be detected and treated because it is accepted precancerous and it causes many benign and malignant diseases of the stomach. We observed that patients were not aware

of early cancer diagnosis by FOBT follow-up and endoscopy. Patients should be well informed about the FOBT importance about early detection of colorectal malignancy.

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