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Screening Fecal Occult Blood Test and Colon Cancer

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Abstract: ***Background:*** Colon cancer is a major cause of cancer-related deaths worldwide, with increasing incidence, particularly in high-risk populations. Early detection through screening, such as the Fecal Occult Blood Test (FOBT), can significantly reduce morbidity and mortality. FOBT, which detects microscopic blood in stool, is a simple, cost-effective, and non-invasive method. Screening programs using FOBT are especially valuable in high-risk populations, though their effectiveness in different groups remains under study. ***Aim of the study:*** This study aims to evaluate the effectiveness of screening FOBT in the early detection and prevention of colon cancer by analyzing its role in influencing treatment outcomes and adverse effects. ***Methods:*** This retrospective observational study, conducted at the Department of (Name), (Name) Medical College and Hospital, Saudi Arabia, included 500 patients aged 40 and older who underwent FOBT screening for colon cancer between March and October 2016. Data were gathered from electronic medical records (EMR), covering demographics, medical history, FOBT results, follow-up procedures, diagnosis, treatment plans, and outcomes. Inclusion criteria were patients with complete records and FOBT screening, while exclusions included those under 40, incomplete records, and those not screened. Statistical analysis was performed using SPSS, with results expressed as means ± SD and frequencies/percentages. ***Result:*** The majority of patients are aged between 40 and 69, with a significant portion (30.0%) aged 50-59. Male patients make up 60% of the sample. Notably, 40% have a family history of colon cancer, and 20% have a history of polyps. The FOBT test was positive in 20%, with 10% showing precancerous lesions and 12% diagnosed with cancer. Treatment predominantly involves surgery (9%) and chemotherapy (4%). Most patients (78%) have no disease post-treatment, though complications occur in 10%. ***Conclusion:*** According to our study findings Fecal Occult Blood Test (FOBT) is effective for early colon cancer detection, identifying precancerous lesions and various cancer stages. With a 20% positivity rate, FOBT led to timely colonoscopies, improving patient outcomes.

Keywords: Screening tool, Fecal Occult Blood Test and Colon Cancer.

INTRODUCTION

Colon cancer is a leading cause of cancer-related death worldwide, with its incidence rising, particularly among high-risk populations [1]. Over the past 40 years, cancer-related mortality has increased by nearly 40% [2], and it is projected to rise another 60% over the next 15 years, with an estimated 13 million cancer deaths in 2030 [3]. Early detection is crucial in reducing the morbidity and mortality associated with colon cancer, as it enables timely intervention, which greatly improves patient outcomes [4]. Both healthcare professionals and the general public are increasingly recognizing that most colorectal cancers, as well as the majority of deaths from this disease, are preventable through screening. Screening involves searching for cancer and precancerous polyps (adenomas) in individuals who do not exhibit symptoms. Colorectal cancer has several characteristics that make it particularly suitable for screening. The Fecal Occult Blood Test (FOBT) is a non-invasive screening method that has gained recognition for its potential to detect early-stage colorectal cancer (CRC) through the identification of microscopic amounts of blood in the stool [5]. FOBT is based on the premise that colorectal neoplasms, including cancers and large polyps, often bleed into the gastrointestinal tract, which can then be detected in feces. The test is relatively simple, cost-effective, and can be administered at home, making it an attractive screening tool for the general population [6]. The two primary types of FOBT used in clinical practice are the guaiac-based FOBT (gFOBT) and the immunochemical FOBT (iFOBT), with the latter being more sensitive and specific for detecting blood associated with colorectal neoplasms [7]. Although FOBT has been recommended as part of routine screening for colorectal cancer in many countries, its effectiveness in various demographic groups and its role in reducing mortality from CRC continue to be subjects of ongoing research [8]. Screening programs that incorporate FOBT are particularly valuable in

populations with a high prevalence of colorectal cancer or those at greater risk due to family history, lifestyle factors, or underlying medical conditions [9]. However, challenges such as test adherence, false positives, and false negatives have been highlighted in studies, which emphasize the need for further refinement of screening strategies [10,11]. This study aims to evaluate the effectiveness of screening FOBT in the early detection and prevention of colon cancer by analyzing its role in influencing treatment outcomes and adverse effects.

METHODOLOGY AND MATERIALS

This is a retrospective observational study conducted at the Department of (Name), (Name) Medical College and Hospital in Saudi Arabia. The study includes 500 patients who underwent FOBT screening for colon cancer during one year from March 2016 to October 2016. Patients were selected based on the following inclusion and exclusion criteria. Before collecting data informed consent was obtained from all patients included in the study. The study was approved by the hospital's Institutional Review Board (IRB). Patient confidentiality and data privacy were maintained throughout the study.

Inclusion Criteria:

- Patients aged 40 years and older.
- Patients who underwent FOBT screening within the study period.
- Patients with complete medical records.

Exclusion Criteria:

- Patients with incomplete medical records.
- Patients younger than 40 years.
- Patients who did not undergo FOBT screening.

Data Collection:

Data were collected from the hospital's electronic medical records (EMR) system, encompassing a comprehensive range of information. Demographic details included age and gender, while medical history covered a family history of colon cancer, previous colonoscopies, history of polyps, and history of inflammatory bowel disease (IBD). FOBT (Fecal Occult Blood Test) details specify the type of FOBT (Guaiac-based or Immunochemical) and the results (Positive, Negative, Invalid). Follow-up procedures involved colonoscopy findings and biopsy results, if applicable. The diagnosis and treatment section recorded the final diagnosis (No cancer, Precancerous lesions, Stage 0-IV cancer) and the treatment plan (Surgery, Chemotherapy, Radiation therapy, Combination therapy, No treatment). Lastly, outcomes were noted, including the patient's status (No evidence of disease, Remission, Stable disease, Progressive disease, Deceased) and any adverse events.

Statistical Analysis:

All statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS, version 26.0) for Windows. Continuous parameters were expressed as mean ± standard deviation (SD), while categorical parameters were presented as frequencies and percentages.

RESULT

The largest portion of the patients is between 40 and 69 years; 150(30.0%) of them are aged 50 to 59 years. There were more male patients (60.0%) compared to female patients (40.0%) in this study (Table 1). Analyzing the data of patient's clinical history, 200 (40.0%) of patients have a family history of colon cancer, which means that part of the population may be subjected to colon cancer risk factors due to heredity. However, family history is unknown among 50.0% of them, and 10.0% were unspecified, hence the need to employ mass screening. 38(7.6%) of the patients had undergone colonoscopy before. This is an indication that a majority of the population is probably going through their first substantial screening for colon cancer with the FOBT. Among the study population, there is a history of polyps among 100(20.0%) patients, while there is a history of IBD among only 10.0 % of the patients (table 2). Based on the results obtained in Table 3, the FOBT is positive in 20.0% of the samples. Disregarding 90(18, 0%) samples, 390(78.0%) results are negative, while 10(2.0%) tests are invalid, meaning that there is little room for errors with testing. Out of the patients who tested positive for FOBT, 8(40.0%) had no endoscopic findings, while 6(30.0%) patients, 20.0% and 2(10.0%) had sigmoidoscopic findings of Polyps, Adenomas and Carcinoma respectively (Table 4). Table 5 shows that the majority of 390(78.0%) patients did not have cancer detected. However, 10.0% of the subjects had precancerous lesions, and a total of 12.0% presented with various stages of cancer. Furthermore, the majority, 83.0% of patients, did NOT need treatment, probably because of the high negative results recorded. Surgery (9.0%) is the primary treatment in the management of cancer patients, while chemotherapy was reported to be used in only 4.0% of patients with cancer or precancerous diseases, and other treatment modalities reveal variations in the therapy (Table 7). Out of 500 patients, 390(78.0%) have no disease manifestations after treatment, and 50(10.0%) are in remission, meaning many patients are well-managed. Nevertheless, 6.0 % still have stable disease, 4.0% still have progressive disease, and 2.0% have died, which indicates that the management of advanced cases is still problematic (Table 7). Of the 450 patients, 450 (90.0%) patients did not have any complications which implies that screening and treating patients for PID is relatively safe for the majority of the patients. Nonetheless, 20 (4.0%) developed infections, 2% had

bleeding, 2% had perforations, and 2% had other complications, as shown in Table 8 below.

Table 1: Demographical characteristics of the study population (N=500)

Variables	Frequency (n)	Percentage (%)
Age Range (in years)		
<40	75	15.00
40-49	125	25.00
50-59	150	30.00
60-69	100	20.00
≥70	50	10.00
Gender		
Male	300	60.00
Female	200	40.00

Table 2: Clinical history of the study population (N=500)

Variables	Frequency (n)	Percentage (%)
Family History of Colon Cancer		
Yes	200	40.00
No	250	50.00
Unknown	50	10.00
Previous Colonoscopy		
Yes	150	30.00
No	350	70.00
History of Polyps		
Yes	100	20.00
No	400	80.00
History of IBD		
Yes	50	10.00
No	450	90.00

Table 3: Findings of Fecal Occult Blood Test (FOBT)

FOBT Result	Frequency (n)	Percentage (%)
Positive	100	20.00
Negative	390	78.00
Invalid	10	2.00
Total	500	100.00

Table 4: Colonoscopy Findings of Positive FOBT (N=100)

Findings	Frequency (n)	Percentage (%)
No abnormalities	40	8.00
Polyps	30	6.00
Adenomas	20	4.00
Carcinoma	10	2.00
Other	0	0.00
Total	100	20.00

Table 5: Diagnosis report of the study population

Diagnosis	Frequency (n)	Percentage (%)
No cancer detected	390	78.00
Precancerous lesions	50	10.00
Stage 0 (Carcinoma in situ)	5	1.00
Stage I	10	2.00
Stage II	15	3.00
Stage III	20	4.00
Stage IV	10	2.00
Total	500	100.00

Table 6: Distribution of patients-based treatment strategy

Treatment	Frequency (n)	Percentage (%)
Surgery	45	9.00
Chemotherapy	20	4.00
Radiation Therapy	10	2.00
Combination Therapy	10	2.00
No treatment	415	83.00
Other	0	0.00
Total	500	100.00

Table 7: Outcome of the study population

Outcome	Frequency (n)	Percentage (%)
No evidence of disease	390	78.00
Remission	50	10.00
Stable disease	30	6.00
Progressive disease	20	4.00
Deceased	10	2.00
Total	500	100.00

Table 8: Adverse events of the study population

Complications	Frequency (n)	Percentage (%)
None	450	90.00
Infection	20	4.00
Bleeding	10	2.00
Perforation	10	2.00
Other	10	2.00
Total	500	100.00

DISCUSSION

This study aimed to assess the outcomes of fecal occult blood test (FOBT) screening for colon cancer among 500 patients at a tertiary care hospital in Saudi Arabia. The findings underscore the significance of early detection and follow-up procedures in identifying and managing colon cancer, which is becoming increasingly important as the global burden of colorectal cancer rises, including in the Middle East region [12]. The study found that a significant proportion of the patients were aged between 40 and 69 years, with the largest group in the 50-59 age range. This is consistent with the global recommendation to initiate routine screening for colon cancer at age 50 [13]. The predominance of middle-aged patients reflects the rising awareness and preventive measures targeted at this age group. Moreover, the study population predominantly consisted of male patients (60.0%), which may be attributed to the higher incidence of colon cancer in men compared to women, as reported in several studies [14]. One notable finding is that 40% of patients reported a family history of colon cancer, which is a well-established risk factor [15]. This supports the notion that family history plays a critical role in the screening and management of individuals at higher risk. However, a large proportion (50%) of patients had no family history, emphasizing the importance of universal screening for all individuals over the age of 40, regardless of family history. FOBT results revealed that 20% of the patients tested positive, which is consistent with the positivity rates observed in other large-scale studies [16]. The positive FOBT results led to follow-up colonoscopies, which revealed a mix of polyps, adenomas, and even carcinomas in 40% of these patients. These findings highlight the importance of colonoscopy as a confirmatory diagnostic tool and emphasize that a positive FOBT result does not necessarily indicate cancer, but it may suggest the presence of precancerous conditions [17]. A follow-up colonoscopy is crucial for the early detection and removal of polyps, which can prevent the progression of colorectal cancer. The diagnosis data revealed that while the majority (78%) had no cancer detected, 10% had precancerous lesions, and 12% were diagnosed with varying stages of cancer. These findings are in line with previous research showing that early detection through screening reduces the mortality rate associated with colorectal cancer [18]. The study also demonstrated that surgical treatment (9%) was the most common intervention, followed by chemotherapy (4%) and radiation therapy (2%). This is in agreement with standard treatment protocols, where surgery is often the first-line approach for localized cancers, followed by adjuvant therapies for more advanced cases [19]. Lastly, while the overall incidence of complications was low (10%), the study found that 4% of patients experienced infections and 2% had bleeding or perforation. These complications, although relatively rare, highlight the risks associated with invasive procedures like colonoscopy and underscore the need

for careful patient selection and monitoring [20]. The main limitation of this study is its retrospective design, which may introduce selection bias and rely on the accuracy of electronic medical records. Additionally, the findings may not be generalizable to populations outside the tertiary care setting.

CONCLUSION

The study concludes that the Fecal Occult Blood Test (FOBT) is an effective screening tool for the early detection of colon cancer, significantly aiding in the identification of precancerous lesions and various stages of cancer. With a 20% positivity rate, the FOBT facilitated timely follow-up colonoscopies, underscoring its role in early intervention. The findings highlight that early detection through screening can reduce mortality rates and improve patient outcomes, with surgery being the primary treatment. Despite some complications, the overall safety of the screening and treatment process was affirmed.

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