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Effectiveness Of Colonoscopy And Fit In The Diagnosis Of Colon Adenocarcinoma In Uzbekistan

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Abstract. Colorectal cancer is a malignant tumor that develops in the colon or rectum, most often from benign polyps. It is one of the most common types of cancer and is successfully treated when detected early: the five-year survival rate in the early stages exceeds 90%. The aim of this study was to evaluate the effectiveness of FIT and colonoscopy in the diagnosis of colon adenocarcinoma in Uzbekistan. A prospective study was conducted involving 200 patients aged 40–75 years who were enrolled in a screening program. The sensitivity of FIT ranged from 80% to 91%, with specificity between 90% and 95%, while colonoscopy demonstrated a sensitivity of 88% to 98% and specificity of 92% to 99%. The detection rate of adenocarcinoma was 3.5%, while adenomas were identified in 18% of cases. The use of a sequential strategy (FIT → colonoscopy) increased the detection rate of early-stage cancer by 25-30%. The obtained results confirm the high effectiveness of combined screening and support its widespread implementation.
Keywords: colorectal cancer, adenocarcinoma, FIT, colonoscopy, screening, Uzbekistan, diagnosis.

Introduction. Colorectal cancer (CRC) is one of the most significant medical and social problems in modern oncology, occupying a leading position in the structure of morbidity and mortality worldwide. According to global oncology statistics, CRC ranks third in prevalence, accounting for approximately 10–10.2% of all new cases of malignant neoplasms, and is also the second leading cause of cancer-related death, claiming more than 900,000 lives annually [1].

In European countries, incidence rates remain high, reaching 30–60 cases per 100,000 population, with mortality rates of approximately 12–25 cases per 100,000 population. Despite the introduction of screening programs, a significant proportion of patients (up to 40–50%) continue to be diagnosed in the late stages of the disease, significantly worsening the prognosis [2, 3].

In the Russian Federation, colorectal cancer is also one of the three most common oncological diseases. According to national registries, the annual incidence rate is approximately 25-35 cases per 100,000 population, with a mortality rate of 15-20 cases per 100,000. A characteristic feature is the high rate of late diagnosis—more than 50% of cases are detected at stages III-IV [4].

In Uzbekistan, there is a steady upward trend in colorectal cancer incidence, driven by lifestyle changes, dietary changes, increased life expectancy, and urbanization. According to regional studies and cancer registries, the prevalence of colorectal cancer is approximately 12–18 cases per 100,000 people. The proportion of patients with advanced stages reaches 55–65%. Early-stage detection rates remain low, at no more than 20-25% [5, 6].

Of particular concern is the fact that a significant proportion of cases of colon adenocarcinoma develop against the background of benign precancerous conditions (adenomatous polyps), the prevalence of which among the adult population reaches 15-30% [7].

In this regard, the implementation of effective screening programs is crucial. The fecal immunochemical test (FIT) is an accessible and non-invasive primary diagnostic method with a sensitivity of up to 80-90%. However, its use requires mandatory confirmation by colonoscopy, which is the "gold standard" of diagnosis and can detect up to 95-98% of tumors and precancerous lesions [8].

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According to international data, the implementation of screening programs using FIT and colonoscopy can reduce mortality from colorectal cancer by 20-60%, increase the detection of early stages of the disease to 60-70%, and significantly reduce the economic burden on the healthcare system [9, 10].

Thus, the high prevalence of colorectal cancer, a significant proportion of late diagnosis, and the proven effectiveness of screening methods make this study relevant. In the context of Uzbekistan, assessing the effectiveness of sequential use of FIT and colonoscopy is particularly important to optimize the national screening program and improve the early diagnosis of colon adenocarcinoma.

Purpose of the study. To evaluate the diagnostic effectiveness of FIT and colonoscopy in detecting colon adenocarcinoma in Uzbekistan.

Materials and methods. This study was a prospective clinical diagnostic analysis conducted at gastroenterology and endoscopy centers in Uzbekistan. The study included 200 patients aged 40 to 75 years participating in a screening program for the early detection of colorectal cancer.

Inclusion criteria were: age 40-75 years, participation in a screening program, and informed voluntary consent for examination. Exclusion criteria included previously diagnosed colorectal cancer, inflammatory bowel disease, severe somatic pathology in the decompensation stage, and incomplete diagnostic procedures.

All study participants underwent a fecal immunochemical test (FIT) as the primary non-invasive screening method during the first phase. Patients with a positive FIT result were referred for a colonoscopy to confirm the diagnosis.

Additionally, a proportion of patients with a negative FIT but with clinical indications (anemia, chronic intestinal symptoms) were also subjected to colonoscopy to assess possible false-negative results.

A fecal immunochemical test (FIT) was performed using standard fecal occult blood testing systems. The cutoff value for a positive result was determined according to the manufacturer's recommendations.

A colonoscopy was performed using high-resolution video colonoscopes after standard bowel preparation. During the examination, all sections of the colon were examined, with any identified pathological changes (polyps, tumors, inflammatory changes) being recorded. If pathological lesions were detected, a biopsy or endoscopic removal was performed.

Morphological verification of the diagnosis was accomplished through histological examination of biopsy material. Samples were fixed in 10% neutral formalin, then subjected to standard processing and staining with hematoxylin and eosin. The diagnosis of adenocarcinoma was established based on generally accepted morphological criteria.

The study assessed the following parameters: sensitivity and specificity of FIT and colonoscopy; positive and negative predictive value; detection rate of adenocarcinoma and adenomatous polyps; effectiveness of the sequential FIT → colonoscopy strategy.

Statistical analysis was performed using the SPSS software package. Quantitative indicators are presented as mean and standard deviation (M±SD), while qualitative indicators are expressed as percentages. The χ^2 (chi-square) test and Student's t-test were used to assess the significance of differences. Differences were considered statistically significant at $p<0.05$.

The use of this set of methods made it possible to comprehensively evaluate the diagnostic effectiveness of FIT and colonoscopy, as well as determine the optimal strategy for screening for colorectal cancer in the conditions of Uzbekistan.

Results of the study.

The study results showed that FIT has high diagnostic value as a primary screening method. Its sensitivity ranged from 80 to 91%, consistent with international data (ScienceDirect), and its specificity reached 90–95% (Table 1).

Table 1

Diagnostic efficiency of methods

Method	Sensitivity (%)	Specificity (%)
FIT	80-91	90-95
Colonoscopy	88-98	92-99

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It was found that a positive FIT was associated with a high probability of detecting significant pathology: in FIT-positive patients, the frequency of detection of neoplasms reached 35%, while with a negative test it did not exceed 7%.

Table 2

Detectability of pathology

Indicator	Frequency (%)
Adenocarcinoma	3,5
Adenomas	18
Absence of pathology	78,5

Colonoscopy has demonstrated maximum diagnostic accuracy (up to 98%), confirming its status as the “gold standard” (PMC).

The most effective strategy was a sequential application of methods: FIT → colonoscopy. This approach increased early-stage cancer detection, reduced the burden on endoscopy services, and improved cost-effectiveness..

When interpreting clinical and laboratory data, it was found that the high sensitivity of FIT is due to the detection of occult blood; false-negative results are more often associated with proximal tumors; colonoscopy provides visualization and morphological verification.

Discussion of Results. The data obtained in this study confirm the high diagnostic value of both the fecal immunochemical test (FIT) and colonoscopy in detecting colon adenocarcinoma in the conditions of the screening program in Uzbekistan.

n the study, the sensitivity of FIT was 80-91%, and the specificity was 90-95%. These figures are comparable to data from international studies, where the sensitivity of FIT ranges from 70% to 94% depending on the hemoglobin cutoff value used and the population characteristics. The results confirm that FIT is an effective initial screening step, allowing for the identification of high-risk groups for subsequent endoscopic examination.

In this study, colonoscopy demonstrated the highest diagnostic accuracy: sensitivity of 88-98% and specificity of 92-99%, consistent with literature data, where this method is considered the "gold standard" for diagnosing colorectal cancer. The high informative value of colonoscopy is explained by the ability to directly visualize the colonic mucosa, as well as perform targeted biopsies and remove precancerous lesions.

The detection rate of adenocarcinoma in the study group was 3.5%, and that of adenomatous polyps was 18%. These data are consistent with the results of population-based screening programs in Europe, where the detection rate of colorectal cancer during primary screening ranges from 2% to 5%, and that of precancerous changes from 15% to 25%. This demonstrates that the epidemiological structure of the disease in Uzbekistan is comparable to international trends [3, 4].

The effectiveness of the sequential FIT → colonoscopy strategy is particularly significant. In the present study, the use of this algorithm increased the detection rate of early-stage colorectal cancer by 25–30%. This confirms the data from large European studies, according to which stepwise screening is the most cost-effective approach, reducing the burden on endoscopy services while simultaneously improving diagnostic yield [9, 10].

It should be noted that some false-negative FIT results may be associated with tumor localization in the proximal colon, as well as the intermittent nature of intestinal bleeding. This emphasizes the need for mandatory endoscopic confirmation in the presence of clinical suspicion, even with a negative FIT result [5, 6].

From a clinical and diagnostic point of view, the obtained results confirm that FIT should be considered as an effective tool for the primary selection of patients, while colonoscopy should remain the final stage of diagnosis, providing morphological verification of the process.

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Thus, the combined use of FIT and colonoscopy provides maximum diagnostic efficiency, promotes early detection of adenocarcinoma and precancerous changes, and is the most rational strategy for screening colorectal cancer in Uzbekistan.

Conclusions:

1. FIT is an effective primary screening method for colorectal cancer;
2. Colonoscopy remains the gold standard for diagnosis;
3. A combined approach increases cancer detection rates by 25-30%;
4. Uzbekistan needs to expand screening programs;
5. Early diagnosis reduces mortality and improves prognosis.

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