



UDC: 616.34-006.6:616-07:616-089

## **EARLY DIAGNOSIS AND TREATMENT OF COLORECTAL CANCER**

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**Abstract:** Colorectal cancer (CRC) is one of the most common malignant tumors worldwide and a leading cause of cancer-related mortality. The prognosis of colorectal cancer largely depends on the stage at which the disease is diagnosed. Early detection significantly increases survival rates and allows the use of less aggressive treatment methods. This article discusses modern approaches to the early diagnosis of colorectal cancer, including screening methods and diagnostic tools, as well as current principles of treatment at early stages of the disease.

**Keywords:** colorectal cancer, early diagnosis, screening, treatment, prevention

### **Introduction**

Colorectal cancer is a malignant neoplasm arising from the epithelial tissues of the colon or rectum and represents one of the most significant oncological problems in modern medicine. According to global epidemiological data, colorectal cancer consistently ranks among the three most commonly diagnosed malignant tumors worldwide, accounting for a substantial proportion of cancer-related morbidity and mortality. Despite advances in medical science, the incidence of colorectal cancer continues to increase, particularly in developed and rapidly developing countries.

One of the major challenges in the management of colorectal cancer is its insidious and slow progression. In the early stages, the disease often develops without pronounced clinical manifestations, allowing the tumor to grow silently for years. As a result, many patients are diagnosed at advanced stages, when treatment becomes more complex and the prognosis significantly worsens. Non-specific or mild symptoms, such as subtle changes in bowel habits or mild abdominal discomfort, are frequently overlooked, further delaying diagnosis.

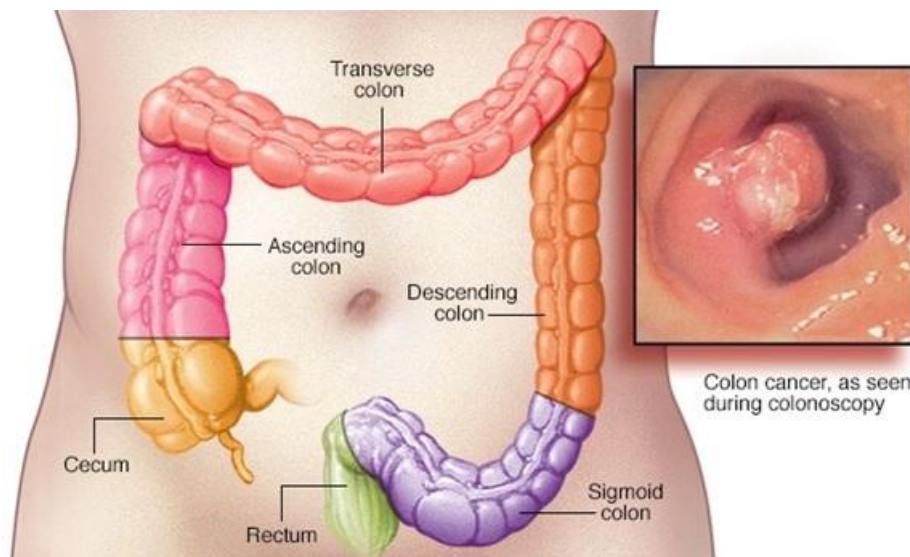
Early detection of colorectal cancer plays a decisive role in improving treatment outcomes and reducing mortality rates. Timely diagnosis enables the identification of precancerous lesions or early-stage tumors, when therapeutic interventions are most effective and less invasive. Moreover, early treatment not only increases survival rates but also significantly improves patients' quality of life by preserving normal bowel function and reducing the need for aggressive therapeutic approaches. Therefore, the development and implementation of effective strategies for early diagnosis remain a priority in the global fight against colorectal cancer.



## Early Diagnosis of Colorectal Cancer

Early diagnosis of colorectal cancer is a complex and multifactorial process that relies on the combination of population-based screening programs, careful clinical evaluation, and the use of modern instrumental and laboratory diagnostic methods. The primary goal of early diagnosis is the detection of precancerous lesions or malignant tumors at an initial stage, when treatment is most effective and patient survival rates are highest.

Screening plays a central role in the early detection of colorectal cancer, particularly among individuals at increased risk. Screening programs are strongly recommended for people over the age of 45–50 years, as well as for patients with a positive family history of colorectal cancer, hereditary cancer syndromes, inflammatory bowel disease, or other known risk factors. Regular screening allows for the identification of asymptomatic disease, which is especially important given the often silent progression of colorectal cancer in its early stages.



Among the available screening methods, fecal occult blood testing (FOBT) and fecal immunochemical testing (FIT) are widely used due to their simplicity, non-invasiveness, and cost-effectiveness. These tests are designed to detect hidden blood in the stool, which may be an early sign of colorectal neoplasia. FIT has largely replaced traditional FOBT in many screening programs because of its higher sensitivity and specificity.

Colonoscopy is considered the gold standard for the early diagnosis of colorectal cancer. This method allows direct visualization of the entire colon and rectum, enabling the detection of small lesions and early-stage tumors. In addition to its diagnostic value, colonoscopy has a significant preventive role, as it allows for the immediate removal of precancerous polyps during the same procedure. Histological examination of biopsy samples obtained during colonoscopy is essential for confirming the diagnosis and determining tumor characteristics.

Additional diagnostic techniques include flexible sigmoidoscopy, which examines the distal colon and rectum, and computed tomography colonography, which provides detailed imaging of

the colon using radiological methods. Although these techniques are less invasive than conventional colonoscopy, they are usually considered complementary tools rather than replacements. Biopsy with subsequent histopathological analysis remains the definitive method for diagnosing colorectal cancer.

Early-stage colorectal cancer often presents with mild, vague, or non-specific symptoms, such as subtle changes in bowel habits, intermittent abdominal discomfort, unexplained iron-deficiency anemia, or general weakness. These symptoms are frequently underestimated or attributed to benign conditions, leading to delays in diagnosis. This emphasizes the critical importance of regular screening examinations, even in individuals who do not report any noticeable symptoms.

**Table: Main Methods for Early Diagnosis of Colorectal Cancer**

Diagnostic Method	Purpose	Advantages	Limitations
FOBT	Detection of occult blood in stool	Non-invasive, inexpensive, suitable for mass screening	Low specificity, false-positive results
FIT	Detection of human hemoglobin in stool	Higher sensitivity and specificity than FOBT	Requires regular repetition
Colonoscopy	Direct visualization and polyp removal	Gold standard, diagnostic and therapeutic	Invasive, requires bowel preparation
Sigmoidoscopy	Examination of distal colon	Less invasive than colonoscopy	Does not examine entire colon
CT Colonography	Radiological visualization of colon	Non-invasive, detailed imaging	Cannot remove polyps
Biopsy	Histological confirmation	Definitive diagnosis	Requires invasive procedure





### **Treatment of Early-Stage Colorectal Cancer**

The choice of treatment strategy for colorectal cancer is determined by several key factors, including the stage of the disease, the anatomical location of the tumor, histopathological characteristics, and the patient's general health status. In cases of early-stage colorectal cancer, particularly stage I and selected stage II tumors, surgical intervention remains the cornerstone of treatment and is often associated with a high probability of complete cure.

Surgical resection aims to remove the primary tumor along with an adequate margin of healthy tissue and regional lymph nodes. When colorectal cancer is diagnosed at an early stage, surgery alone is frequently sufficient to achieve long-term disease control. Advances in surgical techniques have significantly improved treatment outcomes, reducing postoperative complications and enhancing patient recovery.

Minimally invasive approaches, such as laparoscopic and endoscopic resections, are increasingly preferred in the management of early-stage colorectal cancer. These techniques offer numerous advantages over traditional open surgery, including reduced surgical trauma, decreased postoperative pain, shorter hospital stays, and faster return to normal daily activities. From an oncological perspective, minimally invasive procedures have been shown to provide outcomes comparable to those of open surgery, while preserving patients' quality of life.

In selected cases, particularly in stage II disease with unfavorable prognostic factors such as poor tumor differentiation, lymphovascular invasion, or incomplete tumor resection, adjuvant chemotherapy may be recommended. The purpose of adjuvant therapy is to eliminate microscopic residual disease and reduce the risk of cancer recurrence. The decision to initiate chemotherapy is individualized and based on a careful assessment of potential benefits and risks.

Early diagnosis plays a decisive role in enabling less aggressive and more effective treatment strategies. When colorectal cancer is detected at an early stage, patients can often avoid extensive surgical procedures and intensive systemic therapy. As a result, early-stage treatment is associated with significantly improved long-term survival rates, lower recurrence risk, and better overall quality of life. These findings underscore the importance of timely diagnosis and early intervention in the successful management of colorectal cancer.

### **Prevention and Prognosis**

Prevention of colorectal cancer is a multifaceted process that includes both primary and secondary preventive measures aimed at reducing disease incidence and improving patient outcomes. Primary prevention focuses on lifestyle modifications that are known to decrease the risk of colorectal cancer development. A balanced and nutritious diet rich in dietary fiber, fruits, vegetables, and whole grains plays a significant role in maintaining normal bowel function and reducing exposure of the intestinal mucosa to carcinogenic substances. Regular physical activity



contributes to improved metabolic regulation, weight control, and overall gastrointestinal health. In addition, avoidance of tobacco use and limitation of alcohol consumption are essential preventive measures, as smoking and excessive alcohol intake are well-established risk factors for colorectal malignancies.

Secondary prevention is primarily based on the early detection of colorectal cancer through systematic screening programs. Regular screening remains the most effective and evidence-based strategy for preventing colorectal cancer-related mortality. Screening not only allows for the early identification of malignant tumors but also enables the detection and removal of precancerous lesions, thereby preventing the development of invasive cancer. The implementation of population-based screening programs has been shown to significantly reduce both the incidence and mortality of colorectal cancer, particularly when individuals adhere to recommended screening intervals.

The prognosis of colorectal cancer is closely related to the stage at which the disease is diagnosed. When detected at an early stage, colorectal cancer is associated with a highly favorable prognosis. In stage I disease, five-year survival rates exceed 90%, reflecting the effectiveness of early intervention and modern treatment approaches. As the disease progresses to more advanced stages, survival rates decrease substantially, underscoring the importance of early diagnosis and timely treatment.

Overall, the combination of preventive lifestyle measures and regular screening plays a crucial role in improving long-term outcomes for patients with colorectal cancer. Early-stage detection not only increases survival rates but also allows for less aggressive treatment, reduced risk of recurrence, and better quality of life. These factors highlight the essential role of prevention and early diagnosis in the comprehensive management of colorectal cancer.

## **Conclusion**

Early diagnosis and timely treatment of colorectal cancer represent fundamental elements in reducing disease-related mortality and improving overall patient outcomes. Given the often asymptomatic and slowly progressive nature of colorectal cancer in its initial stages, early detection remains a critical challenge in modern clinical practice. However, when the disease is identified at an early stage, therapeutic interventions are significantly more effective, less aggressive, and associated with markedly improved survival rates.

The implementation of comprehensive and well-organized screening programs plays a central role in the early detection of colorectal cancer. The use of modern diagnostic methods, including endoscopic, radiological, and laboratory techniques, allows for accurate identification of precancerous lesions and early-stage tumors. In parallel, advances in surgical techniques and adjuvant therapies have substantially improved treatment outcomes, enabling curative management in the majority of early-stage cases.

Equally important is the role of public awareness and education in the prevention and early diagnosis of colorectal cancer. Increasing awareness about risk factors, early symptoms, and the importance of regular screening encourages individuals to seek medical evaluation in a timely



manner. Ensuring broad access to screening services and modern treatment options is essential for reducing disparities in healthcare outcomes and enhancing the effectiveness of colorectal cancer control strategies.

In conclusion, a combined approach that integrates preventive measures, early diagnostic strategies, and modern therapeutic interventions is crucial in the fight against colorectal cancer. Strengthening screening programs, promoting healthy lifestyles, and improving access to medical care will contribute significantly to reducing the global burden of this disease and improving the quality of life for affected patients.

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