

Rectal Cancer: Causes Symptoms Diagnosis and Treatment

Jeshmin Willson*

Department of Oncology, Global Institute for Pulmonary Research, New York, USA

Introduction

Rectal cancer is a type of colorectal cancer that specifically affects the rectum, the final portion of the large intestine. It develops when abnormal cells grow uncontrollably in the rectal lining, forming tumors. Rectal cancer is a major global health concern, with increasing incidence rates, particularly in older adults [1]. However, recent trends indicate a rising prevalence among younger individuals. Advances in medical research have led to improved diagnostic techniques and treatment options, enhancing survival rates and patient outcomes [2]. This article explores the causes, symptoms, risk factors, diagnostic approaches, treatment options, and preventive measures associated with rectal cancer [3]. Rectal cancer is a significant global health concern, accounting for a considerable percentage of colorectal malignancies. It arises from the inner lining of the rectum, often beginning as a benign polyp before undergoing genetic and molecular changes that lead to malignancy [4]. As one of the leading causes of cancer-related morbidity and mortality worldwide, rectal cancer necessitates early detection and effective treatment strategies to improve patient outcomes [5]. In recent years, advancements in medical research have provided a deeper understanding of the etiology, risk factors, and pathophysiology of rectal cancer [6]. Various lifestyle and genetic components contribute to its development, with factors such as diet, smoking, obesity, and inflammatory bowel disease playing pivotal roles. Despite its alarming prevalence, early diagnosis through advanced screening techniques, including colonoscopy, biopsy, and imaging, has significantly enhanced survival rates [7]. The primary symptoms of rectal cancer often overlap with other gastrointestinal disorders, making early detection challenging. Symptoms such as rectal bleeding, altered bowel habits, abdominal pain, and unexplained weight loss often necessitate thorough medical evaluation. Given the complexities surrounding rectal cancer, a multidisciplinary approach incorporating surgical intervention, chemotherapy, radiation therapy, and targeted therapies has revolutionized treatment modalities [8].

This paper provides an in-depth analysis of the causes, symptoms, diagnostic approaches, and treatment options for rectal cancer. By shedding light on the latest research and medical advancements, it aims to enhance awareness and contribute to the growing body of knowledge in oncology.

Causes and risk factors

Genetic mutations play a crucial role in rectal cancer development. Inherited conditions such as Lynch syndrome and familial adenomatous polyposis (FAP) significantly increase the risk. These syndromes are linked to genetic mutations that predispose individuals to colorectal cancers, including rectal cancer.

Lifestyle and environmental factors

Several lifestyle and environmental factors contribute to the development of rectal cancer:

Diets high in red and processed meats and low in fiber, fruits, and vegetables are associated with an increased risk.

Excess body weight is linked to chronic inflammation, insulin resistance, and hormonal imbalances that may promote cancer growth.

A sedentary lifestyle can increase the likelihood of developing rectal cancer.

Long-term tobacco use and excessive alcohol intake are known risk factors for many cancers, including rectal cancer.

Medical conditions

Certain pre-existing medical conditions elevate the risk of rectal cancer, including:

Conditions such as ulcerative colitis and Crohn's disease cause chronic inflammation in the digestive tract, increasing cancer risk.

Insulin resistance and high blood sugar levels may contribute to the development of rectal cancer.

Symptoms of rectal cancer

Rectal cancer symptoms often resemble those of other gastrointestinal conditions, which can lead to delayed diagnosis. Common symptoms include:

Persistent diarrhea, constipation, or alternating bowel habits may indicate rectal cancer.

Rectal bleeding or dark, tarry stools suggest internal bleeding caused by tumors.

Discomfort in the lower abdomen can result from tumor growth or intestinal obstruction.

Sudden, unintended weight loss is a common cancer symptom.

Anemia caused by blood loss from tumors can lead to persistent fatigue.

Diagnosis of rectal cancer

A physician will review the patient's symptoms, medical history, and family history. A digital rectal exam (DRE) may be performed to detect abnormalities.

A flexible tube with a camera is inserted into the rectum to examine

***Corresponding author:** Jeshmin Willson, Department of Oncology, Global Institute for Pulmonary Research, New York, USA, E-mail: jesh6390_w@gmail.com

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the colon and rectum for polyps or tumors.

A procedure similar to a colonoscopy but limited to the rectum and lower colon.

If abnormal growths are found, a tissue sample is taken for histopathological examination.

Determining the stage of rectal cancer is essential for treatment planning. Common imaging tests include:

- Helps assess tumor size and detect metastasis.

- Provides detailed images of the rectum and surrounding tissues.

- Detects cancerous cells in different parts of the body.

Stages of rectal cancer

Rectal cancer is classified into five stages:

- Cancer is confined to the innermost rectal lining (carcinoma in situ).

- Tumor has grown into the rectal wall but has not spread to lymph nodes.

- Cancer has invaded nearby tissues but not the lymph nodes.

- Cancer has spread to nearby lymph nodes but not distant organs.

- Cancer has metastasized to distant organs such as the liver or lungs.

Treatment strategies depend on the cancer stage, location, and overall patient health.

Surgical removal of tumors is the primary treatment for localized rectal cancer. Options include:

- For early-stage rectal cancer, the tumor is removed without major surgery.

- Removes the affected rectum while preserving normal bowel function.

- Involves removing the rectum and anus, requiring a permanent colostomy.

- High-energy radiation targets cancer cells, often used before surgery to shrink tumors or after surgery to eliminate residual cancer.

- Drugs such as 5-fluorouracil (5-FU) and oxaliplatin are used to kill cancer cells. Chemotherapy may be used before surgery (neoadjuvant therapy) or after surgery (adjuvant therapy).

Targeted therapy and immunotherapy

For advanced cases, newer treatments include:

- Uses drugs like cetuximab and bevacizumab to block specific cancer growth pathways.

- Helps the immune system recognize and attack cancer cells, particularly for tumors with specific genetic mutations.

The prognosis of rectal cancer depends on the stage at diagnosis and treatment response.

High survival rates, with over 80% of patients surviving beyond five years.

The five-year survival rate ranges from 50-70%, depending on lymph node involvement.

Advanced cancer has a lower survival rate, around 10-20%, but emerging therapies are improving outcomes.

Preventive measures

Routine colonoscopies help detect precancerous polyps and early-stage cancers. The American Cancer Society recommends screening starting at age 45 or earlier for high-risk individuals.

- Fruits, vegetables, and whole grains support gut health.

- Reducing consumption lowers colorectal cancer risk.

- Obesity increases the likelihood of rectal cancer.

- Physical activity reduces cancer risk.

- Both are significant risk factors for rectal cancer.

Individuals with a family history of colorectal cancer should undergo genetic counseling and testing for inherited mutations.

Conclusion

Rectal cancer is a serious but treatable disease when detected early. Advances in screening, diagnosis, and treatment have improved survival rates and patient outcomes. Understanding risk factors, recognizing symptoms, and adopting preventive measures can significantly reduce the burden of rectal cancer. Regular screenings, a healthy lifestyle, and early intervention remain the best defense against this disease. As research progresses, newer therapies continue to offer hope for better management and long-term survival. Rectal cancer remains a formidable challenge in the realm of oncology, impacting thousands of individuals worldwide each year. While significant progress has been made in understanding its pathogenesis, early detection and personalized treatment remain crucial in improving prognosis and survival rates. Comprehensive awareness regarding its risk factors, symptoms, and diagnostic techniques empowers individuals to seek timely medical intervention, potentially preventing disease progression. With the advent of precision medicine, the management of rectal cancer has evolved, offering patients more targeted and effective treatment options. Advances in minimally invasive surgical techniques, immunotherapy, and molecular-targeted therapies continue to refine treatment protocols, improving both quality of life and long-term outcomes for patients.

Despite these advancements, ongoing research and clinical trials remain imperative in furthering our understanding of rectal cancer. Increased investment in public health initiatives, screening programs, and innovative treatment strategies can substantially reduce the burden of this disease. As medical science progresses, the hope remains that improved diagnostic tools and therapeutic interventions will pave the way for a future where rectal cancer is more effectively prevented and treated.

Through continued education, research, and collaboration, the fight against rectal cancer will persist, ultimately fostering better patient care and global health outcomes.

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