

# Colon Cancer – A Review

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## Abstract :

Colorectal cancer is a cancer that starts in the colon or rectum. The colon and the rectum are parts of the large intestine, which is the lower part of the body's digestive system. Most colorectal cancers are adenocarcinomas (cancers that begin in cells that make and release mucus and other fluids). Colorectal cancer often begins as a growth called a polyp, which may form on the inner wall of the colon or rectum. Some polyps become cancer over time. Finding and removing polyps can prevent colorectal cancer. Colorectal cancer is the third most common type of cancer in men and women in the United States. Deaths from colorectal cancer have decreased with the use of colonoscopies and fecal occult blood tests, which check for blood in the stool. Occurrence of colon cancer is prevalent among the population who has shifted their diet from traditional food. Since colon cancer is very common now days, it is important to know the various causes and the available treatments in order to prolong life as much as possible. This review can help people gain knowledge about how it is caused and how it can be prevented.

**Keywords :** colorectal cancer, causes, treatments.

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## INTRODUCTION

Colon cancer is cancer of the large intestine (colon), the lower part of your digestive system. Rectal cancer is cancer of the last several inches of the colon. Together, they're often referred to as colorectal cancers. Most cases of colon cancer begin as small, noncancerous (benign) clumps of cells called adenomatous polyps. Over time some of these polyps become cancerous.[1]

Colon cancer is the third most common cancer, the fourth most common cause of cancer death, and the second most common cancer in terms of the number of individuals living with cancer five years after diagnosis worldwide. An estimated 1,361,000 people are diagnosed with CRC annually; approximately 694,000 people die from Colorectal cancer annually; and 3,544,000 individuals are living with Colorectal Cancer.[2]

Most colorectal cancers are because of lifestyle factors and increasing age with just a little number of cases with basic hereditary disorders. Other danger factors incorporate eating routine, obesity, smoking, and insufficient physical activities. Dietary factors that increase the risk include red and processed meat as well as alcohol.[3] Another risk factor is inflammatory bowel disease, which includes Crohn's disease and ulcerative colitis.[4] Some of the inherited genetic disorders that can cause colorectal cancer include familial adenomatous polyposis and hereditary non-polyposis colon cancer; however, these represent less than 5% of cases.[3][4] It typically starts as a benign tumor, often in the form of a polyp, which over time becomes cancerous.[3]

Treatments used for colorectal cancer may include some combination of surgery, radiation therapy, chemotherapy and targeted therapy.[1] Cancers that are confined within the wall of the colon may be curable with surgery while cancer that has spread widely are usually not curable, with management focusing on improving quality of life and symptoms.

## SIGNS AND SYMPTOMS

The signs and symptoms of colorectal cancer depend on the location of the tumor in the bowel, and whether it has spread in the other parts of the body (metastasis). The warning signs include: worsening constipation, blood in the stool, decrease in stool thickness, loss of appetite, loss of weight, and nausea or vomiting in someone over 50 years old.[5] While rectal bleeding or anaemia are high-risk features in those over the age of 50,[6]

## CAUSE

Greater than 75–95% of colon cancer occurs in people with little or no genetic risk.[7][8] Other risk factors include older age, male gender,[8] high intake of fat, alcohol or red meat, obesity, smoking, and a lack of physical exercise.[7]

## ❖ INFLAMMATORY BOWEL DISEASE

People with inflammatory bowel disease (ulcerative colitis and Crohn's disease) are at increased risk of colon cancer.[9] The risk increases as long the person has the disease[10]. In these high risk groups, both prevention with aspirin and regular colonoscopies are recommended.[10] People with inflammatory bowel disease account for less than 2% of colon cancer cases yearly.[11] In those with Crohn's disease 2% get colorectal cancer after 10 years, 8% after 20 years, and 18% after 30 years.[11] In those with ulcerative colitis approximately 16% develop either a cancer precursor or cancer of the colon over 30 years.[11]

## ❖ GENETICS

Certain genetic syndromes also increase the risk of developing colon cancer. Two of the most common are hereditary nonpolyposis colorectal cancer (HNPCC), also known as Lynch syndrome, and familial adenomatous polyposis (FAP).[8][12]

## **PATHOGENESIS**

Most colorectal carcinomas are created from adenomatous polyp emerging from the glandular epithelium of the intestine[13]. Adenomas are started by somatic mutation of the tumor silencer gene APC[14]. Additional genetic modifications of oncogenes and tumor silencer genes are included in a stepwise development process that happens over years[15]. The accumulation of genetic changes as per chromosomal instability, moves the ordinary intestinal coating to an adenomatous polyp, then high-grade adenoma and lastly to a carcinoma[16,17]. CRC can likewise emerge from nonpolypoid and depressed lesions. Despite the fact that these lesions are less common than that of the polypoid adenoma, they show more aggressive behaviour and more quick development, and they are more hard to diagnose[18,19].

### **Diagnostic Tests**

To help find the cause of symptoms, the doctor evaluates a person's medical history. The doctor also performs a physical exam and may order one or more diagnostic tests.

**X-rays** of the large intestine, such as the Double contrast barium enema (DCBE), can reveal polyps or other changes.

A **sigmoidoscopy** lets the doctor see inside the rectum and the lower colon and remove polyps or other abnormal tissue for examination under a microscope.[16]

A **colonoscopy** lets the doctor see inside the rectum and the entire colon and remove polyps or other abnormal tissue for examination under a microscope.

A **polypectomy** is the removal of a polyp during a sigmoidoscopy or colonoscopy.

A **biopsy** is the removal of a tissue sample for examination under a microscope by a pathologist to make a diagnosis.[17]

### **Screening Test**

Tests for Colon cancer screening are divided into 2 major types,

#### **I. Stool-Based Tests:**

- Guaiac-Based Fecal Occult Blood Test (Gfobt)
- Fecal Immunochemical Test (FIT),
- Fecal DNA Testing.

These tests detect cell debris and blood shed by vascularised polyps, adenomas and cancers[17].

#### **II. Endoscopic And Radiologic Tests :**

- Optical Colonoscopy,
- Flexible Sigmoidoscopy (Fs Or Fsig),
- Double-Contrast Barium Enema (Dcbe),
- Capsule Endoscopy,
- Computed tomography colonography

and are based on direct or radiographic visualization of the polyp or cancer.

#### **❖ Stool-Based Tests :**

- I. **Guaiac-based fecal occult blood testing (gFOBT)** is the most noninvasive form of testing. It consists of testing two separate samples from three consecutive bowel movements.[20] Although this is an effective screening tool for blood in the digestive system, it is nonspecific to its origination.[21] It is also noted that a single sample obtained during a digital rectal exam is

not an effective screening tool; this practice is strongly discouraged.[23][20] Additionally, aspirin, nonsteroidal anti-inflammatory drugs, or red meat consumed several days prior to testing may lead to false-positive results. Vitamin C in excess of 250 mg per day may cause false-negative results. [21]

- II. The **immunochemical fecal occult blood test (FIT)** and Stool DNA are alternative screening tools that may be used Instead of gFOBT.[23][22] One benefit of FIT includes less Dietary and medication restrictions which may increase compliance.[22] Another benefit of FIT is an increased sensitivity, which leads to less false positive Results.[23]
- III. In **stool DNA (sdna)**, the Entire specimen is examined for markers which arise from pre-malignant Adenomas and tumors. However, after Recent data collection, the American Cancer Society and U.S. Multi-Society Task Force (USMSTF) on Colorectal Cancer, along with the American College of Radiology, Concluded that there is significant data to include dna as An acceptable option for colorectal cancer screening.[23] Disadvantages of fecal DNA testing include its expensive cost; the inconvenience stool sampling and shipment to the lab; and the need for colonoscopy if the test is positive.

#### **❖ ENDOSCOPIC AND RADIOLOGIC TESTS**

- I. **Flexible sigmoidoscopy** is an effective tool in reducing mortality from colon cancer.[21] While it is limited in visualisation of the distal colon, this is the most common area of occurrence of adenomas. A sigmoidoscopy may be used to determine if a colonoscopy is necessary.
- II. **Double contrast barium enema (DCBE)** is a lower cost alternative to a colonoscopy, but it has a number of drawbacks. The sensitivity is less for smaller lesions, so it requires a more frequent interval of testing (5 years versus 10 years) than with colonoscopy.[21] It also does not allow for excision of lesions or biopsy during the exam. While information about the DCBE test still occurs in the literature and in screening guidelines, the actual use of this screening tool is not known.
- III. **Colonoscopy** can lead to a decreased incidence of cancer and death due to the detection of precancerous lesions and early stage cancer.[24] Colonoscopy is the most used method for screening due to its ability for complete colonic visualisation and polyp removal.[25] It is estimated that the relative mortality reduction is 25% for those screened via colonoscopy.[26] This reduction in mortality is most likely because of the discovery of early stage cancers. Despite its cost, risk, and inconvenience, colonoscopy is a reliable procedure used for screening beginning at age 50.
- IV. **Computed tomography colonography (CTC)**, also referred to as virtual colonoscopy. It is a minimally invasive method used instead of colonoscopy. The technology required to visualise the entire large intestine has improved since its beginning in the mid 1990's.[23] The advanced technology allows for the

integrated use of both 2D and 3D views for enhanced visualisation and optimum detection of polyps.[23] However, it does not allow for excision of lesions or biopsy during the exam. The ability to visualise extracolonic structures provides an added bonus for the patient.

#### TREATMENT :

The type of treatment your doctor recommends will depend largely on the stage of your cancer. The three primary treatment options are surgery, chemotherapy and radiation.

##### I. Surgery for early-stage colon cancer

If your colon cancer is very small, your doctor may recommend a minimally invasive approach to surgery, such as:

- **Removing polyps during colonoscopy.** If the cancer is small, localised in a polyp and in a very early stage, doctor may be able to remove it completely during a colonoscopy[26].
- **Endoscopic mucosal resection.** Removing larger polyps may require also taking a small amount of the lining of the colon in a procedure called endoscopic mucosal resection.[27]
- **Minimally invasive surgery.** Polyps that can't be removed during colonoscopy may be removed using **laparoscopic surgery**.[28] In this procedure, surgeon performs the operation through several small incisions in the abdominal wall, inserting instruments with attached cameras that display the colon on a video monitor. The surgeon may also take samples from lymph nodes in the area where the cancer is located.

##### II. Surgery for invasive colon cancer

If your colon cancer has grown into or through your colon, your surgeon may recommend:

- **Partial colectomy,** the surgeon removes the part of the colon that contains the cancer, along with a margin of normal tissue on either side of the cancer.[27]
- **Surgery to create a way for waste to leave your body,** this procedure is known as permanent or temporary colostomy.[1] This involves creating an opening in the wall of your abdomen from a portion of the remaining bowel for the elimination of body waste into a special bag. Sometimes the colostomy is only temporary, allowing your colon or rectum time to heal after surgery. In some cases, however, the colostomy may be permanent.
- **Lymph node removal.** Nearby lymph nodes are usually also removed during colon cancer surgery and tested for cancer. [27]

##### III. Surgery for advanced cancer

If the cancer is very advanced or the overall health of the patient is very poor, doctor may recommend an operation to relieve a blockage of the colon or other conditions in order to improve symptoms. This surgery isn't done to cure cancer,

but instead to relieve signs and symptoms, such as bleeding and pain.

In specific cases where the cancer has spread only to the liver and if the overall health of the patient is good, doctor may recommend surgery to remove the cancerous lesion from your liver.

- **Chemotherapy,** uses drugs to destroy cancer cells. For colon cancer this is usually given after surgery if the cancer has spread to the lymph nodes. In this way, it may help reduce the risk of cancer recurrence. Chemotherapy may be used before surgery to shrink the cancer before an operation.[8]
- **Radiation therapy,** it uses powerful energy sources, such as X-rays, to kill cancer cells that might remain after surgery, to shrink large tumours before an operation so that they can be removed more easily, or to relieve symptoms of colon cancer and rectal cancer.[8] Its use in colon cancer is not routine due to the sensitivity of the bowels to radiation.[30]

#### CONCLUSION:

The cause of colorectal is still unknown. Some factors that would place individuals at risk for colon cancer would be age, gender, race and ethnicity and socioeconomic status. Some experts mention diet and nutrition can influence the incidence of colon and rectal cancer. It is suggested for patients to obtain screening for colon and rectal cancer at age 50 and older and with family history of colon cancer to have a screen performed as young as age 45. Men have higher incidence of colorectal cancer than women, except in older ages. Caucasian men and women have a lower incidence of the disease than African American men. A focus on dietary intake of eighty percent high fat diet of fatty meats and processed meats increase the risk for colorectal cancer.

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