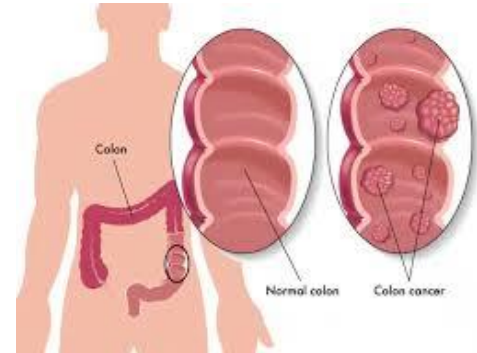


Colorectal cancer

Introduction:

Definition and Overview:

Rectal cancer occurs when there are changes (mutations) to the DNA of normal cells in the rectum. A cell's DNA contains instructions that tell the cell what to do. These changes direct cells to grow uncontrollably and to continue living even after healthy cells die

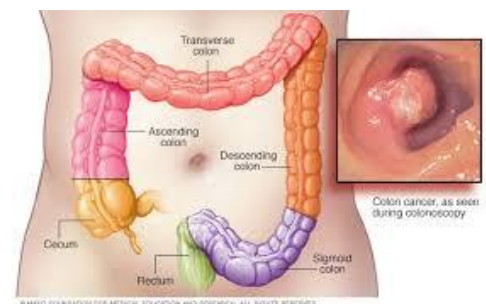


Historical Context:

In the nineteenth century, doctors began documenting cases of cancerous tumors in the intestine more accurately. 1865 Surgeon Sir James described a colon tumor in detail. With the development of medical imaging techniques, such as X-rays and endoscopy, it became possible to diagnose colon cancer more accurately.

Epidemiology:

Colorectal cancer rates vary between countries and regions. Western-style countries, such as the United States, Canada, Australia, and Western Europe, tend to have higher rates compared to developing countries. In addition, the risk of infection increases with age, and most cases occur around the age of 50. Men and women are at risk, with men at greater risk. With a slight defect. Genetic factors increase the risk of infection



Etiology:

Causes and Risk Factors:

Doctors don't know for sure what causes types of colon cancer. However, there are genetic syndromes that increase the risk of colorectal cancer, such as Familial adenomatous polyposis (FAP): It causes the growth of a large number of polyps in the colon and rectum, most of which turn into cancer if not treated. Lynch syndrome (hereditary non-polyposis colon cancer - HNPCC): increases the risk of colorectal cancer and other types of cancer. Chronic diseases also increase the risk of infection, such as ulcerative colitis, diabetes, and Crohn's disease. Age and family history are among the main risk factors that can lead to colorectal cancer



Genetic and Environmental Influences:

Genetic and environmental factors have a great influence, as foods rich in fat and lack of fiber increase the risk of cancer, and obesity is one of the reasons, as people who are overweight are more susceptible to infection. The chances of colon cancer increase if a close relative by birth has cancer. Colon. The risk increases even more if one or more family members have colon cancer or rectal cancer.

Clinical Features:

Signs and Symptoms:

Changes in bowel habit, such as constipation, diarrhea, or a change in the shape of the stool. Rectal bleeding occurs with blood in the stool. Abdominal cramps and pain, unexplained fatigue and weakness, and sudden weight loss

Disease Stages and Progression:

The disease consists of five stages

The first stage: Cancer is in the front and does not extend beyond the colon's lining. The second stage is when the cancer has spread to the muscular layer of the colon. The third stage is when it spreads to the tissues surrounding the colon. The fourth stage is when it spreads to nearby lymph nodes. The final stage is when the cancer spreads to other parts of the body (such as the liver or lungs).

Complications:

If colon cancer is not controlled, it can have serious symptoms such as intestinal obstruction due to tumor growth, bleeding from the tumor itself, and the spread of cancer to other organs (metastasis).

General health problems such as anemia due to blood loss.



Diagnosis

Diagnostic Criteria:

Diagnosing colon cancer requires a set of tests and diagnostics to confirm the presence of cancer and its stage, and the diagnostic criteria include the presence of a change in bowel habit, bleeding that appears with urine, and loss of wet weight, and it also includes family history and personal risk factors.

A physical examination of the abdomen and rectum

Diagnostic Tests and Procedures:

There are several procedures to detect colorectal cancer, including Colonoscopy, the most effective examination for viewing the colon and identifying tumors.

A fecal occult blood test (FOBT) is performed to determine if there is blood in the stool.

Sigmoidoscopy to examine the lower part of the colon and rectum.

Computed tomography (CT) or magnetic resonance imaging (MRI) to determine how far the cancer has spread and at what stage.

Capsule endoscopy involves swallowing a capsule that contains a camera to image the small intestine.

Blood tests including the carcinoembryonic antigen (CEA) test to estimate the presence of cancer and monitor treatment.

Differential Diagnosis:

Differential diagnosis includes distinguishing between rectal cancer and other diseases, such as: hemorrhoids, because they also cause bleeding in the rectum, neuropathy, because they are similar to rectal cancer in changing the lining of the intestine, ulcerative colitis, which causes inflammation and bleeding in the colon without cancer.



Crohn's disease causes chronic inflammation of the digestive system. In addition to benign polyps, which may be like cancerous polyps, but are not malignant

Pathophysiology

Mechanisms of Disease Development:

If colorectal cancer is not diagnosed, it occurs as a result of changes in certain genes APC, KRAS, and TP53, which play an important role in the development of the disease. At the beginning of the cancer, polyps begin to grow in the lining of the colon. These polyps may be benign at first. As time progresses, benign polyps become cancerous cells, and over time, the cancer begins to spread and can be transmitted to other organs in the body through the lymphatic system or blood.



Cellular and Molecular Changes:

As for cellular and molecular changes, for example, genome instability leads to more genetic mutations, and these mutations lead to an uncontrolled growth signal, which allows cancer cells to multiply without stopping. There is also a loss of the function of disease-suppressing genes, such as the TP53 gene, which prevents the proliferation of uncontrolled cells. Normally, the blood vessels feeding the tumor increase, which leads to its spreading faster.

Impact on Body Systems:

These changes that occur affect the body negatively, as the tumor can lead to obstruction in the intestines, and cancer can lead to immune weakness, as the person becomes more susceptible to infection, and it is possible for cancer to spread to the lymph nodes and lead to the spread of the disease to other organs such as the liver, which it affects the functions of the lungs and leads to breathing problems.

Management and Treatment

Management and Treatment In this section, we explain the medical, surgical, and drug treatments and the lifestyle modifications that must be made, as well as rehabilitation and supportive care.

Medical and Surgical Treatments:

Surgery can be performed to get rid of the tumor by removing the damaged part of the colon that contains the tumor, and benign and small polyps can also be removed through endoscopy. Radiation therapy or chemotherapy can also be used to reduce the size of the tumor before surgery or to kill cancer cells remaining after the operation.

Pharmacological Therapies:

In advanced stages, treatment with medications such as 5-fluorouracil (5-FU) and capecitabine can be used. Some medications target specific molecules on the surface or inside cancer cells.

Examples include bevacizumab, cetuximab, and panitumumab.

Some medications stimulate the body's immune system to attack cancer cells.

Such as pembrolizumab and nivolumab.

Lifestyle and Dietary Modifications:

In addition to surgical or medication treatment, a change in the pattern of the pill must be made, such as quitting smoking and stopping alcohol consumption. Eating meals rich in fiber, vegetables, and fruits, and reducing fatty meals and meat. Among the important things are drinking a sufficient amount of water and exercising, such as Walking, swimming, etc. for half an hour every day

Rehabilitation and Supportive Care:

During the journey of recovery from cancer, psychological support must be provided to the patient and his family. Palliative care to improve the quality of life in advanced cases. Regular check-ups to detect any possible recurrence of cancer.

Monitor side effects of treatments and provide necessary care.

Prevention and Control

In the prevention and management part, we explain primary, secondary, and tertiary prevention, and what are the health interventions, vaccination and examination programs.

Primary, Secondary, and Tertiary Prevention:

Primary prevention seeks to prevent the disease from occurring by being careful about smoking and alcohol, eating healthy foods that contain fiber such as vegetables,

reducing meat and foods that contain fat, and also exercising daily. As for secondary prevention, it seeks to detect the disease. At an early stage of control, this is through medical follow-up with the doctor and conducting examinations, such as genetic tests, for people who have a hereditary history of colorectal cancer. Tertiary prevention focuses on preventing complications of the disease and improving the quality of life for patients who have been diagnosed with colorectal cancer, and this is by providing Surgical, radiation, and chemical treatment appropriate for each case and providing psychological support to the patient.

Strategies for Public Health Interventions:

We can also hold awareness campaigns about the danger of colorectal cancer and provide medical campaigns that conduct medical examinations in villages. Establish policies for the use of alcohol and tobacco. Support research related to colorectal cancer to develop new treatments and prevention methods.

Vaccination and Screening Programs:

Although there is no direct vaccination against colorectal cancer, vaccinations such as the human papillomavirus (HPV) vaccine can reduce the risk of some other types of cancer. These strategies help reduce the incidence of colorectal cancer and improve early detection and treatment, which leads to improved overall health.

Prognosis

Predicting the disease is determining the outcome of the disease and survival, and what are the factors affecting prognosis and quality of life.

Disease Outcomes and Survival Rates:

Survival rates vary from one stage to another, with the first and second stages survival rates ranging from 90% to 100%.

As for the third and fourth stages, survival rates range from 70% to 85% in the third stage and from 50% to 70% in the fourth stage. As for the fifth stage, survival rates range from 15% to 10% where the cancer is present. It has spread to other areas of the body

Factors Influencing Prognosis:

There are many factors that affect prognosis, including the stage of the tumor, as we mentioned before, the size and location of the disease, as small tumors or those located in areas that can be easily accessed through surgery are more treatable. The presence of cancer in the lymph node increases the risk of the cancer spreading. How The tumor's response to radiotherapy or chemotherapy also has an impact on the patient's general health, as the healthier the patient is, the easier treatment and recovery from the tumor will be.

Quality of Life:

Improving the patient's quality of life is one of the important things by providing supportive support to the patient and his family. Educating and raising awareness of the patient and his family about the disease, its symptoms, and expected results, so that it will be easier for them to cope during the treatment journey and the challenges they will face. Providing treatments to control the pain that occurs due to intestinal disorder. Paying attention to the patient's proper nutrition and physical activity according to the patient's ability helps improve the patient's mood

Current Research and Future Directions

Recent Advances and Discoveries :

The field of colorectal cancer treatment has witnessed significant progress thanks to advances in medical research and technology.

Immunotherapy has been developed to confront the tumor and defend the body, and has shown effectiveness in treating some types of colorectal cancer, especially in

patients with genomic instability. Magnetic resonance imaging techniques are being improved. Targeted treatments that target a specific part of the cancer cell are being developed.

Ongoing Clinical Trials Future:

Many clinical trials are currently being conducted, such as immunotherapy in patients who have genomic instability or specific genetic mutations, to see the extent of its effect and side effects. A commercial procedure for drug combinations that combine chemotherapy, targeted therapy, and immunotherapy to see their effect and reduce side effects. Experiments to use biotechnology such as gene therapy and stem cell therapy to treat colorectal cancer.

Research Needs:

Despite the great progress that scientists have achieved in developing treatment, there are more developments that must be used, such as exploring the use of artificial intelligence techniques to analyze big data, improve diagnosis, predict the course of the disease, and respond to treatment. Do more research to understand the genetic and molecular developments that lead to cancer. Improving genetic and molecular tests and providing appropriate treatment for each case. Developing treatments that can control the side effects of radiation and chemotherapy.

Case Studies

Example Cases:

Patient: A 60-year-old male with a family history of colorectal cancer.

Symptoms: Rectal bleeding, persistent abdominal pain, and unintentional weight loss.

Diagnosis:

Colonoscopy: Identifies a large obstructive mass in the descending colon.

Biopsy: Confirms adenocarcinoma.

Imaging: CT scan shows liver metastases (Stage IV).

Treatment:

Chemotherapy: Systemic chemotherapy to shrink the tumors.

Targeted Therapy: Bevacizumab added to chemotherapy regimen.

Palliative Surgery: To relieve symptoms caused by bowel obstruction.

Follow-Up: Regular imaging and CEA (carcinoembryonic antigen) levels to monitor response to treatment.