Colon Cancer

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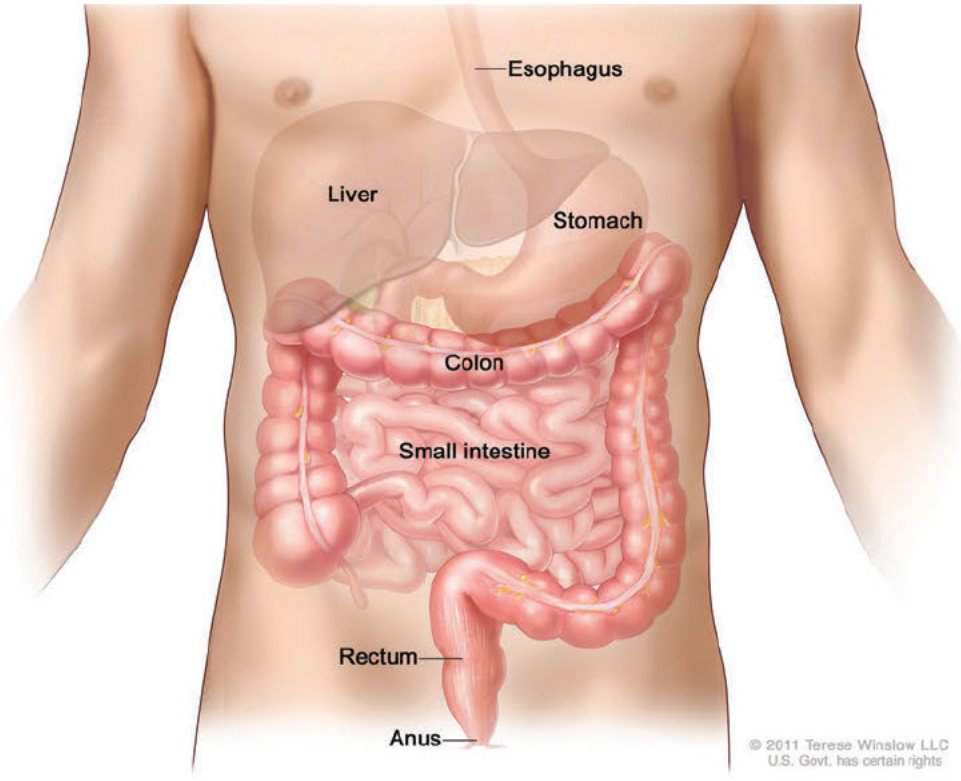
General Information About Colon Cancer

KEY POINTS

- Colon cancer is a disease in which malignant (cancer) cells form in the tissues of the colon.
- Health history affects the risk of developing colon cancer.
- Signs of colon cancer include blood in the stool or a change in bowel habits.
- Tests that examine the colon and rectum are used to diagnose colon cancer.
- Certain factors affect prognosis (chance of recovery) and treatment options.

Colon cancer is a disease in which malignant (cancer) cells form in the tissues of the colon. The colon is part of the body's digestive system. The digestive system removes and processes nutrients (vitamins, minerals, carbohydrates, fats, proteins, and water) from foods and helps pass waste material out of the body. The colon (large bowel) is the main part of the large intestine and is about 5 feet long. Together, the rectum and anal canal make up the last part of the large intestine and are about 6 8 inches long. The anal canal ends at the anus (the opening of the large intestine to the outside of the body).

Lower Gastrointestinal Anatomy



Anatomy of the lower digestive system, showing the colon and other organs.

Health history affects the risk of developing colon cancer.

Risk factors for colon cancer include the following:

- Having a family history of colon or rectal cancer in a first degree relative (parent, sibling, or child).
- Having a personal history of cancer of the colon, rectum, or ovary.
- Having a personal history of high risk adenomas (colorectal polyps that are 1 centimeter or larger in size or that have cells that look abnormal).
- Having inherited changes in certain genes that increase the risk of familial adenomatous polyposis (FAP) or Lynch syndrome (hereditary nonpolyposis colorectal cancer).
- Having a personal history of chronic ulcerative colitis or Crohn's disease for 8 years or more.
- Having three or more alcoholic drinks per day.
- Smoking cigarettes.
- Being black.
- Being obese.

Older age is a main risk factor for most cancers. The chance of getting cancer increases as you get older.

Signs and Symptoms

These and other signs and symptoms may be caused by colon cancer or by other conditions. Check with your doctor if you have any of the following:

- A change in bowel habits.
- Blood (either bright red or very dark) in the stool.
- Diarrhea, constipation, or feeling that the bowel does not empty all the way.
- Stools that are narrower than usual.
- Frequent gas pains, bloating, fullness, or cramps.
- Weight loss for no known reason.
- Feeling very tired.
- Vomiting.

Testing

Tests that examine the colon and rectum are used to diagnose colon cancer. The following are tests and procedures that may be used:

- **Physical exam and health history:** An exam of the body to check general signs of health, including checking for signs of disease, such as lumps or anything else that seems unusual. A history of the patient's health habits and past illnesses and treatments will also be taken.
- **Digital rectal examination (DRE):** An exam of the rectum. The doctor or nurse inserts a lubricated, gloved finger into the lower part of the rectum to feel for lumps or anything else that seems unusual.
- **Fecal occult blood test (FOBT):** A test to check stool (solid waste) for blood that can only be seen with a microscope. A small sample of stool is placed on a special card or in a special container and returned to the doctor or laboratory for testing. Blood in the stool may be a sign of polyps, cancer, or other conditions.

There are two types of FOBTs:

Guaiac FOBT: The sample of stool on the special card is tested with a chemical. If there is blood in the stool, the special card changes color.

Immunochemical FOBT: A liquid is added to the stool sample. This mixture is injected into a machine that contains antibodies that can detect blood in the stool. If there is blood in the stool, a line appears in a window in the machine. This test is also called fecal immunochemical test or FIT.

- **Barium enema**: A series of x rays of the lower gastrointestinal tract. A liquid that contains barium (a silver white metallic compound) is put into the rectum. The barium coats the lower gastrointestinal tract and x rays are taken. This procedure is also called a lower GI series.
- **Sigmoidoscopy:** A procedure to look inside the rectum and sigmoid (lower) colon for polyps (small areas of bulging tissue), other abnormal areas, or cancer. A sigmoidoscope is inserted through the rectum into the sigmoid colon. A sigmoidoscope is a thin, tube like instrument with a light and a lens for viewing. It may also have a tool to remove polyps or tissue samples which are checked under a microscope for signs of cancer.
- **Colonoscopy:** A procedure to look inside the rectum and colon for polyps, abnormal areas, or cancer. A colonoscope is inserted through the rectum into the colon. A colonoscope is a thin, tube like instrument with a light and a lens for viewing. It may also have a tool to remove polyps or tissue samples which are checked under a microscope for signs of cancer.
- **Virtual colonoscopy:** A procedure that uses a series of x rays called computed tomography to make a series of pictures of the colon. A computer puts the pictures together to create detailed images that may show polyps and anything else that seems unusual on the inside surface of the colon. This test is also called colonography or CT colonography.
- **Biopsy:** The removal of cells or tissues, so they can be viewed under a microscope by a pathologist to check for signs of cancer.

Prognosis Factors

Certain factors affect the prognosis (chance of recovery) and treatment options. The prognosis and treatment options depend on the following:

- The stage of the cancer (whether the cancer is in the inner lining of the colon only or has spread through the colon wall or has spread to lymph nodes or other places in the body).
- Whether the cancer has blocked or made a hole in the colon.
- Whether there are any cancer cells left after surgery.
- Whether the cancer has recurred.
- The patient's general health.

The prognosis also depends on the blood levels of carcinoembryonic antigen (CEA) before treatment begins. CEA is a substance in the blood that may be increased when cancer is present.

Stages of Colon Cancer

KEY POINTS

- After colon cancer has been diagnosed, tests are done to find out if cancer cells have spread within the colon or to other parts of the body.
- There are three ways that cancer spreads in the body.

- Cancer may spread from where it began to other parts of the body.
- The following stages are used for colon cancer:

  Stage 0 (Carcinoma in Situ)

  Stage I

  Stage II

  Stage III

  Stage IV
- Sometimes colon cancer recurs (comes back) after it has been treated.

The process used to find out if cancer has spread within the colon or to other parts of the body is called staging. The information gathered from this staging process determines the stage of the disease. It is important to know the stage in order to plan treatment. The following tests may be used in the staging process:

- **CT scan (CAT scan):** A procedure that makes a series of detailed pictures of areas inside the body such as the abdomen, pelvis, or chest, taken from different angles. The pictures are made by a computer linked to an x ray machine. A dye may be injected into a vein or swallowed to help the organs or tissues show up more clearly. This procedure is also called computed tomography, computerized tomography, or computerized axial tomography.
- **Chest x-ray:** An x ray of the organs and bones inside the chest. An x ray is a type of energy beam that can go through the body and onto film making a picture of areas inside the body.
- **MRI (magnetic resonance imaging):** A procedure that uses a magnet, radio waves, and a computer to make a series of detailed pictures of areas inside the colon. A substance called gadolinium is injected into the patient through a vein. The gadolinium collects around the cancer cells, so they show up brighter in the picture. This procedure is also called nuclear magnetic resonance imaging (NMRI).
- **PET scan (positron emission tomography scan):** A procedure to find malignant tumor cells in the body. A small amount of radioactive glucose (sugar) is injected into a vein. The PET scanner rotates around the body and makes a picture of where glucose is being used in the body. Malignant tumor cells show up brighter in the picture because they are more active and take up more glucose than normal cells do.
- **Surgery:** A procedure to remove the tumor and see how far it has spread through the colon.
- **Lymph node biopsy:** The removal of all or part of a lymph node. A pathologist views the lymph node tissue under a microscope to check for cancer cells. This may be done during surgery or by endoscopic ultrasound guided fine needle aspiration biopsy.
- **Complete blood count (CBC):** A procedure in which a sample of blood is drawn and checked for the following:

  The number of red blood cells, white blood cells, and platelets.

  The amount of hemoglobin (the protein that carries oxygen) in the red blood cells.

  The portion of the blood sample made up of red blood cells.
- **Carcinoembryonic antigen (CEA) assay:** A test that measures the level of CEA in the blood. CEA is released into the bloodstream from both cancer cells and normal cells. When found in higher than normal amounts, it can be a sign of colon cancer or other conditions.

Possible Spreading of Cancer

There are three ways that cancer spreads in the body. Cancer can spread through tissue, the lymph system, and the blood.

- **Tissue:** The cancer spreads from where it began by growing into nearby areas.
- **Lymph system:** The cancer spreads from where it began by getting into the lymph system. The cancer travels through the lymph vessels to other parts of the body.
- **Blood:** The cancer spreads from where it began by getting into the blood. The cancer travels through the blood vessels to other parts of the body.

Cancer may spread from where it began to other parts of the body. When cancer spreads to another part of the body, it is called metastasis. Cancer cells break away from where they began (the primary tumor) and travel through the lymph system or blood. The metastatic tumor is the same type of cancer as the primary tumor. For example, if colon cancer spreads to the lung, the cancer cells in the lung are actually colon cancer cells. The disease is metastatic colon cancer and not lung cancer.

Stages Used for Colon Cancer

Stage 0 (Carcinoma in Situ)

In stage 0, abnormal cells are found in the innermost lining of the colon wall. These abnormal cells may become cancer and spread into nearby normal tissue. Stage 0 is also called carcinoma in situ.

Stage I

In stage I colon cancer, cancer has formed in the mucosa (innermost layer) of the colon wall and has spread to the submucosa (layer of tissue next to the mucosa) or to the muscle layer of the colon wall.

Stage II

Stage II colon cancer is divided into stages IIA, IIB, and IIC.

Stage IIA: Cancer has spread through the muscle layer of the colon wall to the serosa (outermost layer) of the colon wall.

Stage IIB: Cancer has spread through the serosa (outermost layer) of the colon wall to the tissue that lines the organs in the abdomen (visceral peritoneum).

Stage IIC: Cancer has spread through the serosa (outermost layer) of the colon wall to nearby organs.

Stage III

Stage III colon cancer is divided into stages IIIA, IIIB, and IIIC.

- **Stage IIIA:**
  - Cancer has spread through the mucosa (innermost layer) of the colon wall to the submucosa (layer of tissue next to the mucosa) or to the muscle layer of the colon wall. Cancer has either spread to one to three nearby lymph nodes, or cancer cells have formed in tissue near the lymph nodes.

  OR

  - Cancer has spread through the mucosa (innermost layer) of the colon wall to the submucosa (layer of tissue next to the mucosa). Cancer has spread to four to six nearby lymph nodes.

- **Stage IIIB:**

  • Cancer has spread through the muscle layer of the colon wall to the serosa (outermost layer) of the colon wall or has spread through the serosa to the tissue that lines the organs in the abdomen (visceral peritoneum). Cancer has spread to one to three nearby lymph nodes or cancer cells have formed in tissue near the lymph nodes.

  OR

  • Cancer has spread to the muscle layer or to the serosa (outermost layer) of the colon wall. Cancer has spread to four to six nearby lymph nodes.

  OR

  • Cancer has spread through the mucosa (innermost layer) of the colon wall to the submucosa (layer of tissue next to the mucosa) or to the muscle layer of the colon wall. Cancer has spread to seven or more nearby lymph nodes.

- **Stage IIIC:**

  • Cancer has spread through the serosa (outermost layer) of the colon wall to the tissue that lines the organs in the abdomen (visceral peritoneum). Cancer has spread to four to six nearby lymph nodes.

  OR

  • Cancer has spread through the muscle layer of the colon wall to the serosa (outermost layer) of the colon wall or has spread through the serosa to the tissue that lines the organs in the abdomen (visceral peritoneum). Cancer has spread to seven or more nearby lymph nodes.

  OR

  • Cancer has spread through the serosa (outermost layer) of the colon wall to nearby organs. Cancer has spread to one or more nearby lymph nodes or cancer cells have formed in tissue near the lymph nodes.

Stage IV

Stage IV colon cancer is divided into stages IVA, IVB, and IVC.

Stage IVA: Cancer has spread to one area or organ that is not near the colon such as the liver, lung, ovary, or a distant lymph node.

Stage IVB: Cancer has spread to more than one area or organ that is not near the colon such as the liver, lung, ovary, or a distant lymph node.

Stage IVC: Cancer has spread to the tissue that lines the wall of the abdomen and may have spread to other areas or organs.

Recurrent Colon Cancer: Recurrent colon cancer is cancer that has recurred (come back) after it has been treated. The cancer may come back in the colon or in other parts of the body.

Treatment Option Overview

KEY POINTS

- There are different types of treatments for patients with colon cancer.
- Seven types of standard treatments are used:
    - Surgery
    - Radiofrequency ablation
    - Cryosurgery
    - Chemotherapy
    - Radiation therapy
    - Targeted therapy
    - Immunotherapy
- New treatments are being tested in clinical trials.
- Treatment for colon cancer may cause side effects.
- Patients may want to think about taking part in a clinical trial.
- Patients can enter clinical trials before, during, or after starting their cancer treatment.
- Follow up tests may be needed.

Treatment Options for Patients with Colon Cancer

There are different types of treatments for patients with colon cancer. Some treatments are standard (the currently used treatment), and some are being tested in clinical trials. A treatment clinical trial is a research study meant to help improve current treatments or obtain information on new treatments for patients with cancer. When clinical trials show that a new treatment is better than the standard treatment, the new treatment may become the standard treatment. Patients may want to think about taking part in a clinical trial. Some clinical trials are open only to patients who have not started treatment.

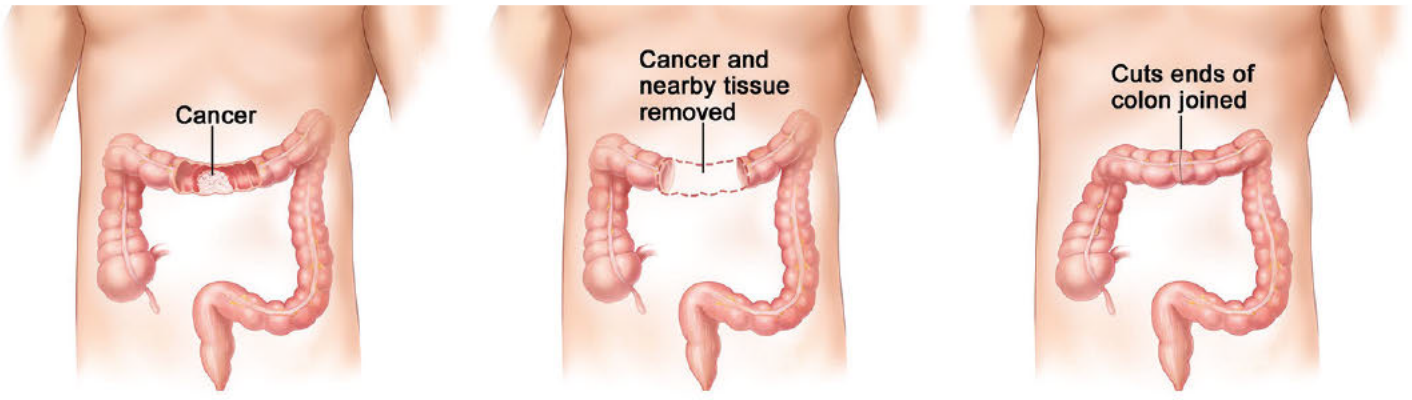
Seven types of standard treatments are used:

Surgery

Surgery (removing the cancer in an operation) is the most common treatment for all stages of colon cancer. A doctor may remove the cancer using one of the following types of surgery:

- **Local excision:** If the cancer is found at a very early stage, the doctor may remove it without cutting through the abdominal wall. Instead, the doctor may put a tube with a cutting tool through the rectum into the colon and cut the cancer out. This is called a local excision. If the cancer is found in a polyp (a small bulging area of tissue), the operation is called a polypectomy.
- **Resection of the colon with anastomosis:** If the cancer is larger, the doctor will perform a partial colectomy (removing the cancer and a small amount of healthy tissue around it). The doctor may then perform an anastomosis (sewing the healthy parts of the colon together). The doctor will also usually remove lymph nodes near the colon and examine them under a microscope to see whether they contain cancer.

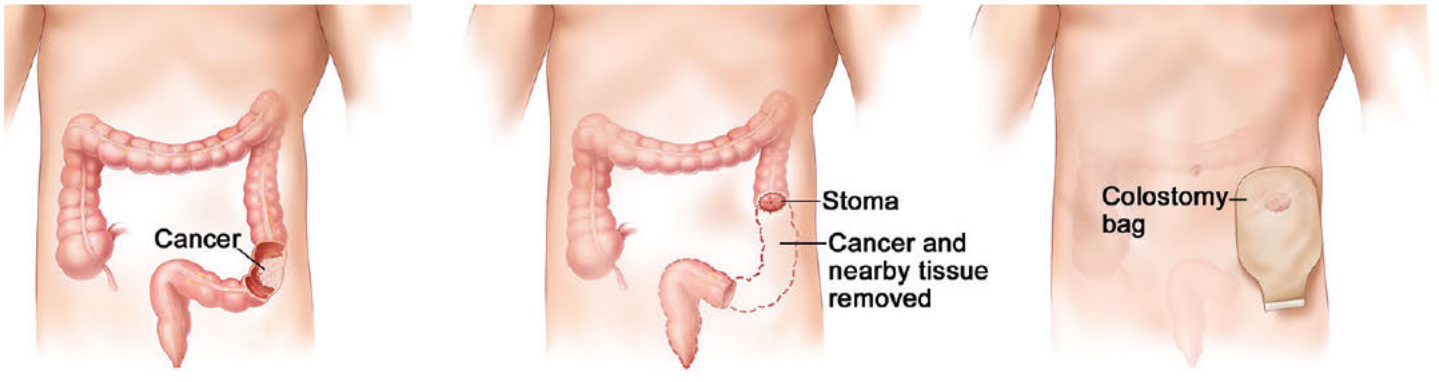
Resection of the Colon with Anastomosis



Resection of the colon with anastomosis. Part of the colon containing the cancer and nearby healthy tissue is removed, and then the cut ends of the colon are joined.

- **Resection of the colon with colostomy:** If the doctor is not able to sew the 2 ends of the colon back together, a stoma (an opening) is made on the outside of the body for waste to pass through. This procedure is called a colostomy. A bag is placed around the stoma to collect the waste. Sometimes the colostomy is needed only until the lower colon has healed, and then it can be reversed. If the doctor needs to remove the entire lower colon, however, the colostomy may be permanent.

Colostomy



Colon cancer surgery with colostomy. Part of the colon containing the cancer and nearby healthy tissue is removed, a stoma is created, and a colostomy bag is attached to the stoma.

After the doctor removes all the cancer that can be seen at the time of the surgery, some patients may be given chemotherapy or radiation therapy after surgery to kill any cancer cells that are left. Treatment given after the surgery to lower the risk that the cancer will come back is called adjuvant therapy.

Radiofrequency Ablation

Radiofrequency ablation is the use of a special probe with tiny electrodes that kill cancer cells. Sometimes the probe is inserted directly through the skin, and only local anesthesia is needed. In other cases, the probe is inserted through an incision in the abdomen. This is done in the hospital with general anesthesia.

Cryosurgery

Cryosurgery is a treatment that uses an instrument to freeze and destroy abnormal tissue. This type of treatment is also called cryotherapy.

Chemotherapy

Chemotherapy is a cancer treatment that uses drugs to stop the growth of cancer cells either by killing the cells or by stopping the cells from dividing.

When chemotherapy is taken by mouth or injected into a vein or muscle, the drugs enter the bloodstream and can reach cancer cells throughout the body (systemic chemotherapy).

When chemotherapy is placed directly into the cerebrospinal fluid, an organ, or a body cavity such as the abdomen, the drugs mainly affect cancer cells in those areas (regional chemotherapy).

Chemoembolization of the hepatic artery may be used to treat cancer that has spread to the liver. This involves blocking the hepatic artery (the main artery that supplies blood to the liver) and injecting anticancer drugs between the blockage and the liver. The liver's arteries then deliver the drugs throughout the liver. Only a small amount of the drug reaches other parts of the body. The blockage may be temporary or permanent depending on what is used to block the artery. The liver continues to receive some blood from the hepatic portal vein which carries blood from the stomach and intestine.

The way the chemotherapy is given depends on the type and stage of the cancer being treated.

Radiation Therapy

Radiation therapy is a cancer treatment that uses high energy x rays or other types of radiation to kill cancer cells or keep them from growing. There are two types of radiation therapy:

- **External radiation therapy:** This type of radiation uses a machine outside the body to send radiation toward the area of the body with cancer.
- **Internal radiation therapy:** This type of radiation uses a radioactive substance sealed in needles, seeds, wires, or catheters that are placed directly into or near the cancer.

The way the radiation therapy is given depends on the type and stage of the cancer being treated. External and internal radiation therapies are used to treat colon cancer.

Targeted Therapy

Targeted therapy is a type of treatment that uses drugs or other substances to identify and attack specific cancer cells. Targeted therapies usually cause less harm to normal cells than chemotherapy or radiation therapy do.

Types of targeted therapies used in the treatment of colon cancer include the following:

- **Monoclonal antibodies:** Monoclonal antibodies are immune system proteins made in the laboratory to treat many diseases including cancer. As a cancer treatment, these antibodies can attach to a specific target on cancer cells or other cells that may help cancer cells grow. The antibodies are able to then kill the cancer cells, block their growth, or keep them from spreading. Monoclonal antibodies are given by infusion. They may be used alone or to carry drugs, toxins, or radioactive material directly to cancer cells. There are different types of monoclonal antibody therapy:

Vascular endothelial growth factor (VEGF) inhibitor therapy: Cancer cells make a substance called VEGF which causes new blood vessels to form (angiogenesis) and helps the cancer grow. VEGF inhibitors block VEGF and stop new blood vessels from forming. This may kill cancer cells because they need new blood vessels to grow.

Epidermal growth factor receptor (EGFR) inhibitor therapy: EGFRs are proteins found on the surface of certain cells, including cancer cells. Epidermal growth factor attaches to the EGFR on the surface of the cell and causes the cells to grow and divide. EGFR inhibitors block the receptor and stop the epidermal growth factor from attaching to the cancer cell. This stops the cancer cell from growing and dividing.

- **Angiogenesis inhibitors:** Angiogenesis inhibitors stop the growth of new blood vessels that tumors need to grow.

Immunotherapy

Immunotherapy is a treatment that uses the patient's immune system to fight cancer. Substances made by the body or made in a laboratory are used to boost, direct, or restore the body's natural defenses against cancer. This cancer treatment is a type of biologic therapy.

Clinical Trials

For some patients, taking part in a clinical trial may be the best treatment choice. Clinical trials are part of the cancer research process. Clinical trials are done to find out if new cancer treatments are safe and effective or better than the standard treatment.

Many of today's standard treatments for cancer are based on earlier clinical trials. Patients who take part in a clinical trial may receive the standard treatment or be among the first to receive a new treatment.

Patients who take part in clinical trials also help improve the way cancer will be treated in the future. Even when clinical trials do not lead to effective new treatments, they often answer important questions and help move research forward.

Patients can enter clinical trials before, during, or after starting their cancer treatment.

Some clinical trials only include patients who have not yet received treatment. Other trials test treatments for patients whose cancer has not gotten better. There are also clinical trials that test new ways to stop cancer from recurring (coming back) or reduce the side effects of cancer treatment.

Follow-up tests may be needed.

Some of the tests that were done to diagnose the cancer or to find out the stage of the cancer may be repeated. Some tests will be repeated in order to see how well the treatment is working. Decisions about whether to continue, change, or stop treatment may be based on the results of these tests.

Some of the tests will continue to be done from time to time after treatment has ended. The results of these tests can show if your condition has changed or if the cancer has recurred (come back). These tests are sometimes called follow up tests or check ups.

Treatment Options by Stage

Stage 0 (Carcinoma in Situ)

Treatment of stage 0 (carcinoma in situ) may include the following types of surgery:

- Local excision or simple polypectomy.
- Resection and anastomosis. This is done when the tumor is too large to remove by local excision.

Stage I Colon Cancer

Treatment of stage I colon cancer usually includes the following:

- Resection and anastomosis.

Stage II Colon Cancer

Treatment of stage II colon cancer may include the following:

- Resection and anastomosis.

Stage III Colon Cancer

Treatment of stage II colon cancer may include the following:

- Resection and anastomosis which may be followed by chemotherapy.
- Clinical trials of new chemotherapy regimens after surgery.

Stage IV and Recurrent Colon Cancer

Treatment of stage IV and recurrent colon cancer may include the following:

- Local excision for tumors that have recurred.
- Resection with or without anastomosis.
- Surgery to remove parts of other organs such as the liver, lungs, and ovaries where the cancer may have recurred or spread. Treatment of cancer that has spread to the liver may also include the following:

  Chemotherapy given before surgery to shrink the tumor, after surgery, or both before and after.

  Radiofrequency ablation or cryosurgery for patients who cannot have surgery.

  Chemoembolization of the hepatic artery.
- Radiation therapy or chemotherapy may be offered to some patients as palliative therapy to relieve symptoms and improve quality of life.
- Chemotherapy and/or targeted therapy with a monoclonal antibody or an angiogenesis inhibitor.
- Immunotherapy.
- Clinical trials of chemotherapy and/or targeted therapy.

Check the list of NCI supported cancer clinical trials that are now accepting patients with the colon cancer stage you are experiencing. For more specific results, refine the search by using other search features such as the location of the trial, the type of treatment, or the name of the drug. Talk with your doctor about clinical trials that may be right for you. General information about clinical trials is available from the following NCI website:

www.cancer.gov/about cancer/treatment/clinical trials

Notes

For more information and related links visit: www.cancer.gov/types/colorectal

Resource: PDQ® Adult Treatment Editorial board. PDQ Colon Cancer Treatment. Bethesda, MD: National Cancer Institute. Available at https://www.cancer.gov/types/colorectal/patient/colon-treatment-pdq Accessed 08/06/2021.

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Cancer Support Services