

# Rectal Cancer

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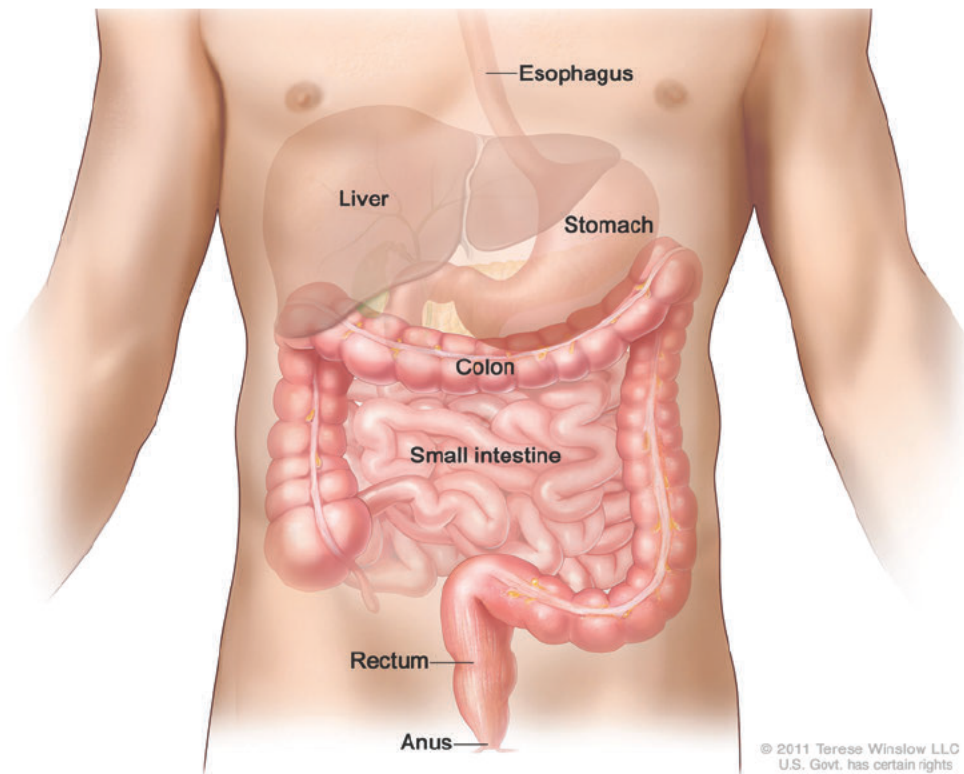
## General Information About Rectal Cancer

### KEY POINTS

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

**Rectal cancer** is a disease in which malignant (cancer) cells form in the tissues of the rectum. The rectum 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 digestive system is made up of the esophagus, stomach, the small intestines, and the large intestines. The colon (large bowel) is the first 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 rectum and other organs.

## Health history affects the risk of developing rectal cancer.

Risk factors for rectal 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 under a microscope).
- 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 rectal cancer or by other conditions. Check with your doctor if you have any of the following:

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

## Testing

Tests that examine the rectum and colon are used to diagnose rectal 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.
- **Colonoscopy:** A procedure to look inside the rectum and colon for polyps (small pieces of bulging tissue), abnormal areas, or cancer. 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.

- **Biopsy:** The removal of cells or tissues, so they can be viewed under a microscope to check for signs of cancer. Tumor tissue that is removed during the biopsy may be checked to see if the patient is likely to have the gene mutation that causes HNPCC. This may help to plan treatment. The following tests may be used:

**Reverse transcription-polymerase chain reaction (RT-PCR) test:** A laboratory test in which the amount of a genetic substance called mRNA made by a specific gene is measured. This test may be used to look for certain changes in a gene or chromosome which may help diagnose cancer.

**Immunohistochemistry:** A laboratory test that uses antibodies to check for certain antigens (markers) in a sample of a patient's tissue. This type of test is used to help diagnose cancer and to help tell one type of cancer from another type of cancer.

- **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 rectal cancer or other conditions.

## 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 rectum, involves the whole rectum, or has spread to lymph nodes, nearby organs, or other places in the body).
- Whether the tumor has spread into or through the bowel wall.
- Where the cancer is found in the rectum.
- Whether the bowel is blocked or has a hole in it.
- Whether all of the tumor can be removed by surgery.
- Whether the cancer has just been diagnosed or has recurred.
- The patient's general health.

## Stages of Rectal Cancer

### KEY POINTS

- After rectal cancer has been diagnosed, tests are done to find out if cancer cells have spread within the rectum 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 rectal cancer:

Stage 0 (Carcinoma in Situ)

Stage I

Stage II

Stage III

Stage IV

The process used to find out if cancer has spread within the rectum 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:

- **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.
- **Colonoscopy:** A procedure to look inside the rectum and colon for polyps (small pieces of bulging tissue), abnormal areas, or cancer. 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.
- **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.
- **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 body. 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.
- **Endorectal ultrasound:** A procedure used to examine the rectum and nearby organs. An ultrasound transducer (probe) is inserted into the rectum and used to bounce high energy sound waves (ultrasound) off internal tissues or organs and make echoes. The echoes form a picture of body tissues called a sonogram. The doctor can identify tumors by looking at the sonogram. This procedure is also called transrectal ultrasound.

## 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 rectal cancer spreads to the lung, the cancer cells in the lung are actually rectal cancer cells. The disease is metastatic rectal cancer and not lung cancer.

## Stages Used for Rectal Cancer

### Stage 0 (Carcinoma in Situ)

In stage 0, abnormal cells are found in the innermost lining of the rectum 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 rectal cancer, cancer has formed in the mucosa (innermost layer) of the rectum wall and has spread to the submucosa (layer of tissue next to the mucosa) or to the muscle layer of the rectum wall.

### Stage II

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

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

**Stage IIB:** Cancer has spread through the serosa (outermost layer) of the rectum 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 rectum wall to nearby organs.

### Stage III

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

#### - Stage IIIA:

- Cancer has spread through the mucosa (innermost layer) of the rectum wall to the submucosa (layer of tissue next to the mucosa) or to the muscle layer of the rectum wall. Cancer has either spread to 1 to 3 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 rectum wall to the submucosa (layer of tissue next to the mucosa). Cancer has spread to 4 to 6 nearby lymph nodes.

#### - Stage IIIB:

- Cancer has spread through the muscle layer of the rectum wall to the serosa (outermost layer) of the rectum wall or has spread through the serosa to the tissue that lines the organs in the abdomen (visceral peritoneum). Cancer has spread to 1 to 3 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 rectum wall. Cancer has spread to 4 to 6 nearby lymph nodes.

OR

- Cancer has spread through the mucosa (innermost layer) of the rectum wall to the submucosa (layer of tissue next to the mucosa) or to the muscle layer of the rectum wall. Cancer has spread to 7 or more nearby lymph nodes.

#### - Stage IIIC:

- Cancer has spread through the serosa (outermost layer) of the rectum wall to the tissue that lines the organs in the abdomen (visceral peritoneum). Cancer has spread to 4 to 6 nearby lymph nodes.

OR

- Cancer has spread through the muscle layer of the rectum wall to the serosa (outermost layer) of the rectum wall or has spread through the serosa to the tissue that lines the organs in the abdomen (visceral peritoneum). Cancer has spread to 7 or more nearby lymph nodes.

OR

- Cancer has spread through the serosa (outermost layer) of the rectum wall to nearby organs. Cancer has spread to 1 or more nearby lymph nodes, or cancer cells have formed in tissue near the lymph nodes.

### Stage IV

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

**Stage IVA:** Cancer has spread to one area or organ that is not near the rectum 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 rectum 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 Rectal Cancer:** Recurrent rectal cancer is cancer that has recurred (come back) after it has been treated. The cancer may come back in the rectum or in other parts of the body

## Treatment Option Overview

### KEY POINTS

- There are different types of treatments for patients with rectal cancer.
- Six types of standard treatments are used:
  - Surgery
  - Radiation therapy
  - Chemotherapy
  - Active surveillance
  - Targeted therapy
  - Immunotherapy
- Other types of treatments are being tested in clinical trials.
- Treatment for rectal 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 Rectal Cancer

There are different types of treatments for patients with rectal 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.

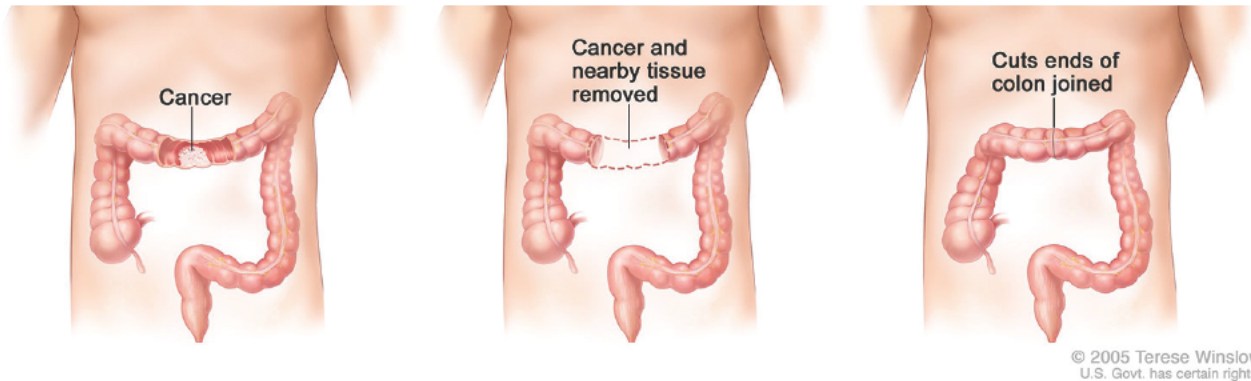
Six types of standard treatments are used:

### Surgery

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

- **Polypectomy:** If the cancer is found in a polyp (a small piece of bulging tissue), the polyp is often removed during a colonoscopy.
- **Local excision:** If the cancer is found on the inside surface of the rectum and has not spread into the wall of the rectum, the cancer and a small amount of surrounding healthy tissue is removed.
- **Resection with anastomosis:** The surgeon will sew the healthy parts of the rectum together, sew the remaining rectum to the colon, or sew the colon to the anus.

### Resection of the Rectum with Anastomosis



Resection of the rectum with anastomosis. The rectum and part of the colon are removed and then the colon and the anus are joined.

- **Resection with colostomy:** The surgeon will make a stoma (an opening) from the rectum to the outside of the body for waste to pass through. This procedure is done if the cancer is too close to the anus and is called a colostomy. A bag is placed around the stoma to collect the waste. Sometimes the colostomy is needed only until the rectum has healed, and then it can be reversed. If the entire rectum is removed, however, the colostomy may be permanent.
- **Radiofrequency ablation:** 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:** A treatment that uses an instrument to freeze and destroy abnormal tissue. This type of treatment is also called cryotherapy.
- **Pelvic exenteration:** If the cancer has spread to other organs near the rectum, the lower colon, rectum, and bladder are removed. In women, the cervix, vagina, ovaries, and nearby lymph nodes may be removed. In men, the prostate may be removed. Artificial openings (stoma) are made for urine and stool to flow from the body to a collection bag.

Other treatment options: Radiation therapy and/or chemotherapy may be given before surgery to shrink the tumor, make it easier to remove the cancer, and help with bowel control after surgery. Treatment given before surgery is called neoadjuvant therapy.

After all of the cancer that can be seen at the time of the surgery is removed, some patients may be given radiation therapy and/or chemotherapy 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.

### 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 therapy is used to treat rectal cancer.

Short course preoperative radiation therapy is used in some types of rectal cancer. This treatment uses fewer and lower doses of radiation than standard treatment followed by surgery several days after the last dose.

### 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.

## Active surveillance

Active surveillance is closely following a patient's condition without giving any treatment unless there are changes in test results. It is used to find early signs that the condition is getting worse. In active surveillance, patients are given certain exams and tests to check if the cancer is growing. When the cancer begins to grow, treatment is given to cure the cancer. Tests include the following:

- Digital rectal exam
- MRI
- Endoscopy
- Sigmoidoscopy
- CT scan
- Carcinoembryonic antigen (CEA) assay

## Targeted Therapy

Targeted therapy is a type of treatment that uses drugs or other substances to identify and attack specific cancer cells without harming normal cells.

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

- **Monoclonal antibodies:** Monoclonal antibody therapy is a type of targeted therapy being used for the treatment of rectal cancer. Monoclonal antibody therapy uses antibodies made in the laboratory from a single type of immune system cell. These antibodies can identify substances on cancer cells or normal substances that may help cancer cells grow. The antibodies attach to the substances and 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:

- Simple polypectomy.
- Local excision.
- Resection.

### Stage I Rectal Cancer

Treatment of stage I rectal cancer usually includes the following:

- Local excision.
- Resection.
- Resection with radiation therapy and chemotherapy after surgery.

### Stages II and III Rectal Cancer

Treatment of stage II and stage III cancer may include the following:

- Surgery.
- Chemotherapy combined with radiation therapy followed by surgery.
- Short course radiation therapy followed by surgery and chemotherapy.
- Resection followed by chemotherapy combined with radiation therapy.
- Chemotherapy combined with radiation therapy followed by active surveillance. Surgery may be done if the cancer recurs (comes back).
- A clinical trial of a new treatment.

## Notes

### Stage IV and Recurrent Rectal Cancer

Treatment of stage IV rectal cancer may include the following:

- Surgery with or without chemotherapy or radiation therapy.
- Systemic chemotherapy with or without targeted therapy (angiogenesis inhibitor).
- Systemic chemotherapy with or without immunotherapy (immune checkpoint inhibitor therapy).
- Chemotherapy to control the growth of the tumor.
- Radiation therapy, chemotherapy, or a combination of both as palliative therapy to relieve symptoms and improve the quality of life.
- Placement of a stent to help keep the rectum open if it is partly blocked by the tumor as palliative therapy to relieve symptoms and improve the quality of life.
- Immunotherapy.
- Clinical trials of chemotherapy and/or targeted therapy.

Treatment of areas where rectal cancer may have spread includes the following:

- Surgery to remove the tumor. Chemotherapy may be given before surgery to shrink the tumor.
- Cryosurgery or radiofrequency ablation.
- Chemoembolization and/or systemic chemotherapy.
- A clinical trial of chemoembolization combined with radiation therapy to the tumors in the liver.

Check the list of NCI supported cancer clinical trials that are now accepting patients with the rectal 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](http://www.cancer.gov/about_cancer/treatment/clinical_trials)

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For more information and related links visit: [www.cancer.gov/types/colorectal](http://www.cancer.gov/types/colorectal)

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





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