

## Colorectal Cancer

*This information is reviewed by a physician with expertise in the area presented and is further reviewed by committees from the American College of Radiology (ACR) and the Radiological Society of North America (RSNA), comprising physicians with expertise in several radiologic areas.*

### Colorectal cancer overview

Colorectal cancer, also called large bowel cancer, is the term used to describe malignant tumors found in the colon and rectum. The colon and rectum are part of the large intestine of the digestive system, usually referred to as the gastrointestinal tract. Typically, the colon is the upper 5 or 6 feet of the large intestine, and the rectum is the lower 5 to 7 inches located above the anal canal.

In the United States, colorectal cancer is the third most common cancer. However, the number of deaths from the disease has decreased as a result of improved tests that allow early detection of the cancer, when it can be more easily treated. Physical activity and a good diet are associated with a decreased incidence of colorectal cancer. There are approximately 150,000 cases of colon and rectal cancer diagnosed in the United States every year.

### What are my treatment options?

- Treatment options overview
- How can I choose from among the options?
- If I choose surgery, will radiation treatment still be required?
- How effective is modern radiation treatment of colorectal cancer?

### Treatment options overview

Treatment options for colorectal cancer depend on the stage of the tumor—that is, how far it has spread or how deeply it is affecting the intestinal wall and other tissues as well as whether it is located in the colon or rectum. In general patients with colon cancer receive postoperative chemotherapy if the lymph nodes are positive.

For rectal cancer patients with positive nodes or who have tumors which extend into the fat surrounding the rectum receive chemotherapy plus radiation, most commonly before surgery. Treatment is also determined by the patient's age, medical history, overall health, and tolerance for specific medications and therapies.

Standard options include:

- Partial colectomy (also called partial bowel resection)—The tumor and normal tissue on either side of the diseased area in the colon are removed. The surgeon then reconnects the healthy colon. Sometimes the physician may have to create a temporary colostomy, or an opening for solid waste from the bowel to a special bag a patient wears outside the body, until the healthy tissue has healed. At times, the colostomy is permanent.
- Laparoscopic surgery or keyhole surgery—Small tube-like instruments and an extremely small camera are inserted into the abdomen through incisions made in the abdominal wall. The surgeon sees what the camera sees on a television-type screen and can cut out a large section of the bowel and adjacent tissue, called the mesentery.
- Radiation therapy—High-energy radiation is used to kill cancer cells. Radiation may be used in conjunction with surgery as definitive therapy, or may be used to reduce, or palliate, the symptoms of colorectal cancer such as pain, bleeding, or blockage. Typically, one of the following radiation therapy procedures may be used to treat Colorectal Cancer:
  - External beam therapy (EBT): a method for delivering a beam of high-energy x-rays to the location of the tumor. The beam is generated outside the patient (usually by a linear accelerator) and is targeted at the tumor site. These x-rays can destroy the cancer cells and careful treatment planning allows the surrounding normal tissues to be spared. No radioactive sources are placed inside the patient's body.

- Brachytherapy: the temporary placement of radioactive materials within the body, usually employed to give an extra dose—or boost—of radiation to the area of the excision site..
- Brachytherapy is used on rare occasions.
- Chemotherapy—Drugs are given intravenously or orally to kill cancer cells. Chemotherapy is often given to decrease the chance of the tumor returning elsewhere in the body. Like radiation therapy, chemotherapy can ease disease symptoms and increase length of survival for patients with tumors that have spread. It is usually given over time and alternated with periods of no treatment. This alleviates potential side effects, such as abnormal blood-cell counts, fatigue, diarrhea, mouth sores, and a compromised immune system.

## How can I choose from among the options?

You need to rely on the information provided by the team of physicians responsible for your care. Generally, patients undergo a specific therapy because a cancer specialist, after analyzing all available data and the condition of the patient, has decided it is the best way to treat the cancer.

If you are to undergo radiation therapy, a radiation oncologist will determine how much radiation is needed, to which areas of the body it should be delivered, and how many doses of radiation will be necessary.

## If I choose surgery, will radiation treatment still be required?

Radiation may be used to shrink a tumor before surgical removal or destroy any remaining cancer cells after removal.

## How effective is modern radiation treatment of colorectal cancer?

Surgery remains the most effective treatment for colorectal cancer. Radiation therapy is most effective as additional or adjuvant therapy either before or after surgery. It reduces the chance of cancer spread or recurrence.

Radiation is not normally used as the only, or definitive, treatment for colorectal cancer. Radiation is often used in conjunction with chemotherapy treatments that are given at the same time as the radiation to help the radiation work better. These chemotherapy treatments may be given intravenously or by mouth.

## What happens during radiation therapy?

Radiation is a special kind of energy carried by waves or a stream of particles. When radiation is used at high doses—much higher than the amount used to obtain x-ray images—it can destroy abnormal cells that cause cancer. It does this by damaging the cell's DNA, which eventually causes the cell to die.

Because of the importance of treating the cancer but sparing healthy tissue, you will visit the medical center a few times before actual therapy for treatment planning and simulation. Correct patient positions for radiation exposure are determined for accurate, effective therapeutic results. Your skin may be marked with permanent ink. Custom-made lead shields may be constructed to protect your healthy organs from the radiation, or the radiation fields may be shaped for your situation with special blocks inside the radiation machine. CT or MRI scans may be used to better represent the tumor and the sensitive normal tissues for treatment planning.

## What are possible side effects of radiation therapy?

Complications of radiation therapy may include diarrhea or frequent bowel movements, fatigue, appetite loss, and redness of the skin where external x-rays enter the body. Generally, side effects stop gradually once treatment is discontinued, but often bowel function remains altered from what it was before the disease started.

## What kind of treatment follow-up should I expect?

Colorectal cancer can recur, or reappear, in a patient previously treated for the disease. Because patients can sometimes be cured after their tumor recurs, follow-up care is critically important.

- Physical examination. Patients will undergo frequent physical examinations from a few weeks to many years after treatment, especially if side effects from the treatment do not subside or new symptoms develop. Symptoms of pain, unexplained weight loss, or bleeding can occur with tumor recurrence.
- Blood tests. Follow-up evaluation usually includes periodic blood tests. An abnormal result may indicate that the colorectal cancer has recurred.

- Colonoscopy. Approximately one year after treatment for colorectal cancer, patients usually undergo a colonoscopy, or examination of the colon with a tiny camera at the end of a hollow, flexible tube to detect recurrence or development of new benign or malignant masses. If findings from this examination are normal, it should be repeated three years later, then every five years after that.
- Imaging. Also during follow-up examinations, a patient may undergo computed tomography (CT) or magnetic resonance imaging (MRI). The images obtained by using these devices can help determine treatment response and detect disease spread. Occasionally, a specialized screening procedure, called positron emission tomography (PET), can also be used to detect disease spread, but this is normally used only when other symptoms are present.

## Are there any new developments in treating my disease?

- New drugs are being developed that enhance the tumor-killing ability of radiation therapy and chemotherapy. These drugs can work in a variety of ways but often enhance the normal cell-killing processes within the body.
- Drugs are being developed to stop angiogenesis—that is, the formation of new blood vessels that nourish the cancerous tumor. This can produce tumor shrinkage or prevent disease spread.
- Immunotherapy enhances the body's immune system and increases the likelihood that the cancer cells will be killed.
- Monoclonal antibodies are proteins produced in a laboratory that can identify a cancer cell for destruction or prevent the tumor cell from dividing.
- Vaccines are being developed that may cause the body to produce more antibodies to kill cancer cells.
- Gene therapy involves altering genetic material. Either a new gene is introduced to enhance the ability of the body to kill cancer cells or a gene is administered directly to the cancer cells, causing them to die. Getting the gene to the right cells in the body is a major challenge. The treatment is still experimental and in its early stages of development.

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