

Colon and Rectal Cancer

Treatment Guidelines for Patients

Version V/ October 2007



Current Cancer Treatment Guidelines for Patients

Advanced Cancer and Palliative Care Treatment Guidelines for Patients
(English and Spanish)

Bladder Cancer Treatment Guidelines for Patients (English and Spanish)

Breast Cancer Treatment Guidelines for Patients (English and Spanish)

Cancer Pain Treatment Guidelines for Patients (English and Spanish)

Cancer-Related Fatigue and Anemia Treatment Guidelines for Patients
(English and Spanish)

Colon and Rectal Cancer Treatment Guidelines for Patients (English and Spanish)

Distress Treatment Guidelines for Patients (English and Spanish)

Fever and Neutropenia Treatment Guidelines for Patients with Cancer
(English and Spanish)

Lung Cancer Treatment Guidelines for Patients (English and Spanish)

Melanoma Cancer Treatment Guidelines for Patients (English and Spanish)

Nausea and Vomiting Treatment Guidelines for Patients with Cancer
(English and Spanish)

Non-Hodgkin's Lymphoma Treatment Guidelines for Patients (English and Spanish)

Ovarian Cancer Treatment Guidelines for Patients (English and Spanish)

Prostate Cancer Treatment Guidelines for Patients (English and Spanish)

Colon and Rectal Cancer

Treatment Guidelines for Patients

Version V/October 2007

The mutual goal of the National Comprehensive Cancer Network® (NCCN®) and the American Cancer Society (ACS) partnership is to provide patients and the general public with state-of-the-art cancer treatment information in an easy-to-understand language. This information, based on the NCCN's Clinical Practice Guidelines, is intended to help you discuss your treatment with your doctor. These guidelines do not replace the expertise and clinical judgment of your doctor.

NCCN Clinical Practice Guidelines are developed by a diverse panel of experts. The guidelines are a statement of consensus of its authors regarding the scientific evidence and their views of currently accepted approaches to treatment. The NCCN guidelines are updated as new information becomes available. The Patient Information version is updated accordingly and is available on-line through the American Cancer Society and NCCN Web sites. To ensure you have the most recent version, contact the American Cancer Society at 1-800-ACS-2345 or the NCCN at 1-888-909-NCCN.

©2007 by the American Cancer Society (ACS) and the National Comprehensive Cancer Network (NCCN). All rights reserved. The information herein may not be reprinted in any form for commercial purposes without the expressed written permission of the ACS. Single copies of each page may be reproduced for personal and non-commercial uses by the reader.

Contents

Introduction	5
Making Decisions about Colon and Rectal Cancer Treatment	5
About the Colon and Rectum	6
Colon and Rectal Cancer Work-up (Evaluation)	7
Colon and Rectal Cancer Stages	9
Types of Treatment for Colon and Rectal Cancers	12
Clinical Trials	17
Side Effects of Colon and Rectal Cancer Treatments	19
Other Things to Consider During and After Treatment	20
<i>Colon and Rectal Cancer Treatment Guidelines</i>	23
Decision Trees	
Treatment for Cancerous Polyps	24
Treatment for Colon Cancer	28
Adjuvant Treatment for Colon Cancer	32
Colon Cancer with Metastases	36
Colon Cancer with Spread to Liver or Lung at Diagnosis	38
Colon Cancer That Has Spread to the Abdomen or Peritoneum at Diagnosis	42
Recurrent Colon Cancer	44
Chemotherapy for Advanced or Metastatic Colon Cancer	48
Treatment of Rectal Polyps	52
Evaluation of Rectal Cancer	54
Treatment of Early Stage Rectal Cancer	56
Treatment of Large Rectal Cancers	60
Rectal Cancer With Spread to Distant Sites (Metastases)	64
Rectal Cancer With Spread to Distant Sites That Cannot Be Removed ...	68
Treatment of Recurrent Rectal Cancer	70
Treatment of Spread (Metastases) to Distant Sites	72
Chemotherapy for Advanced Disease or Distant Spread That Cannot Be Removed	74
Glossary	79

Arthur G. James Cancer Hospital and Richard J. Solove Research
Institute at The Ohio State University

City of Hope

Dana-Farber/Brigham and Women's Cancer Center
Massachusetts General Hospital Cancer Center

Duke Comprehensive Cancer Center

Fox Chase Cancer Center

Fred Hutchinson Cancer Research Center/
Seattle Cancer Care Alliance

H. Lee Moffitt Cancer Center & Research Institute
at the University of South Florida

Huntsman Cancer Institute at the University of Utah

Memorial Sloan-Kettering Cancer Center

Robert H. Lurie Comprehensive Cancer Center
of Northwestern University

Roswell Park Cancer Institute

The Sidney Kimmel Comprehensive Cancer Center
at Johns Hopkins

Siteman Cancer Center at Barnes-Jewish Hospital and
Washington University School of Medicine

St. Jude Children's Research Hospital/
University of Tennessee Cancer Institute

Stanford Comprehensive Cancer Center

University of Alabama at Birmingham
Comprehensive Cancer Center

UCSF Comprehensive Cancer Center

University of Michigan Comprehensive Cancer Center

UNMC/Eppley Cancer Center at The Nebraska Medical Center

The University of Texas M.D. Anderson Cancer Center

Vanderbilt-Ingram Cancer Center

Introduction

With this booklet, patients have information on the ways colon and rectal cancers are treated at the nation's leading cancer centers. Originally developed for cancer specialists by the National Comprehensive Cancer Network (NCCN), these treatment guidelines have now been written for the general public by the American Cancer Society (ACS).

Since 1995, doctors have looked to the NCCN for guidance on the highest quality, most effective advice on treating cancer. For more than 90 years, the public has relied on the American Cancer Society for information about cancer. The Society's books and brochures provide comprehensive, current, and understandable information to hundreds of thousands of patients, their families, and friends. This collaboration between the NCCN and ACS provides an authoritative and understandable source of cancer treatment information for the public.

These patient guidelines will help you better understand your cancer treatment options. We urge you to discuss them with your doctor. To make the best use of this information, you might want to begin by asking your doctor the following questions:

- Where is my cancer located?
- How far has my cancer spread? What is the stage of my cancer? How does this stage influence my outlook for cure and survival and my treatment options?
- What treatment options do I have?

- What are the risks or side effects associated with each of my treatment options and how are they likely to affect my quality of life?
- What should I do to be ready for treatment, reduce side effects of treatment, and hasten my recovery?
- What support services are available to me and my family?

In addition to these questions, be sure to write down some of your own. For instance, you might want more information about how long it will take you to recover from surgery so you can plan your work schedule. Or you may want to ask about clinical trials.

Making Decisions about Colon and Rectal Cancer Treatment

Colon cancer and rectal cancer have many features in common. They are often referred to together as colorectal cancer, and in some sections of this document, they are discussed together. In other sections, however, colon and rectal cancers are discussed separately because the treatments differ.

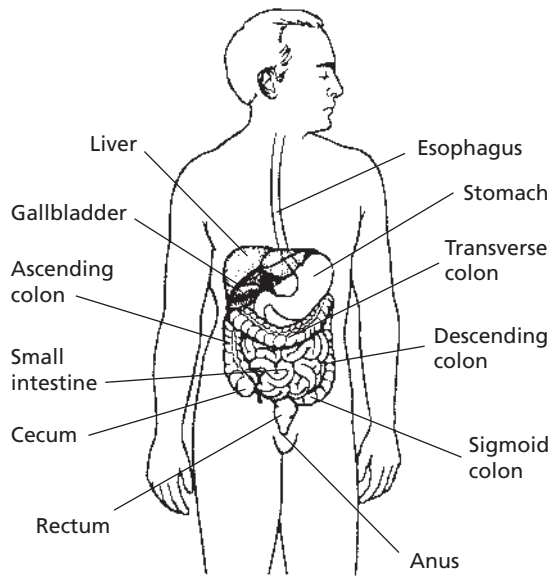
Colorectal cancer is the third most common cancer (excluding skin cancer) of both men and women in the United States. The ACS estimates that about 112,000 new cases of colon cancer and 41,000 new cases of rectal cancer are diagnosed each year. About 52,000 people die of colorectal cancer each year.

Most colorectal cancers are *adenocarcinomas* (cancers of the glandular cells that line the inside of the colon and rectum). The information here refers to colorectal adenocarcinomas only. Other tumors of the colon or rectum, such as carcinoid tumors, stromal tumors, and lymphomas, are much less common. The treatment and prognosis (outlook for survival) for these rarer types of colorectal tumors differ from that for adenocarcinomas and are not covered in this booklet.

Although colorectal cancer is a serious disease, it can be treated successfully by a team of health care professionals. The team may include a gastroenterologist, surgeon, radiation oncologist, medical oncologist, pathologist, oncology nurse, social worker, radiologist, and enterostomal therapist.

This information is intended to help you understand the treatment options available to people with colon and rectal cancers so that you and your doctor can work together to decide which ones best meet your medical and personal needs.

On the pages after the general information about colorectal cancer, you'll find flow charts that doctors call Decision Trees. The charts represent different stages of colon or rectal cancer, and each one shows how you and your doctor can arrive at the choices you need to make about your treatment. You will also find information on colorectal cancer, an explanation of colorectal cancer stages, what tests are needed to diagnose and stage your cancer, and treatment options with possible side effects for each option. A glossary of medical terms is also included at the end of the booklet. Words in the glossary will appear in italics when first mentioned.



Organs of the Digestive System

About the Colon and Rectum

Understanding a little about the normal function and anatomy of the colon and rectum can help you understand how colorectal cancers spread and what is removed by the operations we will discuss later in this booklet.

The colon and rectum are parts of the large intestine, or *bowel*, which is part of the *digestive system*. The digestive system processes food for energy and rids the body of solid waste matter.

After food is chewed and swallowed, it travels through the esophagus to the stomach. There it is partly broken down and then sent to the *small intestine*, also called the small bowel. The small intestine continues breaking down the food and absorbs most of the nutrients.

The small intestine joins the *colon*, a muscular tube about 5 feet long. The large intestine continues to absorb water and mineral nutrients from the food and stores waste matter, called *feces* or *stool*. The waste matter left after this process passes out of the body through the *anus*. The first 4½ feet or so of the large intestine is called the colon, and the remainder is the *rectum*.

The colon has 4 sections. The small intestine is connected to the first of these, called the *ascending colon* because it extends upward on the right side of the abdomen. The part where the ascending colon joins the small intestine is called the cecum. The second section is called the *transverse colon* because it goes across the body from the right to the left side. There it joins the third section, the *descending colon*, which continues downward on the left side. The fourth section is known as the *sigmoid colon* because of its S-shape. The sigmoid colon joins the rectum, which in turn joins the anus.

Each of these sections of the colon and rectum has several layers (see diagram on page 11). Colorectal cancers start in the innermost layer and can grow through some or all of the other layers. Knowing a little about these layers is important because the *stage* (extent of spread) of a colorectal cancer depends to a great degree on which of these layers it affects. This is discussed further in the section, “Colon and Rectal Cancer Stages,” on page 9.

The lymphatic system carries fluid throughout the body. Lymph is a clear fluid that contains waste products and immune system cells. Lymphatic vessels carry this fluid to *lymph nodes* (small, bean-shaped collections

of immune system cells important in fighting infections). Most lymphatic vessels of the colon or rectum lead to nearby (regional) lymph nodes. Cancer cells may enter lymph vessels and travel to lymph nodes, where they can continue to grow. If cancer cells grow in these lymph nodes, they are more likely to have spread to other organs of the body as well.

The walls of the colon and rectum are nourished by blood from arteries. After flowing through these body parts, the blood flows into veins. Veins from the colon and rectum lead to the liver and then back to the heart. This pattern of blood flow is important, because cells may break off from a colorectal cancer, enter veins leaving these organs, and travel to the liver. This is why the liver is the most common site of colorectal cancer spread (*metastasis*).

Colon and Rectal Cancer Work-up (Evaluation)

If there is reason to suspect that you have colon or rectal cancer, your doctor will take a complete medical history and do a physical exam. Also, one or more of the following tests will be done to find out if the disease is really present and to determine its stage (how far the cancer has spread).

Medical history and physical exam: When your doctor “takes a history,” he or she will ask you a series of questions about your symptoms and *risk factors*. Some colorectal cancers may be found because of symptoms such as a change in bowel habits, blood in the stool, weakness or fatigue, abdominal pain, loss of appetite, nausea, weight loss, and

straining during a bowel movement. Of course, many non-cancerous (*benign*) conditions and some other cancers can cause one or more of these symptoms. But if these symptoms are present, a medical evaluation is the only way to determine their cause so that the most appropriate treatment can be chosen. A physical exam for patients thought to have colorectal cancer will include a digital rectal examination (DRE), careful examination of the abdomen to feel for masses or enlarged organs, and a general survey of the rest of the body.

Colonoscopy: A *colonoscope* is a long, flexible, lighted tube about the thickness of a finger. It is inserted through the rectum into the colon. A colonoscope allows the doctor, in most cases, to see the entire colon lining. The colonoscope is connected to a video camera and video display monitor so that the doctor can look closely at the inside of your colon. The day before this test you will take strong laxatives to clean out your bowel and on the morning of the test you may also take an enema. Colonoscopy lasts about 15 to 30 minutes and is generally not painful because you are given a mild sedative.

Biopsy: If a mass or any other abnormal areas are seen through the flexible *sigmoidoscope* or through the colonoscope, a sample will be taken. A *pathologist* will examine the sample under a microscope to determine whether it is a cancer or some benign condition. Some abnormalities, such as small *polyps*, may be entirely removed through a colonoscope. If the abnormal area is large, a *biopsy* (small tissue sample) is taken. The biopsy sample is usually about 1/8-inch across and is removed with instruments that are used through the scope.

If you have questions about pathology results or any other aspect of the diagnostic process, do not hesitate to ask your doctor. You can get a pathology review by having microscope slides containing thin slices of your specimen sent to a consulting pathologist at an NCCN cancer center or other laboratory recommended by your doctor.

Blood counts and blood chemistry: Your doctor will order a blood test that will determine if you have low red blood cell counts (anemia). Many people with colorectal cancer become anemic because of bleeding from the *tumor*. A blood test result will also show how your liver is functioning. Colorectal cancer can spread to the liver and cause changes in blood proteins and enzymes.

Tumor markers: Some colon and rectal cancers produce substances such as carcinoembryonic antigen (CEA) that are then released into the bloodstream. Blood tests for these tumor markers are used most often with other tests to watch patients who already have been treated for colorectal cancer. They may provide an early warning that a cancer has returned.

Because the CEA level in the blood can be high for reasons other than cancer or may be normal in a person who has cancer, it is not used to find cancer in people who have never had cancer and appear to be healthy.

Chest x-ray: This familiar imaging test can often detect colorectal cancer that has spread to the lungs.

Ultrasound: This imaging test uses a device called a transducer that produces sound waves, which are reflected by nearby body tissues and organs. The pattern of sound wave echoes is detected by the transducer

and analyzed by a computer to create an image of the area being studied. Since normal body tissues and tumors reflect sound waves differently, ultrasound is sometimes used to find masses that indicate the cancer has spread. Two special types of *ultrasound* examinations are used to evaluate people with colon and rectal cancer. Endorectal ultrasound uses a special transducer that can be inserted into the rectum. This test is used to see how far a rectal cancer may have grown and whether it has spread to nearby organs or tissues. Intraoperative ultrasound is done after the surgeon has opened the abdominal cavity. The transducer can be placed against the surface of the liver, making this test very useful in detecting colorectal cancer that has metastasized to the liver.

Computed tomography: Commonly referred to as CT or a CAT scan, this test uses a rotating x-ray beam to create a series of pictures of the body from many angles. A computer combines the information from these pictures, producing a detailed cross-sectional image. Contrast material is usually injected into a vein before CT scanning to help produce clearer pictures. A CT scan can often detect colorectal cancer that has spread to internal organs such as the liver, lungs, or elsewhere in the abdomen.

CT-guided needle biopsy: This test is often done if metastasis is suspected. For this test, the patient remains on the CT scanning table while a radiologist places a biopsy needle in the mass. CT scans are repeated until the doctors are confident that the needle is within the mass. A fine needle biopsy sample (tiny fragment of tissue) or a core needle biopsy sample (a thin cylinder of tissue about ½-

inch long and less than ⅛-inch in diameter) is removed and examined under a microscope.

Magnetic resonance imaging: Like computed tomography, magnetic resonance imaging (MRI or an MRI scan) displays a cross-section of the body. However, MRI uses powerful magnetic fields instead of radiation. The procedure can show cross-sectional views from several angles and is useful in locating metastases from colorectal cancer that are sometimes hard to see on standard x-rays and CT scans. A special MRI can show the doctor more about rectal tumors.

Positron emission tomography: Positron emission tomography (PET or a PET scan) uses glucose (a form of sugar) that contains a radioactive atom. The cancer cells will absorb the glucose and can be detected by a scanner. PET is often useful in identifying cancers that have spread and may be used in patients who have a rising CEA level or suspected metastatic disease that has been indicated by other tests.

Colon and Rectal Cancer Stages

Staging is a process that tells the doctor how widespread the cancer may be — that is, whether the cancer has spread and how far. The stage of a cancer is one of the most important factors in selecting treatment options and predicting outcome. If you have any questions about your stage, please discuss them with your doctor.

A staging system is a standardized way for the cancer care team to describe the extent to which a cancer has spread. This document uses the American Joint Committee on Cancer

(AJCC) system, also called the TNM System. This staging system describes the spread of the cancer in relation to the layers of the wall of the colon or rectum, nearby lymph nodes, other organs next to the colon and rectum, and organs farther away.

There are 2 types of AJCC stages. The clinical stage is based on physical examination and some imaging studies done before surgery. The clinical stage is used to decide which, if any, operations should be done for people with colorectal cancer. After colorectal surgery, the pathologic stage is determined by examining the tumor tissue that has been removed. The pathologic stage is used to decide which patients with colon and rectal cancer should receive adjuvant treatment and, if needed, exactly which treatment is best.

The TNM System describes the extent of the primary tumor (T), the absence or presence of metastasis (spread) to nearby lymph nodes (N), and the absence or presence of distant metastasis (M).

T Categories for Colorectal Cancer

T categories of colorectal cancer describe how far the cancer has spread through the layers that form the wall of the colon and rectum. These layers, from the inner to the outer, include:

- the mucosa (the lining) which includes the muscularis mucosae (a thin layer of muscle tissue beneath the mucosa),
- the submucosa (connective tissue beneath this thin muscle layer),
- the muscularis propria (a thick layer of muscle that contracts to force the contents of the intestines along),

- the subserosa (a thin layer of connective tissue),
- and the serosa (a thin layer that covers the outer surface of some parts of the large intestine).

Tis: The cancer is in the earliest stage. It has not grown beyond the mucosa (inner layer) of the colon or rectum. This stage is also known as carcinoma in situ or intramucosal carcinoma.

T1: The cancer has grown through the mucosa and extends into the submucosa.

T2: The cancer has grown through the mucosa and the submucosa and extends into the thick muscle layer.

T3: The cancer has grown through the mucosa, the submucosa, and completely through the thick muscle layer. It has spread to the subserosa but not to any nearby organs or tissues.

T4: The cancer has spread completely through the wall of the colon or rectum into nearby tissues or organs.

N Categories for Colorectal Cancer

The N category describes the cancer spread into nearby lymph nodes.

N0: No lymph node involvement.

N1: Cancer cells found in 1 to 3 regional lymph nodes.

N2: Cancer cells found in 4 or more regional lymph nodes.

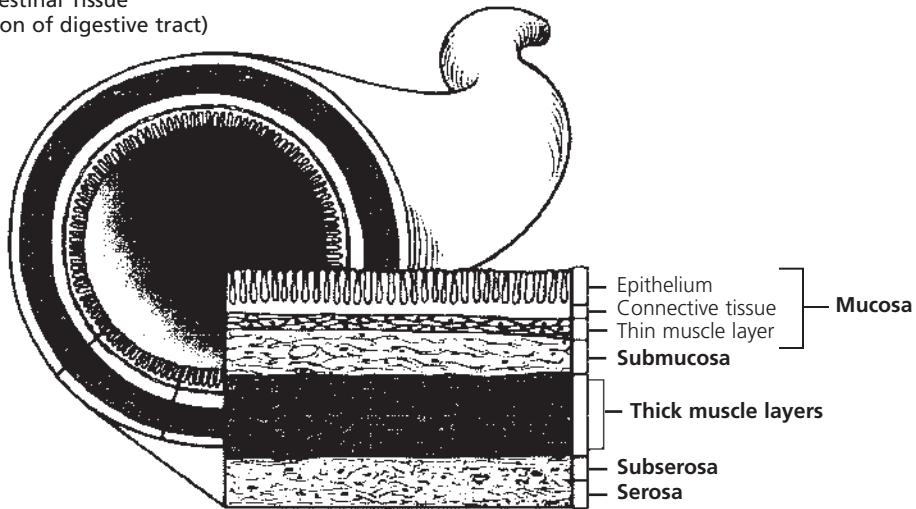
M Categories for Colorectal Cancer

The M category describes whether or not there is distant metastasis (spread).

M0: No distant spread.

M1: Distant spread is present.

Normal Intestinal Tissue
(Cross section of digestive tract)



The layers of the colon wall

Stage grouping

Once a patient's T, N, and M categories are known, this information is combined to determine the stage (from stage zero, the least advanced, to stage IV, the most advanced stage). The following table illustrates how TNM categories are grouped together into stages.

STAGE	TNM CATEGORY
Stage 0:	Tis, N0, M0
Stage I:	T1, N0, M0 T2, N0, M0
Stage IIA:	T3, N0, M0
Stage IIB:	T4, N0, M0
Stage IIIA:	T1-T2, N1, M0
Stage IIIB:	T3-T4, N1, M0
Stage IIIC:	Any T, N2, M0
Stage IV:	Any T, Any N, M1

Stage 0: Tis, N0, M0: The cancer is in the earliest stage. It has not grown beyond the inner layer (mucosa) of the colon or rectum. This stage is also known as carcinoma in situ or intramucosal carcinoma.

Stage I: T1, N0, M0, or T2, N0, M0: The cancer has grown through the mucosa into the submucosa (T1) *or* it may also have grown into the muscularis propria (T2), but it has not spread into nearby lymph nodes (N0) or distant sites.

Stage IIA: T3, N0, M0: The cancer has grown through the wall of the colon or rectum, into the outermost layers (T3). It has not yet spread to the nearby lymph nodes (N0) or distant sites.

Stage IIB: T4, N0, M0: The cancer has grown through the walls of the colon or rectum into other nearby tissues or organs (T4). It has not yet spread to the nearby lymph nodes (N0) or distant sites.

Stage IIIA: T1-T2, N1, M0: The cancer has grown through the mucosa into the submucosa (T1) *or* it may also have grown into the muscularis propria (T2), and it has spread to 1 to 3 nearby lymph nodes (N1) but not distant sites.

Stage IIIB: T3-T4, N1, M0: The cancer has grown through the wall of the colon or rectum (T3) *or* into other nearby tissues or organs (T4) and has spread to 1 to 3 nearby lymph nodes (N1) but not distant sites.

Stage IIIC: Any T, N2, M0: The cancer can be any T but has spread to 4 or more nearby lymph nodes but not distant sites.

Stage IV: Any T, Any N, M1: The cancer can be any T, any N, but has spread to distant sites such as the liver, lung, peritoneum (the membrane lining the abdominal cavity), or ovary (M1).

To use the decision trees in this booklet, it will be very helpful if you know either the stage of your tumor, or the specific T, N, and M number. Your doctor will be able to give this information to you.

Types of Treatment for Colon and Rectal Cancers

The 4 main types of treatment for colon and rectal cancer are surgery, radiation therapy, chemotherapy, and *immunotherapy*. Depending on the stage of the cancer, 2 or even 3 of these types of treatment may be combined at the same time or after one another.

After your cancer has been found and staged, your doctor will recommend one or more treatment options. It is important to take time and think about all of your choices.

You may want to ask for a second opinion. This can give you even more information and help you feel more confident about the treatment plan you choose.

Surgery

Colon surgery

Surgery is the main treatment for colon cancer. The usual operation is called a *segmental resection* or partial *colectomy*. To prepare for this surgery you will be given laxatives and enemas to clean out your colon. Just before the surgery you will be given general anesthesia, which puts you into a deep sleep. During this surgery, the cancer and a length of normal tissue on either side of the cancer, as well as the nearby lymph nodes are removed. The remaining sections of the colon are then re-attached. When you wake up you will have some pain and will need to be given pain medicines, usually morphine for the first day or two. This operation rarely causes any major permanent problems with digestive functions. Sometimes, a temporary *colostomy* may be needed. For a colostomy, the colon is attached to the abdominal wall and fecal material drains through an opening in the wall into a bag. Even more rarely, a permanent colostomy may be needed. Your doctor will discuss this with you before your surgery. Patients can usually leave the hospital about 5 to 7 days after surgery and resume usual activities in 6 weeks. Of course, hospitalization and recovery times depend on each patient's specific medical condition.

It is sometimes possible to remove some very early colon cancers through a colonoscopy. When surgery is done this way, the

surgeon does not have to cut into the abdomen, which shortens recovery time.

Some advanced colon cancers can block the flow of feces. When it is not possible to remove the cancer, the flow of feces can be diverted to a colostomy. (This operation is called a diverting colostomy.) Another alternative is placing a stent (a plastic or metal tube) inside the colon to keep it from becoming blocked if the tumor cannot be removed. If there is blockage, surgery is more likely to lead to complications because the bowel cannot be cleaned with enemas, which helps prevent infection. Also, a complete colonoscopy cannot be done.

It is sometimes possible to remove segments of the colon and nearby lymph nodes through a *laparoscope* (laparoscopic colectomy). This instrument is a long, lighted viewing tube through which the doctor can operate with special surgical instruments. The viewing tube and instruments are placed into the abdomen through several small surgical incisions. The NCCN guidelines include this procedure as an option. Clinical trials have shown that as a procedure, laparoscopic colectomy works as well as abdominal colectomy.

Rectal surgery

Several methods are used to remove or destroy rectal cancers. Local resection is an option for some people with stage I rectal cancer. It involves cutting through all layers of the rectum to remove invasive cancers as well as some surrounding normal rectal tissue. This surgery can be done through the anus without cutting through the abdomen and it leaves the rectum intact. This procedure is called

transanal resection. If your cancer cannot be removed completely by this procedure, transanal resection will not be an option for you. Doctors consider the cancer's size, its exact location within the rectum, and how far around the circumference of the rectum it extends in order to select which patients should have a local resection.

Many stage I and most stage II and stage III rectal cancers are removed by either *low anterior (LA) resection* or *abdominoperineal (AP) resection*. LA resection is used for cancers near the upper part of the rectum, close to where it connects with the sigmoid colon. After LA resection, the colon is attached to the lower rectum and feces are eliminated in the usual way.

AP resection is used for cancer in the lower part of the rectum, close to its outer connection to the anus. Because the cancer is close to the anus, the anus is also removed. After AP resection, a permanent colostomy is needed. Some patients with stage IV rectal cancers will need a diverting colostomy. In this operation the surgeon does not remove a rectal cancer that is blocking fecal flow, but instead bypasses the blockage and diverts fecal flow to a colostomy. Some patients may now have a stent (a plastic or metal tube) placed to keep the colon or rectum from becoming blocked if the tumor cannot be removed. Heating the rectal tumor with a laser beam aimed through the anus, called photocoagulation, is another way to relieve or prevent rectal blockage in patients with stage IV cancers.

Surgical treatment of colorectal cancer metastases

For patients whose colorectal cancer has spread to a few areas in the liver or lungs, removing these metastases can cure the cancer in some instances. Other times, destroying metastases without surgery can help the patient live longer, but not cure them. Liver metastases may also be destroyed by heating them with radiofrequency waves (called radiofrequency *ablation*). The radiofrequency probe is placed through the skin and guided to the tumor by CT scans or ultrasound images.

Radiation Therapy

Radiation has a major role in treating rectal cancers. Radiation therapy uses high-energy x-rays or particles to kill cancer cells. In treating rectal cancer, radiation treatment is usually given by *external beam radiation*. External beam radiation is usually given with a linear accelerator, 5 days a week for several weeks. This must be carefully planned, using different imaging techniques, such as a CT scan, so that the beams focus on the cancer and not healthy tissue. Radiation can be given either before surgery (to shrink a tumor so it is easier to remove or to decrease the risk of complications) or after surgery (if there is a risk of the cancer coming back in the tumor area). Chemotherapy with the drug fluorouracil (5-FU) may be given by continuous infusion through an intravenous (IV) line (placed in a vein) at the same time as radiation. This drug makes the radiation more effective. Radiation therapy can also be combined with oral capecitabine. Studies have shown that for rectal cancer, radiation along with surgery

will often decrease the risk of the cancer coming back (*recurrence*).

Chemotherapy

Chemotherapy is the use of cancer-fighting drugs injected into a vein or taken by mouth. Chemotherapy is a systemic treatment. The drugs enter the bloodstream and reach all areas of the body, making this treatment useful for cancers that have spread beyond the place they started.

Fluorouracil (5-FU) is the drug most often used to treat colorectal cancer. It is usually given together with other drugs, such as leucovorin, that increase its effectiveness.

5-FU can be given continuously over 2 days as well as by rapid injection on each day. The leucovorin is given on each day over 2 hours. This combination, called the de Gramont regimen, is given every other week.

In some cases, to make the patient respond better to radiation therapy, 5-FU is given as a continuous infusion into a vein. The patient wears a small battery-operated pump that continuously releases 5-FU into an IV line. For patients whose colon or rectal cancer has spread to their liver, chemotherapy drugs may be given directly into the artery that supplies blood to the liver. This approach to treatment of liver metastases is called hepatic artery infusion.

Irinotecan (Camptosar®) is another chemotherapy drug that is used with 5-FU. This treatment is called FOLFIRI. It adds irinotecan to the de Gramont 5-FU/leucovorin regimen. Recent studies have shown there may be many side effects when 5-FU, leucovorin, and irinotecan are combined. If this combination of drugs is used, the starting doses may be

reduced and your doctor will watch you carefully so that your doses can be adjusted if necessary. If you have a lot of side effects, the dosages may be adjusted.

Oxaliplatin (Eloxatin®) is another drug that works well when combined with 5-FU and leucovorin. It may be used instead of irinotecan. Like irinotecan, it is often used with the de Gramont 5-FU/leucovorin regimen. This treatment is called FOLFOX.

Capecitabine (Xeloda®), a newer chemotherapy drug given by mouth, is changed to 5-FU once it gets inside the body to the tumor site. This drug can be used instead of intravenous 5-FU and acts as if the 5-FU was being given continuously. Capecitabine can also be combined with radiation therapy.

Immunotherapy

Immunotherapies use natural substances produced by the body's immune system. These substances may kill cancer cells, slow their growth, or activate the patient's immune system to fight cancer more effectively.

The immune system produces antibodies to help fight infections. Similar antibodies, called *monoclonal antibodies*, can be made in the laboratory. Instead of attacking germs as usual antibodies do, some monoclonal antibodies can be designed to attack cancer cells. Three monoclonal antibodies have been approved by the US Food and Drug Administration (FDA) to treat colon or rectal cancer.

The first, bevacizumab (Avastin®), works by preventing the growth of new blood vessels that supply tumor cells with the blood, oxygen, and other nutrients they need to grow. Bevacizumab is used with chemotherapy and is likely to be the first treatment used for

patients with advanced or metastatic colon or rectal cancer.

The other two monoclonal antibodies, cetuximab (Erbix®) and panitumumab (Vectibix®), work by locking onto a protein on the surface of the tumor cell called epidermal growth factor receptor. This prevents the tumor cell from dividing. Both of these drugs can be used alone as a second or third line treatment for patients with advanced or metastatic colon or rectal cancer. Cetuximab also can be used with irinotecan, either alone or in the FOLFIRI regimen.

Neoadjuvant Treatment and Adjuvant Treatment

The terms *neoadjuvant treatment* and *adjuvant treatment* refer to radiation therapy and/or chemotherapy given before (neoadjuvant) or after (adjuvant) surgery.

Neoadjuvant treatment

The purpose of neoadjuvant treatment is to shrink tumors so that they can be more completely removed by surgery and to help prevent the cancer from coming back in that area. If the tumor in the colon is large or has spread to lymph nodes, chemotherapy may be recommended before surgery. For some rectal tumors, chemotherapy may be combined with radiation therapy before surgery.

Adjuvant treatment

After surgery, the tissue that has been removed is examined under a microscope to determine the cancer's stage (how far it has spread). If the cancer is large or has spread to lymph nodes, even though no remaining cancer can be seen, doctors believe it is possible that a

few scattered cancer cells may remain in the patient's body. In this situation more treatment in the form of chemotherapy or radiation therapy may be given.

Talking with an enterostomal therapist

NCCN guidelines recommend that people with rectal cancer (and some with colon cancer) be referred to an *enterostomal therapist* as part of their initial work-up. An enterostomal therapist is a health care professional, most often a nurse, specially trained to provide information and training for people who need temporary or permanent colostomies. He or she can address concerns about how a colostomy might affect the patient's daily activities. A colostomy is an opening in the abdominal wall where a section of the colon is attached to allow for passage of body waste. A bag is attached to the skin with adhesives to collect waste. Discussing these issues shortly after diagnosis can help patients make informed decisions about treatment options, some of which may include a colostomy.

The ACS and many cancer centers can refer patients with colostomies to support groups and other programs that can provide additional information.

Treatment of Pain and Other Symptoms

Most of this document discusses ways to remove or destroy colorectal cancer cells or to slow their growth. But it is important to realize that maintaining the lifestyle you have always enjoyed is an important goal. Don't hesitate to discuss your symptoms or any other concerns with your cancer care team.

There are effective and safe ways to treat pain, most other symptoms of colorectal cancer, and most of the side effects caused by colorectal cancer treatment. (You might want to see the ACS/NCCN treatment guidelines for patients on the following topics: cancer pain, nausea and vomiting, cancer-related fatigue, and fever and neutropenia.)

Alternative or Complementary Therapies

Complementary and *alternative therapies* are a group of different types of health care practices, systems, and products that are not part of your usual medical treatment. They may include Chinese herbs, special supplements, acupuncture, massage, and a host of other types of treatment. You may hear about some of these different treatments from your family and friends. People will offer all sorts of things, such as vitamins, herbs, stress reduction, and more as a treatment for your cancer or to help you feel better. Some of these treatments are harmless in certain situations, while others have been shown to cause problems. Most of them are of unproven benefit.

The American Cancer Society defines complementary medicine or methods as those that are used in addition to your regular medical care. If these treatments are carefully managed, they may add to your comfort and well-being. Alternative medicines are defined as those that are used instead of your regular medical care. Some of them have been proven harmful, but are still promoted as "cures." If you choose to use these alternatives, they may reduce your chance of fighting your cancer successfully by delaying or replacing regular cancer treatment.

There is a great deal of interest today in complementary and alternative treatments for cancer. Many are being studied to find out if they are truly helpful to people with cancer.

Before changing your treatment or adding any of these methods, it is best to discuss this openly with your doctor or nurse. Some methods can be safely used along with standard medical treatment. Others, however, can interfere with standard treatment or cause serious side effects. That is why it's important to talk with your doctor. More information about complementary and alternative methods of cancer treatment is available through the American Cancer Society's toll-free number at 1-800-ACS-2345 or on our Web site at www.cancer.org.

Clinical Trials

Studies of promising new or experimental treatments in patients are known as clinical trials. You may have heard about clinical trials being done for your type of cancer. Or maybe someone on your health care team has mentioned a clinical trial to you. Clinical trials are one way to get state-of-the-art cancer care.

A clinical trial is only done when there is some reason to believe that the treatment being studied may be valuable to the patient. Researchers conduct studies of new treatments to answer the following questions:

- Is the treatment helpful?
- What is the best way to give it?
- How does this new type of treatment work?
- Does it work better than other treatments already available?

- What side effects does the treatment cause?
- Are there more side effects than the standard treatment used now?
Fewer side effects?
- Do the benefits outweigh the side effects?
- In which patients is the treatment most likely to be helpful?

There are 4 phases of clinical trials, which are numbered I, II, III, and IV.

Phase I clinical trials: The purpose of a phase I study is to find the best way to give a new treatment safely to patients. The cancer care team closely watches patients for any harmful side effects. Although doctors are hoping to help patients, the main purpose of such a phase I study is to test the safety of the treatment.

If a treatment is found to be reasonably safe in phase I studies, it can be tested in a phase II clinical trial.

Phase II clinical trials: These are designed to see if the treatment works. Patients are closely watched for an effect on the cancer. The cancer care team also looks for side effects and benefits.

If a drug is found to be effective in phase II studies, it can be tested in a phase III clinical trial.

Phase III clinical trials: Phase III studies involve large numbers of patients. Often, these studies are randomized. This means that patients are randomly put in one of two (or more) groups. One group (called the control group) gets the standard, most accepted treatment. Another group (or more than one group) will get the new one being studied.

Phase III clinical trials are usually needed before the FDA will approve a treatment for use by the general public.

Phase IV clinical trials: Once a treatment has been approved by the FDA and is available for all patients, it is still studied in other clinical trials (sometimes referred to as phase IV studies). This way more can be learned about short-term and long-term side effects and safety as the treatment is used in larger numbers of patients with many types of diseases.

What It Will Be Like to Be in a Clinical Trial

If you are in a clinical trial, you will have a team of experts taking care of you and watching your progress very carefully. Depending on the phase of the clinical trial, you may receive more attention (such as having more doctor visits and lab tests) than you would if you were treated outside of a clinical trial. Clinical trials are especially designed to pay close attention to you.

However, there are some risks. No one involved in the study knows in advance whether the treatment will work or exactly what side effects will occur. That is what the study is designed to find out. While most side effects go away in time, some may be long-lasting or even life threatening. Keep in mind, though, that even standard treatments have side effects. Depending on many factors, you may decide to enter (enroll in) a clinical trial.

Deciding to Enter a Clinical Trial

If you would like to take part in a clinical trial, you should begin by asking your doctor if your clinic or hospital conducts clinical trials. There

are requirements you must meet to take part in any clinical trial. But whether or not you enter (enroll in) a clinical trial is completely up to you.

Your doctors and nurses will explain the study to you in detail. They will go over the possible risks and benefits and give you a form to read and sign. The form says that you understand the clinical trial and want to take part in it. This process is known as giving your informed consent. Even after reading and signing the form and after the clinical trial begins, you are free to leave the study at any time, for any reason.

Taking part in a clinical trial does not keep you from getting any other medical care you may need.

To find out more about clinical trials, talk to your doctor, nurse, or other member of your cancer care team. Among the questions you should ask are:

- Is there a clinical trial that I could take part in?
- What is the purpose of the study?
- What kinds of tests and treatments does the study involve?
- What does this treatment do? Has it been used before?
- Will I know which treatment I receive?
- What is likely to happen in my case with, or without, this new treatment?
- What are my other choices and their pros and cons?
- How could the study affect my daily life?
- What side effects can I expect from the study? Can the side effects be controlled?
- Will I have to stay in the hospital? If so, how often and for how long?

- Will the study cost me anything? Will any of the treatment be free?
- If I am harmed as a result of the research, what treatment would I be entitled to?
- What type of long-term follow-up care is part of the study?
- Has the treatment been used to treat other types of cancers?

How Can I Find Out More About Clinical Trials That Might Be Right for Me?

The American Cancer Society offers a clinical trials matching service for patients, their family, and friends. You can reach this service at 1-800-303-5691 or on our Web site at <http://clinicaltrials.cancer.org>.

Based on the information you give about your cancer type, stage, and previous treatments, this service can put together a list of clinical trials that match your medical needs. The service will also ask where you live and whether you are willing to travel so that it can look for a treatment center that you can get to.

You can also get a list of current clinical trials by calling the National Cancer Institute's Cancer Information Service toll free at 1-800-4-CANCER (1-800-422-6237) or by visiting the NCI clinical trials Web site at www.cancer.gov/clinicaltrials.

For even more information on clinical trials, the American Cancer Society has a document called "Clinical Trials: What You Need to Know." You can read this on the Web site, www.cancer.org, or have it sent to you by calling 1-800-ACS-2345.

Side Effects of Colon and Rectal Cancer Treatments

Side Effects of Surgery

Side effects that can occur as a result of colorectal surgery include bleeding from the surgery, blood clots in the legs, and damage to nearby organs during the operation. Rarely, the connections between the ends of the intestine may not hold together completely and can leak. If an infection occurs, it is possible that the incision might open up, causing a gaping wound. Later, after the surgery, you might develop internal bands of scar tissue called adhesions, which could cause the bowel to become blocked.

Side Effects of Radiation

Side effects of radiation occur mainly in the area where the radiation is given and may include skin irritation, diarrhea, rectal irritation, and bladder irritation. You might also feel nauseated and tired. These slowly build up during treatment and over time disappear after treatment. Long-term effects such as scarring or bleeding are possible. Irritation of the rectum is called *radiation proctitis*, and irritation of the colon is called *radiation colitis*. Occasionally, irritation of the rectum or bladder may last a long time.

Side Effects of Chemotherapy

Your cancer care team will pay careful attention to avoiding or reducing any side effects, which depend on the type of drugs, the amount taken, and the length of treatment. The most common side effects might include loss of appetite, mouth sores, diarrhea (which can sometimes be quite severe and even life

threatening — particularly if irinotecan is given), or a rash on the patient’s hands and feet. Hair loss can also occur. Because chemotherapy can damage the blood-producing cells of the bone marrow, patients may have low blood cell counts. This can result in an increased chance of infection (due to a shortage of white blood cells), bleeding or bruising after minor cuts or injuries (due to a shortage of blood platelets), and fatigue (sometimes due to low red blood cell counts). Fatigue also occurs even when blood counts are normal.

Most side effects disappear once treatment is stopped. Hair will grow back after treatment ends. There are remedies for many of the temporary side effects of chemotherapy. For example, anti-nausea drugs can be given to prevent or reduce nausea and vomiting. (For more information you might want to see the *ACS/NCCN Nausea and Vomiting Treatment Guidelines for Patients with Cancer*.)

Side Effects of Immunotherapy

Although monoclonal antibodies are similar to normal parts of the immune system, treatment with them also can cause side effects. Common side effects of these agents are high blood pressure, blood clots, diarrhea, fatigue, decreased white blood cell counts, headache, and skin rashes like acne.

Body Image and Sexuality Issues

Surgery and radiation therapy may sometimes affect how people feel about their body and may lead to specific physical problems that affect sexuality. Men who have an abdominoperineal (AP) resection can have “dry” orgasms following surgery because of damage to the nerves that control ejaculation. Sometimes the

surgery only causes retrograde ejaculation, which means the semen goes backward into the bladder. AP resection should not stop a man’s erections or ability to reach orgasm. However, his pleasure at orgasm may be less intense. Radiation also may cause sexual dysfunction in men. Women who have an AP resection should not expect any loss of normal sexual function.

Your cancer care team can discuss these issues with you, so don’t hesitate to share your concerns and ask questions. The American Cancer Society also has resources available to help you understand and cope with the changes you are experiencing. Call 1-800-ACS-2345 any time, any day.

Other Things to Consider During and After Treatment

During and after treatment for your colon or rectal cancer, you may be able to speed up your recovery and improve your quality of life by taking an active role. Learn about the benefits and disadvantages of each of your treatment options and ask questions of your cancer care team if there is anything you do not understand. Learn about and watch for side effects of treatment and report these promptly to your cancer care team so that they can take steps to reduce them.

Remember that your body is as unique as your personality and your fingerprints. Although understanding your cancer’s stage and learning about your treatment options can help predict what health problems you may face, no one can say how you will respond to cancer or its treatment.

You may have special strengths such as a history of excellent nutrition and physical activity, a strong family support system, or a deep faith, and these strengths may make a difference in how you respond to cancer treatment. There are also experienced professionals in mental health services, social work services, and pastoral services who may help you cope with your illness.

You can also help in your own recovery from cancer by making healthy lifestyle choices. If you use tobacco, stop now. Quitting will improve your overall health, and the full return of the sense of smell may help you enjoy a healthy diet during recovery. If you use alcohol, limit how much you drink. Have no more than 1 or 2 drinks per day. Good nutrition can help you get better after treatment. Eat a nutritious and balanced diet, with plenty of fruits, vegetables, and whole grain foods. If you are having eating problems, ask your cancer care team if you might benefit

from a special diet — they may have specific recommendations for people who have had radiation therapy, a colostomy, or other colorectal surgery.

If you are being treated for cancer, be aware of the battle going on in your body. Radiation therapy and chemo add to the fatigue caused by the disease itself. To help you with the fatigue, plan your daily activities around when you feel your best. Get plenty of sleep at night. Ask your cancer care team about including a regular program of exercise in your daily routine to help in your recovery.

A cancer diagnosis and its treatment are major life challenges, with an impact on you and everyone who cares for you. Before you get to the point where you feel overwhelmed, consider attending a meeting of a local support group. If you need assistance in other ways, contact your hospital's social service department or the American Cancer Society.

NOTES

NOTES

Colon and Rectal Cancer Treatment Guidelines

Decision Trees

The Decision Trees (or flow charts) on the following pages represent treatment at different stages of colorectal cancer. Each one shows you step-by-step how you and your doctor can arrive at the choices you need to make about your treatment.

Keep in mind that this information is not meant to be used without the expertise of your own doctor, who is familiar with your situation, medical history, and personal preferences.

You may even want to review this booklet together with your doctor, who can show you which of the Decision Trees apply to you. Ask your doctor about the specific stage of the colon cancer (**tumor**, **nodes**, and **metastasis**). This information will also help you know which decision trees apply to you. We've left some blank spaces in the Decision Trees for you or your doctor to add notes about the treatments. You also might use this space to write down some questions to ask your doctors about the treatments. Finally, your doctor should ask you about a family history of colon cancer. If there is a strong family history, additional *screening* tests may be appropriate for you and other family members.

Participating in a clinical trial is an option for people with any stage of colorectal cancer. Taking part in that study does not prevent you from getting other medical care you may need.

The NCCN guidelines are updated as new information become available. To ensure you have the most recent version, consult the Web sites of the NCCN (www.nccn.org) or ACS (www.cancer.org). You may also call the NCCN at 1-888-909-NCCN or the ACS at 1-800-ACS-2345 for the most recent information on these guidelines or for information on cancer in general. If you have questions about your cancer or cancer treatment, please call the ACS any day at any time at 1-800-ACS-2345.

Clinical Presentation*

Work-up (Evaluation)

Invasive cancer in a polyp on a stalk that has been removed by polypectomy



- Pathology review
- Colonoscopy
- Marking of polyp site



Invasive cancer found in a flat polyp that has been removed by polypectomy



- Pathology review
- Colonoscopy
- Marking of polyp site



** All patients with colon cancer should be counseled for family history*

Treatment for Cancerous Polyps

Many factors are considered when selecting treatment for patients with colon cancer. These factors are considered in a stepwise manner, starting with the doctor's initial impression of the patient's medical situation (called the clinical presentation). All patients with colon cancer should be asked about

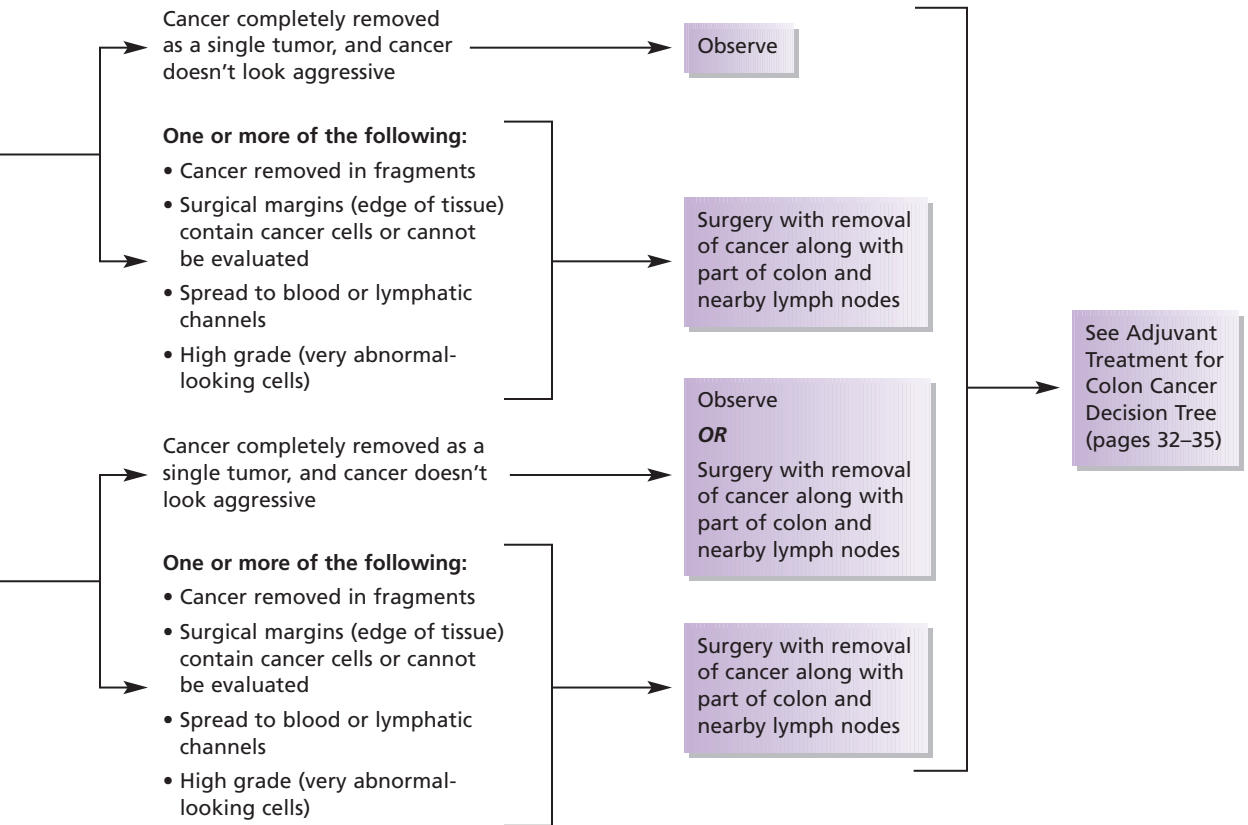
their family history to determine whether the cancer may have a genetic basis.

Sometimes a patient is thought to have a non-cancerous, or benign, polyp of the colon. Only after it is removed and studied under a microscope can the doctors tell if cancer is present. If there is any sign that the polyp contains cancer, colonoscopy should be done

Treatment for Cancerous Polyps

Findings After Polyp Removal

Treatment



©2007 by the National Comprehensive Cancer Network (NCCN) and the American Cancer Society (ACS). All rights reserved. The information herein may not be reproduced in any form for commercial purposes without the expressed written permission of the NCCN and the ACS. Single copies of each page may be reproduced for personal and non-commercial uses by the reader.

promptly and the site marked with metal clips for further study.

Polyps can be subdivided according to whether they have a stalk (called a pedunculated polyp), or whether they are flatter with a

broad base (called a sessile polyp). Treatment decisions are similar for these two types.

If the cancerous part of the growth has been completely removed and is limited to the surface of the polyp (the part that resembles

the cap of a mushroom) and the cancer cells do not appear to be aggressive under the microscope, no more treatment is needed. However, part of the colon can be removed (colectomy) to be sure that surgery got all the cancer if the polyp is flat.

Surgery to remove the cancer along with removal of nearby lymph nodes is recommended if there is any chance that the tumor was not entirely removed. For example, surgery is recommended if the polyp was removed in pieces (making it difficult to

NOTES

Treatment for Cancerous Polyps (continued)

determine if the tumor was entirely removed); or if cancer cells are in the edges of the removed tissue *margin*; or if the margins cannot be completely evaluated. Surgery is also recommended if the tumor has spread into

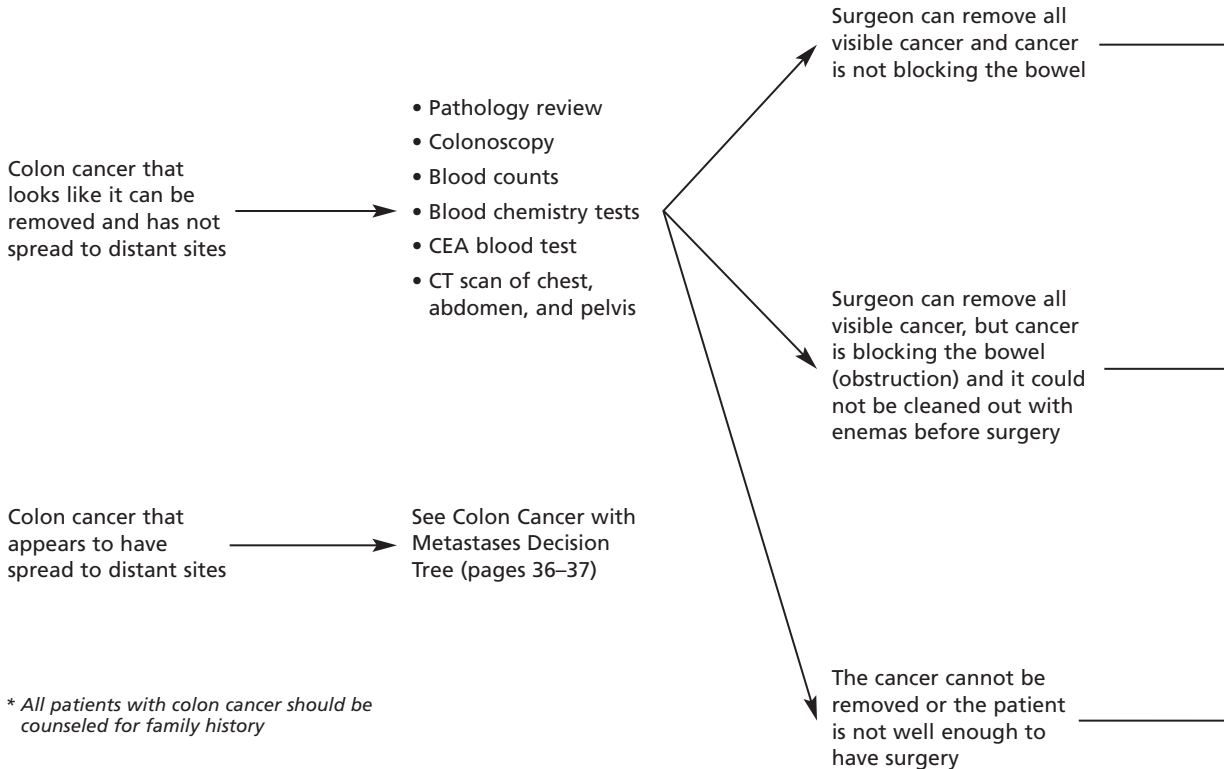
the blood vessels or lymph channels, or if the tumor appears aggressive or the cancer cells look highly abnormal (high grade) under the microscope.

NOTES

Clinical Presentation*

Work-up (Evaluation)

Findings of Work-up



Treatment for Colon Cancer

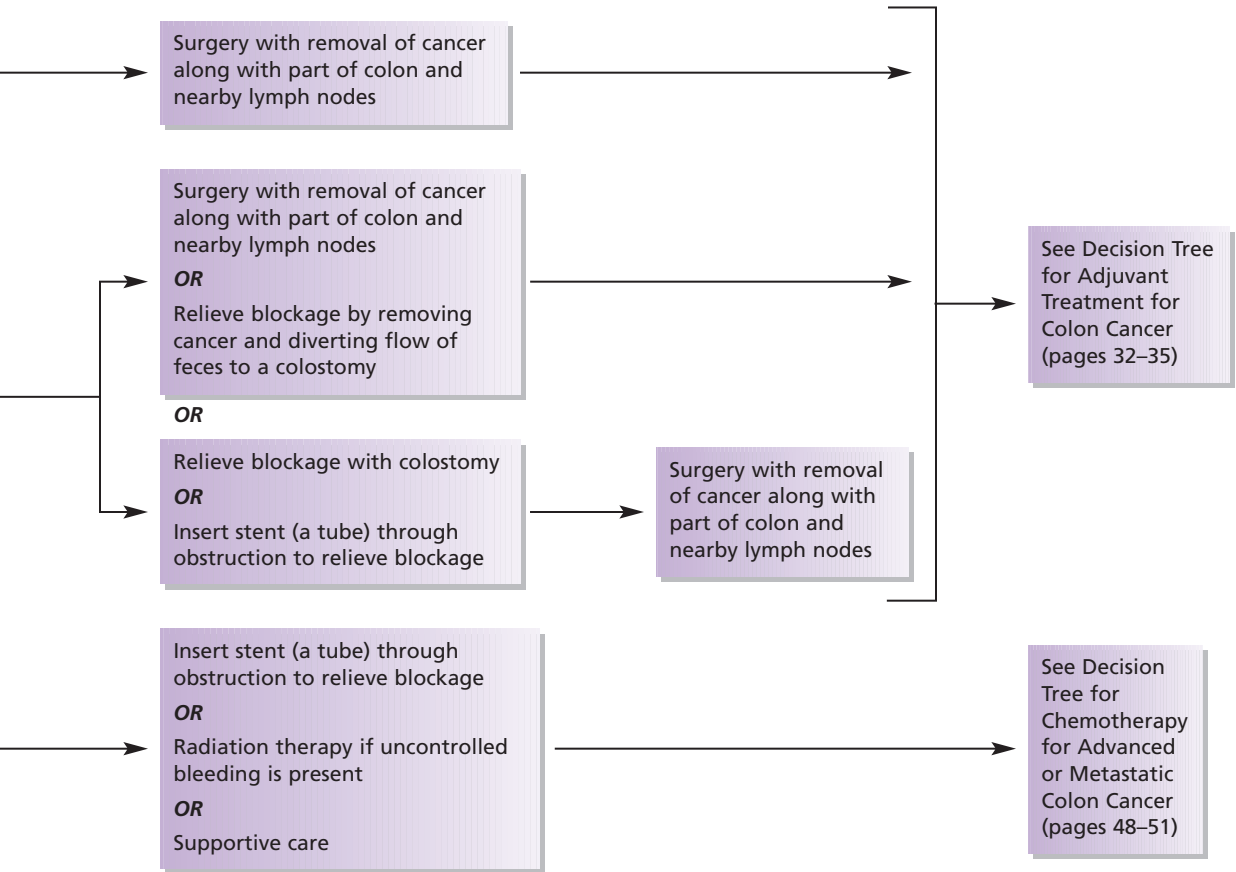
If a cancer invades the wall of the colon but has not spread to distant sites, then there should be a complete evaluation with a pathology review, colonoscopy (if not already done), blood tests, and CT scans of the chest, abdomen, and pelvis. If the cancer appears to be completely removable and is not blocking

the bowel, then surgery should be done to remove the part of the colon containing the cancer and nearby lymph nodes.

It is necessary before any colorectal surgery to clean the bowel. However, some large cancers may block the flow of feces making this difficult to do. In this situation there are 4 options.

Treatment for Colon Cancer

Surgery



©2007 by the National Comprehensive Cancer Network (NCCN) and the American Cancer Society (ACS). All rights reserved. The information herein may not be reproduced in any form for commercial purposes without the expressed written permission of the NCCN and the ACS. Single copies of each page may be reproduced for personal and non-commercial uses by the reader.

The first is for the surgeon to remove the part of the colon with the cancer and nearby lymph nodes.

In the second option the surgeon can do a smaller operation to remove just the cancer and

create a temporary colostomy. The bowel can then be cleaned out so that the full operation can be done and more of the colon and nearby lymph nodes can be removed. The colostomy is then repaired so the colon is intact again.

The third and fourth options are similar. The blockage can be immediately relieved by placing a plastic tube or stent through it or by creating a temporary colostomy. The bowel can then be cleaned out, followed by surgery to remove part of the colon and nearby lymph nodes.

Chemotherapy is recommended following the removal of the tumor. This is discussed in the adjuvant treatment Decision Tree on the next page.

If it turns out the cancer cannot be completely removed or the patient's condition is

NOTES

Treatment for Colon Cancer (continued)

too poor for surgery, then a stent can be placed to relieve any blockage. Radiation therapy may also be used if there is bleeding from the tumor. *Supportive care*, which is focused on controlling symptoms, but not treating the cancer, is another option. These patients may also be

offered chemotherapy which is discussed on pages 48–51.

If the cancer appears to have spread to distant sites, then the treatment is completely different (see the Decision Tree on pages 36–37).

NOTES

Pathological Stage

Adjuvant (Additional) Treatment

Stages 0 or I: Tumor is small, doesn't invade past muscular layer, and has not spread to lymph nodes or distant sites (Tis, T1, T2, N0, M0)

No further treatment

Stage IIA: Tumor has no high risk features, is larger and invades through bowel wall, but has not spread to lymph nodes or distant sites (T3, N0, M0)

Consider chemotherapy with 5-FU and leucovorin, or capecitabine, or FOLFOX, or FLOX

OR

Observe

OR

Clinical trial

Stage IIA: Same as above but the cancer has high-risk features such as very abnormal-looking cells, has grown into blood or lymphatic vessels, or has obstructed the colon (T3, N0, M0)

Chemotherapy with FOLFOX, or FLOX, or 5-FU and leucovorin, or capecitabine. Radiation may be added for T4 tumors with spread to adjacent structures

OR

Observe

OR

Clinical trial

Stage IIB: There is a hole in the bowel wall, or there is cancer at the edge of the surgical specimen (T4, N0, M0)

Stage IIB: The cancer has grown into surrounding tissues but has not spread to lymph nodes or distant sites (T4, N0, M0)

Stage IIIA, B, C: The tumor is of any size and has spread to lymph nodes but not distant sites (T1–T4, N1, N2, M0)

Chemotherapy with FOLFOX, or FLOX, or 5-FU and leucovorin, or capecitabine. Radiation may be added for T4 tumors with spread to adjacent structures

Adjuvant Treatment for Colon Cancer

Even though the tumor may appear to have been completely removed by surgery, microscopic cells may remain, which can result in the cancer recurring. The risk of cancer recurrence is higher if it has spread to the

lymph nodes. Adjuvant chemotherapy refers to additional chemotherapy given after surgery to reduce this risk. The need for adjuvant therapy is based, in part, on the number of lymph nodes the tumor has spread to. It is recommended that at least 12 lymph nodes

Adjuvant Treatment for Colon Cancer

Follow-up Tests and Examinations

- History and physical exam every 3 to 6 months for 2 years, then every 6 months for a total of 5 years.
- Repeat CEA blood test every 3 to 6 months for 2 years, then every 6 months for 5 years (only for T2, T3, and T4 cancers) if further treatment is a possibility.
- Consider CT of chest, abdomen, and pelvis once a year for 3 years if there is a high risk of recurrence, tumor spread to blood or lymph vessels, or tumor has very abnormal cells.
- Colonoscopy 1 year after surgery. If abnormal, repeat colonoscopy again in 1 year. If no polyps are found, repeat every 3 years and then every 5 years.
- If cancer has blocked the flow of feces (obstruction) and colonoscopy is not done before surgery, then colonoscopy after 3 to 6 months. If abnormal, repeat colonoscopy again in 1 year. If no polyps are found, repeat every 3 years and then every 5 years.
- PET scan is not routinely recommended

FOLFOX = 5-FU continuous infusion and leucovorin and oxaliplatin

FLOX = 5-FU bolus and leucovorin and oxaliplatin

©2007 by the National Comprehensive Cancer Network (NCCN) and the American Cancer Society (ACS). All rights reserved. The information herein may not be reproduced in any form for commercial purposes without the expressed written permission of the NCCN and the ACS. Single copies of each page may be reproduced for personal and non-commercial uses by the reader.

be checked under the microscope for tumor spread. If not enough lymph nodes have been evaluated, the tumor is considered high risk.

Different combinations of chemotherapy are listed in the Decision Trees. Specific combinations may be referred to with an acronym. For example, one combination of 5-FU, leucovorin, and oxaliplatin is referred to

as FOLFOX, while another is called FLOX. These acronyms are used in the Decision Trees.

Stages 0 or I: Tis; T1, T2, N0, M0: The tumor is small and doesn't invade past the muscle layer and it has not spread to nearby nodes or distant sites. Because the risk of cancer returning after surgery is low, adjuvant (or additional) treatment is not needed.

Stage IIA: T3, N0, M0 without high-risk features: The tumor is larger and invades through the bowel wall. It has not spread to nearby nodes or distant sites. The tumor does not have high risk features such as abnormal looking cells, spread to blood vessels, or tumor at the edge of the surgical specimen. In this situation, there is no clear evidence that adjuvant treatment is helpful, but this is not certain. Options include different chemotherapy treatments (see Decision Tree) or no adjuvant treatment. Participation in a clinical trial is also an option.

Stage IIA: T3, N0, M0 with high-risk features or Stage IIB: T4, N0, M0: Treatment options for these tumors are similar to those described for Stage IIA tumors, except that

chemotherapy is more strongly recommended since there is a higher chance that the cancer will come back without treatment. If there is a hole or perforation in the bowel (T4), radiation might be added to the chemotherapy. No treatment is also an appropriate option since chemotherapy does not improve survival more than 5%. The decision regarding adjuvant therapy requires careful discussion with your doctor. Participation in a clinical trial would also be an option.

Stages III A, B, C: T1–T4, N1, N2, M0: The cancer has spread to nearby lymph nodes but not distant sites. Patients whose tumors have spread to surrounding lymph nodes have a greater chance of having their cancer recur. Studies have shown that giving adjuvant

NOTES

Adjuvant Treatment for Colon Cancer (continued)

chemotherapy can lower the risk of the cancer recurring. The FOLFOX or FLOX combinations are preferred. Other options include capecitabine alone or 5-FU with leucovorin. Radiation therapy may be added for T4 tumors that have spread to nearby tissues.

Follow-up tests and examinations for colon cancer: After treatments are finished, follow-up tests are routinely done. The purpose of these tests is to find colorectal cancer that has recurred (come back) as soon as possible, when further treatments are most likely to be helpful.

You should see your doctor for regular check-ups — every 3 to 6 months for 2 years, then every 6 months for at least another 3 years. If you are healthy enough to have surgery to remove cancer that might come back

in the liver or lungs, a CEA blood test should be done at the same time as each check-up. A yearly CT scan of the chest, abdomen, and pelvis may be done for 3 years after treatment for patients at high risk for recurrence. Tumors that have spread to the blood or lymph vessels or tumors with very abnormal looking cells under the microscope are considered at high risk for recurrence. Colonoscopy to detect new polyps should be done in a year or in 3 to 6 months if your cancer was blocking the bowel and a colonoscopy couldn't be done before surgery. If polyps are found, the colonoscopy should be repeated in a year. If none are found, colonoscopy should be done again in 3 years and then every 5 years. PET scans are not recommended as part of routine follow-up.

NOTES

Clinical Presentation*

Work-up (Evaluation)

Stage IV: Colon cancer with proven or suspected distant spread (Any T, Any N, M1)

- Colonoscopy
- CT scan of chest, abdomen, and pelvis
- Blood counts
- Blood chemistry tests
- CEA blood test
- Needle biopsy of suspected metastasis
- MRI if removal of liver metastasis considered
- PET scan if it looks like there is a single metastasis that can be removed

* All patients with colon cancer should be counseled for family history

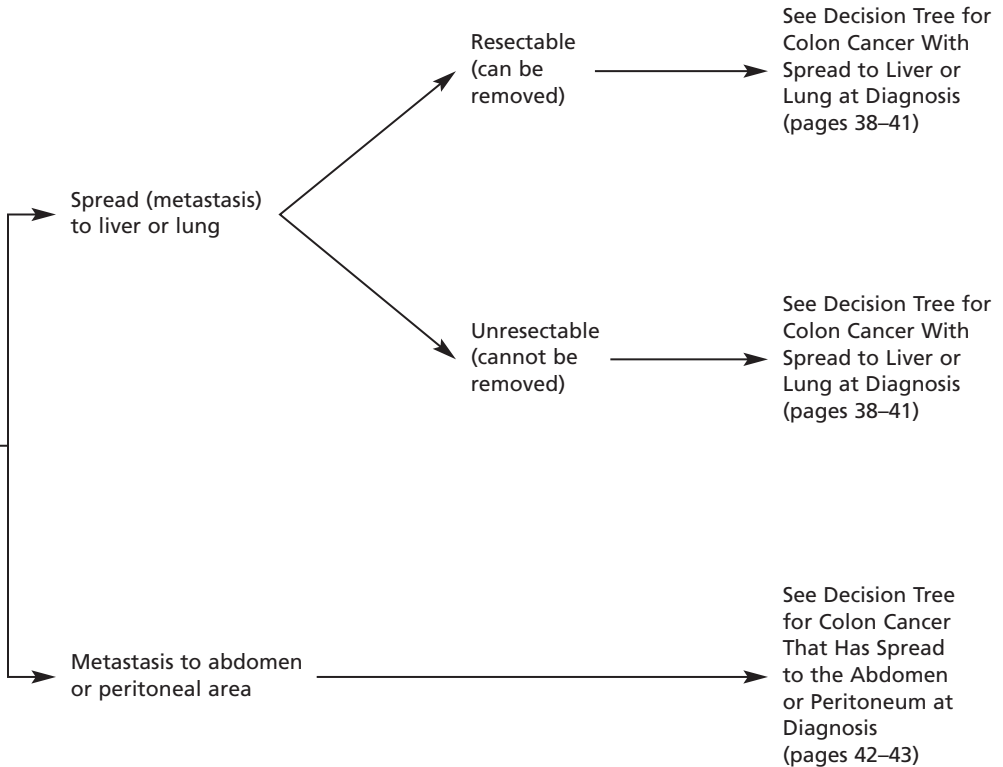
Colon Cancer with Metastases

Stage IV: Any T, any N, M1: The cancer has spread to distant sites. Work-up may include colonoscopy; CT scans of the chest, abdomen, and pelvis; blood tests; and a needle biopsy of the suspected metastasis. If it looks like the tumor could be removed with surgery more tests may be done, such as MRI or PET scans.

Sometimes, metastatic disease is identified at the same time colon cancer is diagnosed. Metastatic disease is most commonly found in the liver, lungs, and the abdomen, or its lining (called the peritoneum). It is important to determine if removing the colon tumor is still appropriate, and if the liver or lung metastases can be removed along with the colon tumor.

Colon Cancer with Metastases

Findings



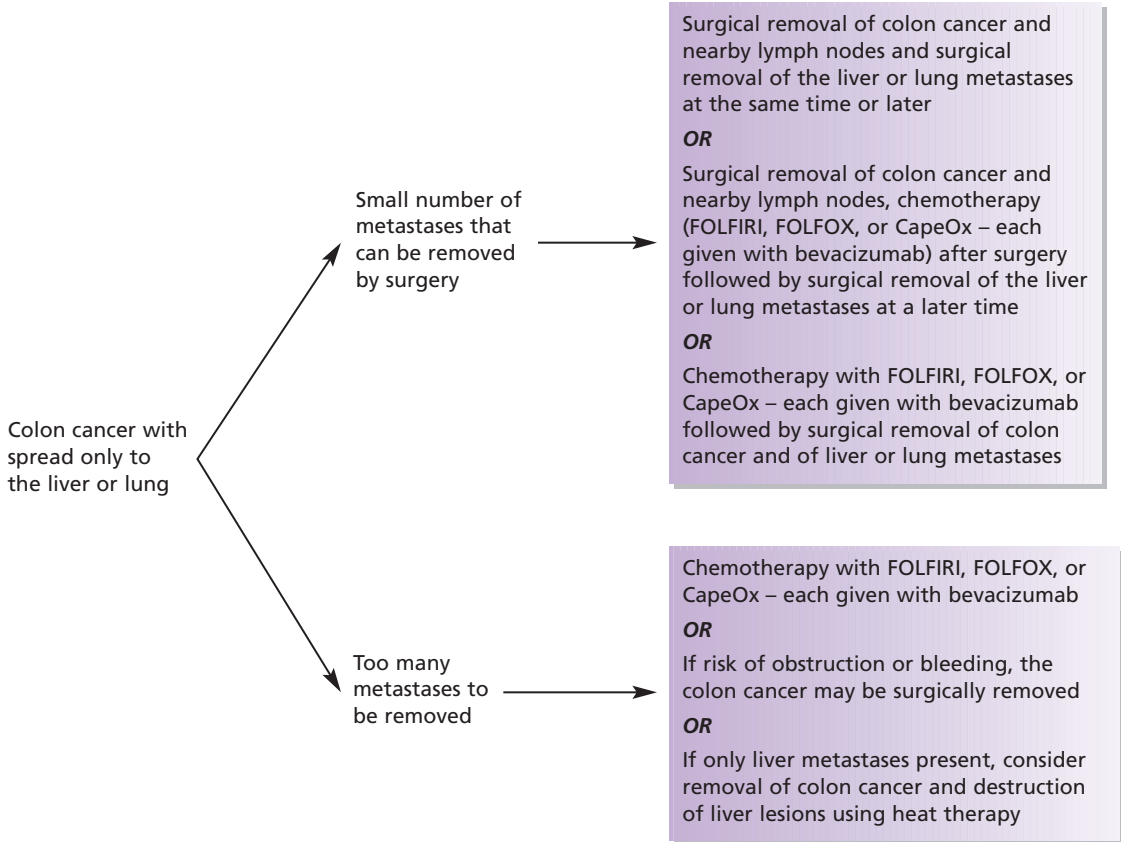
©2007 by the National Comprehensive Cancer Network (NCCN) and the American Cancer Society (ACS). All rights reserved. The information herein may not be reproduced in any form for commercial purposes without the expressed written permission of the NCCN and the ACS. Single copies of each page may be reproduced for personal and non-commercial uses by the reader.

This decision will be based on the number of metastatic tumors and their exact location. One tumor or a few tumors of metastatic colorectal cancer can often be removed from

the liver or lungs. Several tumors or tumors in certain critical parts of these organs may be impossible to remove without severely damaging those organs.

Findings

Surgery



Colon Cancer with Spread to Liver or Lung at Diagnosis

If the cancer has already spread, but only to the liver or lungs, doctors will decide if the metastases can be safely removed either at the same time or after surgery on the colon. If only a few metastases are present, surgery may

be able to remove them at the same time the colon is removed. Or, the colon and adjacent lymph nodes can be removed, followed by chemotherapy, and then surgical removal of the liver or lung metastases at a later time. Finally, chemotherapy can be given first, followed by removal of the colon and metastases

Colon Cancer with Spread to Liver or Lung at Diagnosis

Adjuvant Therapy

(6 months of treatment is preferred)

Chemotherapy for advanced disease
(See pages 48–51)
OR
If only liver metastases are present, chemotherapy into the liver with or without intravenous 5-FU/leucovorin or continuous 5-FU infusion
OR
Observation or shortened course of chemotherapy if chemotherapy was given prior to surgery

Follow-up Tests

If all cancer appears to have been removed:

- CEA every 3 months for 2 years, then every 6 months for 3 to 5 years
- CT of chest, abdomen, and pelvis every 3 to 6 months for 2 years, then every 6 to 12 months for a total of 5 years
- Colonoscopy 1 year after surgery. If abnormal, repeat colonoscopy again in 1 year. If no polyps are found, repeat in 3 years, then every 5 years
- If cancer had blocked the flow of feces (obstruction) and colonoscopy was not done before surgery, then colonoscopy after 3 to 6 months. If abnormal, repeat colonoscopy again in 1 year. If no polyps are found, repeat in 3 years, then every 5 years

Tumor shrinks and can be removed; treat as above

Tumor does not shrink

See the Decision Tree for Chemotherapy for Advanced or Metastatic Colon Cancer (pages 48–51)

FOLFOX = Continuous infusion 5-FU and leucovorin and oxaliplatin

FOLFIRI = Continuous infusion 5-FU and leucovorin and irinotecan

CapeOx = Capecitabine and oxaliplatin

©2007 by the National Comprehensive Cancer Network (NCCN) and the American Cancer Society (ACS). All rights reserved. The information herein may not be reproduced in any form for commercial purposes without the expressed written permission of the NCCN and the ACS. Single copies of each page may be reproduced for personal and non-commercial uses by the reader.

in the liver or lungs. Chemotherapy combinations that may be considered are FOLFIRI, FOLFOX, or capecitabine/oxaliplatin (CapeOx), each given with bevacizumab.

Regardless of the initial sequence of therapy, adjuvant chemotherapy is recommended for six months after surgery in most patients. The chemotherapy treatments are discussed on pages 48–51. Additionally, chemotherapy

can be given directly into the blood supply of the liver, known as hepatic artery infusion. For patients who received chemotherapy before surgery, a shortened course of chemotherapy is recommended, or the patient can be followed without further treatment.

If all cancer has disappeared after surgery and chemotherapy, the patient will be followed

with regularly scheduled laboratory tests, CT scans, and colonoscopy as noted in the above Decision Tree.

If there are too many metastases in the liver or lungs to be removed, patients may receive initial chemotherapy with either the FOLFIRI, FOLFOX, or CapeOx regimen, each in combination with bevacizumab. In some

NOTES

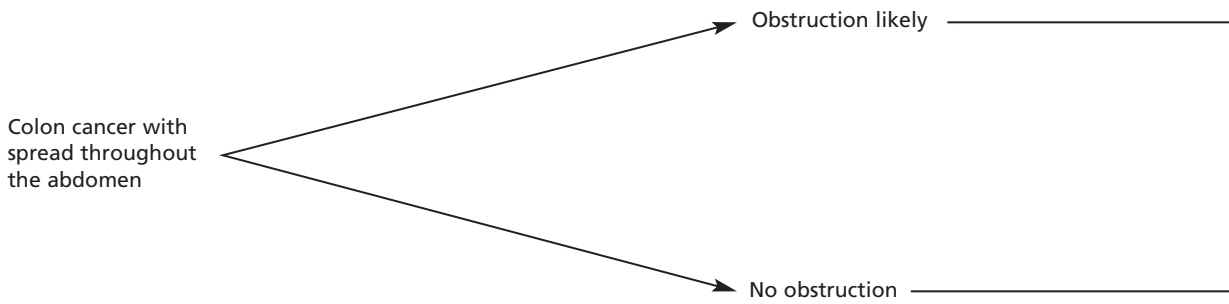
Colon Cancer with Spread to Liver or Lung at Diagnosis (continued)

cases, this therapy can shrink the metastases so that they can be removed with surgery. If so, the treatment options are the same as above. If the chemotherapy does not adequately shrink the tumor, then the patient is treated with chemotherapy for advanced or metastatic disease, as described on pages 48–51.

If surgery cannot remove the metastases, removal of the tumor and the colon is only considered if there is a high risk of colon obstruction or significant bleeding. Although not a cure, destroying liver metastases by heating them with radiofrequency waves is another option. This treatment can be combined with removal of the colon tumor.

NOTES

Findings



Colon Cancer That Has Spread to the Abdomen or Peritoneum at Diagnosis

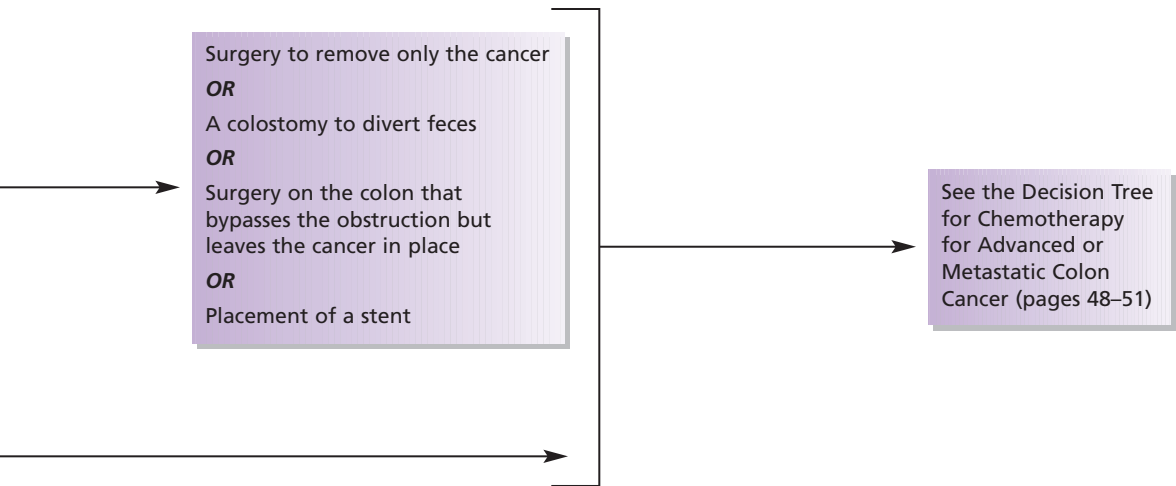
Sometimes the colon cancer already has spread to the lining of the abdomen (called the peritoneum) when it is first diagnosed.

This type of metastasis cannot be removed with surgery, so, the key decision is whether or not the tumor in the colon looks as if it could obstruct (block) the colon.

If the colon tumor is not blocking the flow of feces, then the patient can be treated with

Colon Cancer That Has Spread to the Abdomen or Peritoneum at Diagnosis

Treatment



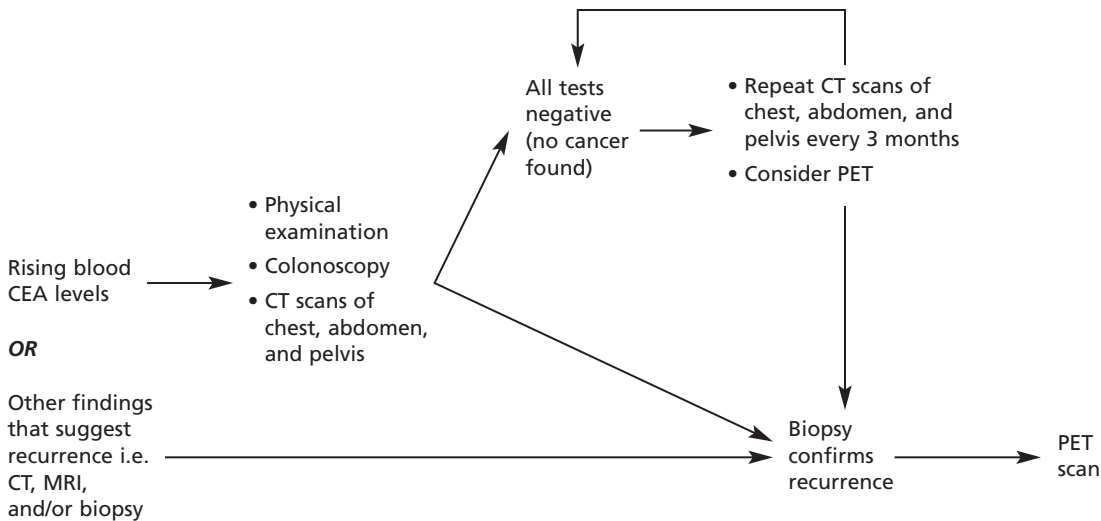
©2007 by the National Comprehensive Cancer Network (NCCN) and the American Cancer Society (ACS). All rights reserved. The information herein may not be reproduced in any form for commercial purposes without the expressed written permission of the NCCN and the ACS. Single copies of each page may be reproduced for personal and non-commercial uses by the reader.

chemotherapy for advanced or metastatic disease, described on page 48–51. If there is likely to be a blockage, options include surgery that removes the cancer, surgery that leaves the cancer in place but creates a colostomy to empty feces into a bag, or surgery that leaves

the cancer in place but bypasses the obstruction. A stent (a plastic or metal tube) placed through the blockage to allow the feces to pass through is another option. Chemotherapy after surgery may be considered.

Clinical Presentation

Evaluation



FOLFOX = 5-FU continuous infusion and leucovorin and oxaliplatin

FOLFIRI = 5-FU continuous infusion and leucovorin and irinotecan

Recurrent Colon Cancer

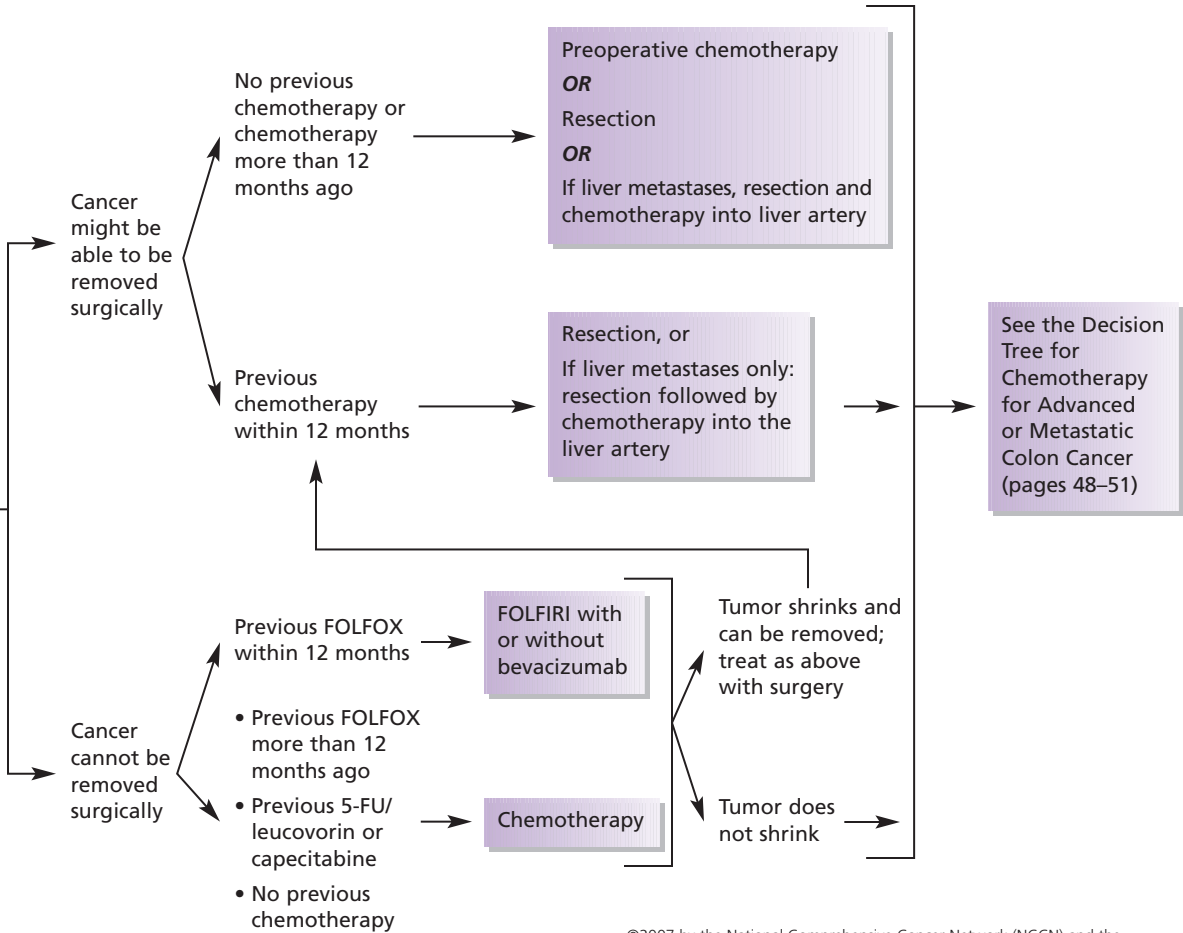
CEA levels that rise steadily after initial treatment strongly suggest that a colorectal cancer has come back (recurred). A thorough search for the location of the recurrent cancer is needed. The search includes a physical exam, colonoscopy, and CT scans of the chest, abdomen, and pelvis. If no cancer is found, the CT scans should be repeated every 3 months and a positron emission tomography (PET) scan should be considered.

Some patients may have an elevated CEA level for months or years before recurrent disease is found. Patients are not given chemotherapy based on a rising CEA level alone.

If recurrent cancer is found by imaging tests, a biopsy may be done to be certain that this is cancer and not some other disease. In most cases, this involves a needle biopsy procedure that uses a CT scan for guidance. There may be other reasons to suspect a recurrence, such as symptoms or something not

Recurrent Colon Cancer

Treatment



©2007 by the National Comprehensive Cancer Network (NCCN) and the American Cancer Society (ACS). All rights reserved. The information herein may not be reproduced in any form for commercial purposes without the expressed written permission of the NCCN and the ACS. Single copies of each page may be reproduced for personal and non-commercial uses by the reader.

normal on examination or by CT scan or MRI. A biopsy can confirm recurrence.

Treatment of recurrent cancer depends on whether the recurrent tumor can be completely removed with surgery. Before surgery, a PET

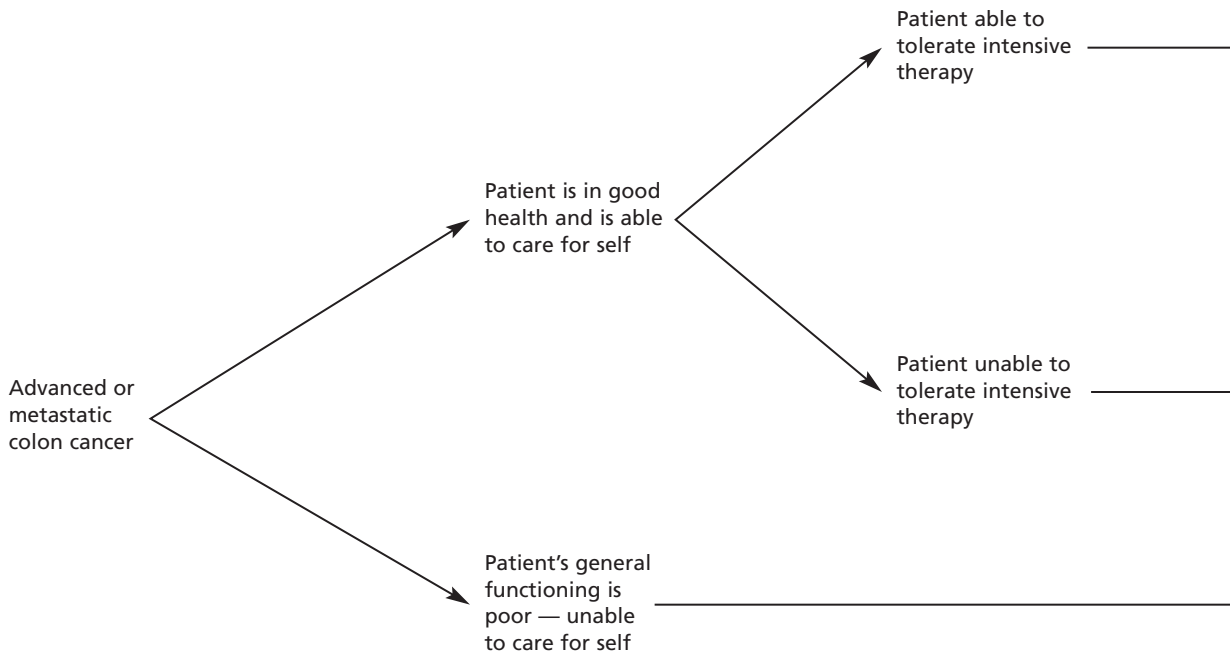
scan is recommended to make sure there isn't any cancer elsewhere.

If the tumor can be removed with surgery (resection), treatment will depend on if and when prior chemotherapy was given.

Chemotherapy before resection is recommended for those who were not treated with chemotherapy before, or received chemotherapy more than a year earlier. If chemotherapy was given within the past 12 months,

immediate resection is recommended. If the recurrence is located in the liver alone, then resection can be followed by chemotherapy directly into the artery feeding the liver to destroy any remaining tumor cells. After

NOTES



Chemotherapy for Advanced or Metastatic Colon Cancer

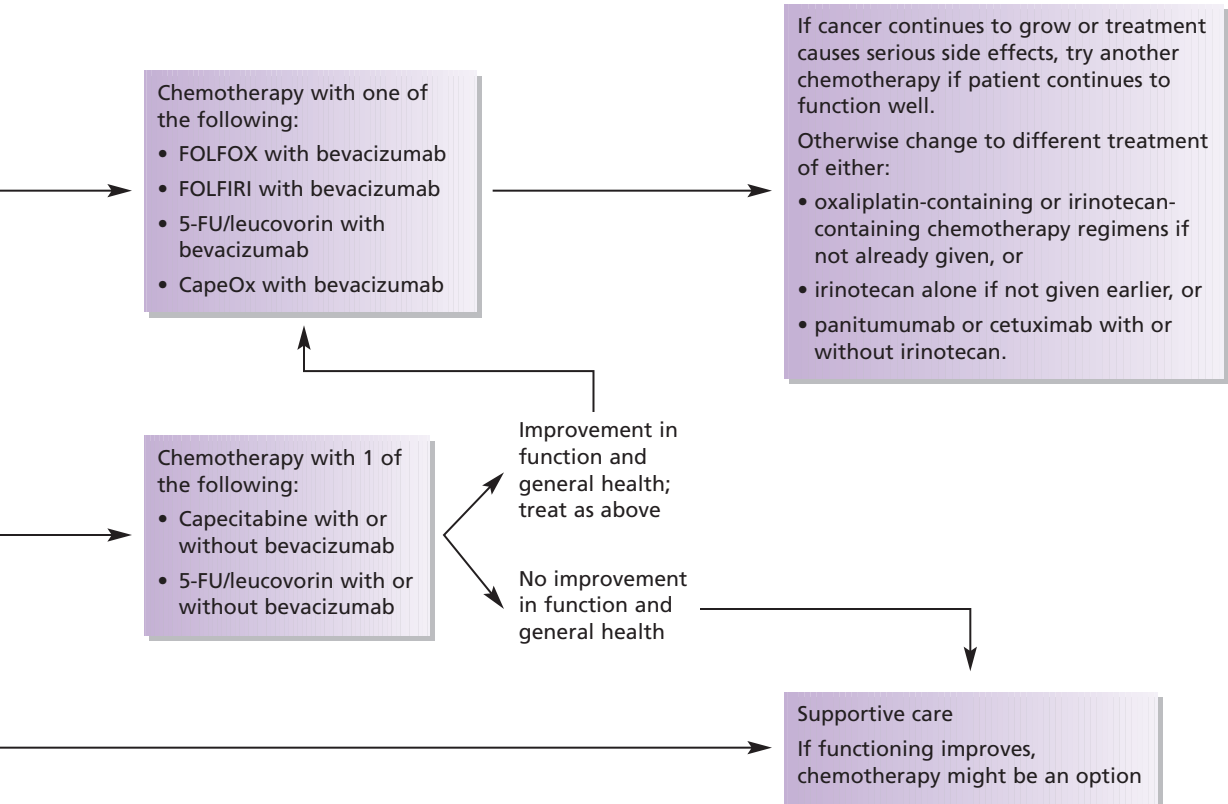
For patients whose recurrences or metastases are too large or numerous to remove completely, treatment options depend on whether they are in good health apart from the cancer and are able to care for themselves. Many

studies have shown that patients who are too ill to care for themselves almost never benefit from chemotherapy.

For patients who can tolerate intensive chemotherapy, the options include intravenous drugs with one of the following combinations:

Chemotherapy for Advanced or Metastatic Colon Cancer

Additional Treatment for Recurrent or Metastatic Cancer



FOLFOX = 5-FU continuous infusion and leucovorin and oxaliplatin

FOLFIRI = 5-FU continuous infusion and leucovorin and irinotecan

CapeOx = Capecitabine and oxaliplatin

©2007 by the National Comprehensive Cancer Network (NCCN) and the American Cancer Society (ACS). All rights reserved. The information herein may not be reproduced in any form for commercial purposes without the expressed written permission of the NCCN and the ACS. Single copies of each page may be reproduced for personal and non-commercial uses by the reader.

- 5-FU given as a continuous infusion with leucovorin and oxaliplatin (FOLFOX) combined with bevacizumab
- 5-FU given as a continuous IV infusion with leucovorin and irinotecan (FOLFIRI) combined with bevacizumab
- 5-FU and leucovorin, combined with bevacizumab
- capecitabine and oxaliplatin (CapeOX) with bevacizumab

Clinical Presentation*

Work-up (Evaluation)

Polyp on a stalk
with invasive cancer

- Pathology review
- Colonoscopy
- Marking of polyp site

Flat polyp with
invasive cancer

- Pathology review
- Colonoscopy
- Marking of polyp site

** All patients with colon cancer should be counseled for family history*

Treatment of Rectal Polyps

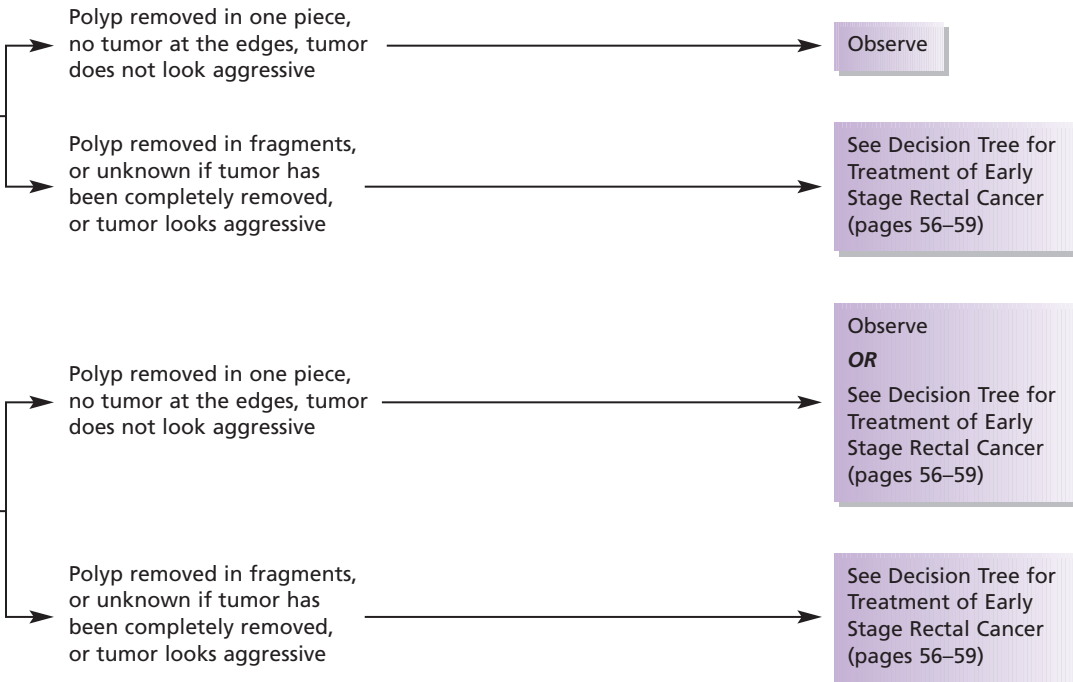
Rectal polyps are mushroom-like growths on the lining of the rectum. If cancer is found in these polyps when they are removed, they should be sent for pathology review and a colonoscopy is recommended to look at the rest of the gastrointestinal tract. The site of the polyp should also be marked with a clip to keep track of where the original cancer was found. Further treatment is based on whether or not the polyp was attached to the colon by a stalk (called pedunculated) or whether it was flatter with a broad base (called sessile),

and whether or not the polyp was removed in one piece or in fragments.

If the polyp was on a stalk, and was entirely removed as a single specimen (i.e. there was no tumor found at the edge of the polyp where it was removed) and the tumor does not look aggressive, no further treatment is needed. If the polyp was removed in fragments, or if it is difficult to determine if the tumor has been entirely removed for any reason, or if the tumor looks aggressive, further surgery to remove the cancer (resection) with or without adjuvant therapy is recommended (see pages 56–59).

Treatment of Rectal Polyps

Finding



©2007 by the National Comprehensive Cancer Network (NCCN) and the American Cancer Society (ACS). All rights reserved. The information herein may not be reproduced in any form for commercial purposes without the expressed written permission of the NCCN and the ACS. Single copies of each page may be reproduced for personal and non-commercial uses by the reader.

If the polyp was flatter and was removed in one piece with no cancer at the edges of the specimen, and the tumor does not look aggressive, options include no further treatment, or further treatment as described on pages 56–59. Further resection with or without adjuvant therapy is also recommended if any polyp was removed in fragments, or if it

is difficult to determine if the tumor has been entirely removed for any reason, or if the tumor looks aggressive. Aggressive features include very abnormal looking cells under the microscope or invasion into blood or lymph vessels.

All patients with colon cancer should be asked about their family history to determine if the cancer may have a genetic basis.

Clinical Presentation*

Rectal tumor
that can be
resected
(removed
with surgery)

Work-up (Evaluation)

- Medical history
- Physical examination
- Biopsy
- Pathology review
- Colonoscopy
- Proctoscopy
- CT scan of chest, abdomen, and pelvis
- CEA blood test
- Endorectal ultrasound or endorectal MRI or pelvic MRI
- If colostomy is needed, evaluation by therapist trained in colostomy care

* All patients with colon cancer should be counseled for family history

Evaluation of Rectal Cancer

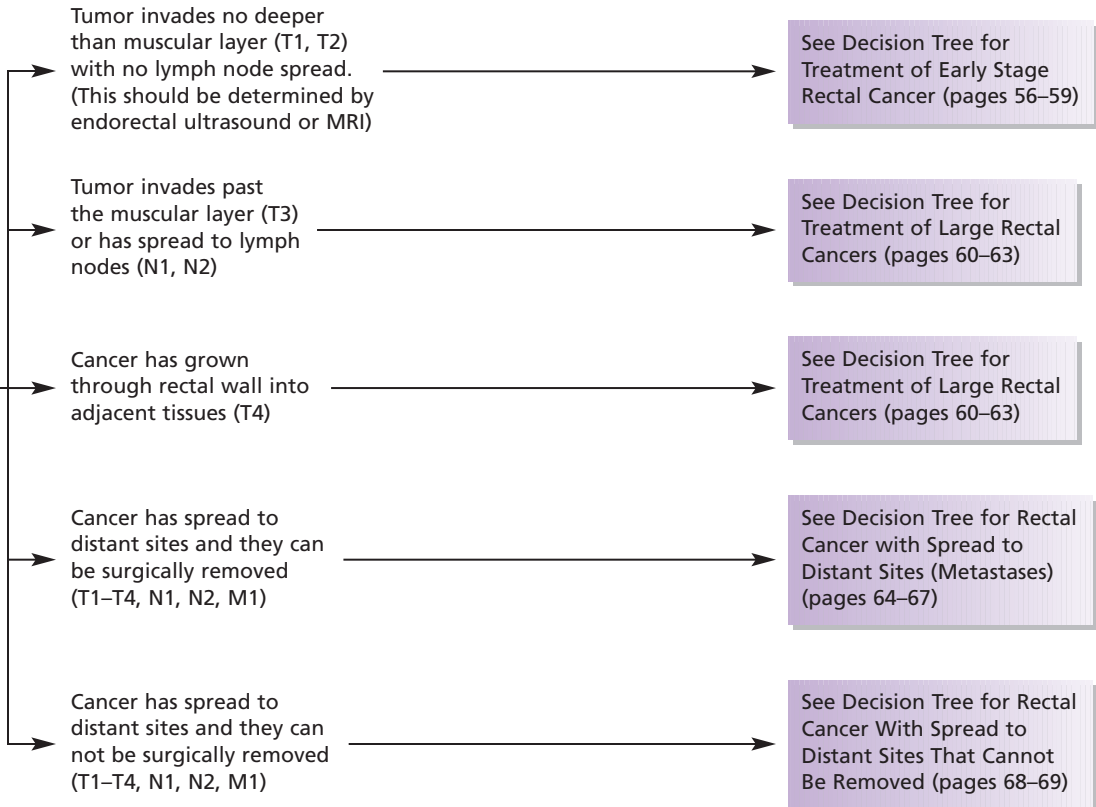
The work-up (evaluation) for patients with a rectal tumor begins with a medical history; physical examination; biopsy and a pathology review of the specimen; colonoscopy; *proctoscopy*; CT scans of the chest, abdomen,

and pelvis; CEA blood levels; and an endorectal ultrasound or endorectal or pelvic MRI examination. Consultation with a therapist or nurse trained in colostomy care is recommended if it is likely that a colostomy will be needed.

Evaluation of Rectal Cancer

Clinical Stage

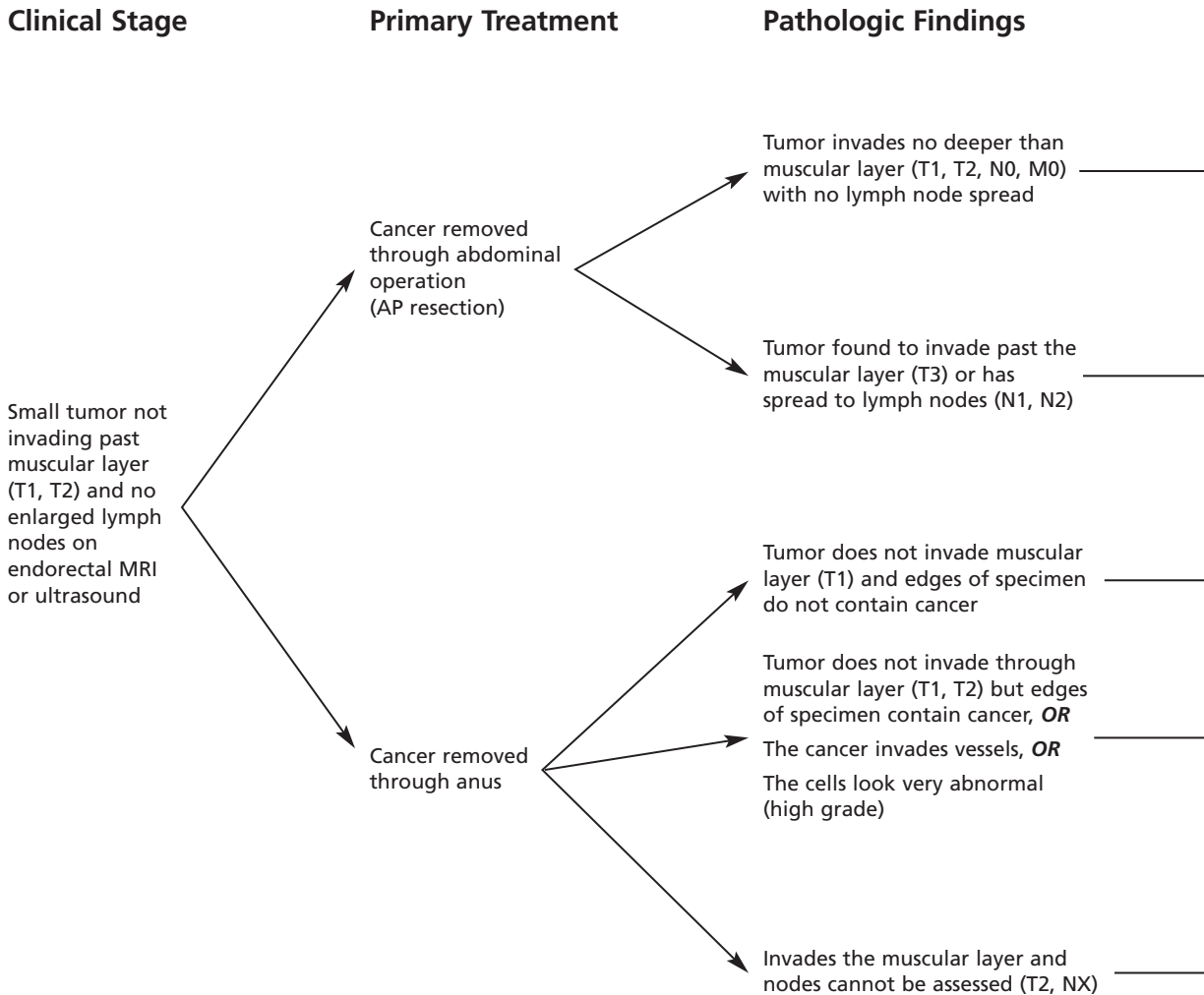
Primary (Main) Treatment



©2007 by the National Comprehensive Cancer Network (NCCN) and the American Cancer Society (ACS). All rights reserved. The information herein may not be reproduced in any form for commercial purposes without the expressed written permission of the NCCN and the ACS. Single copies of each page may be reproduced for personal and non-commercial uses by the reader.

Further treatment depends on the doctor's estimate of the clinical stage, depending on what the physical examination and imaging

tests show. All patients with rectal cancer should be evaluated with a family history to determine if the cancer has a genetic basis.



Treatment of Early Stage Rectal Cancer

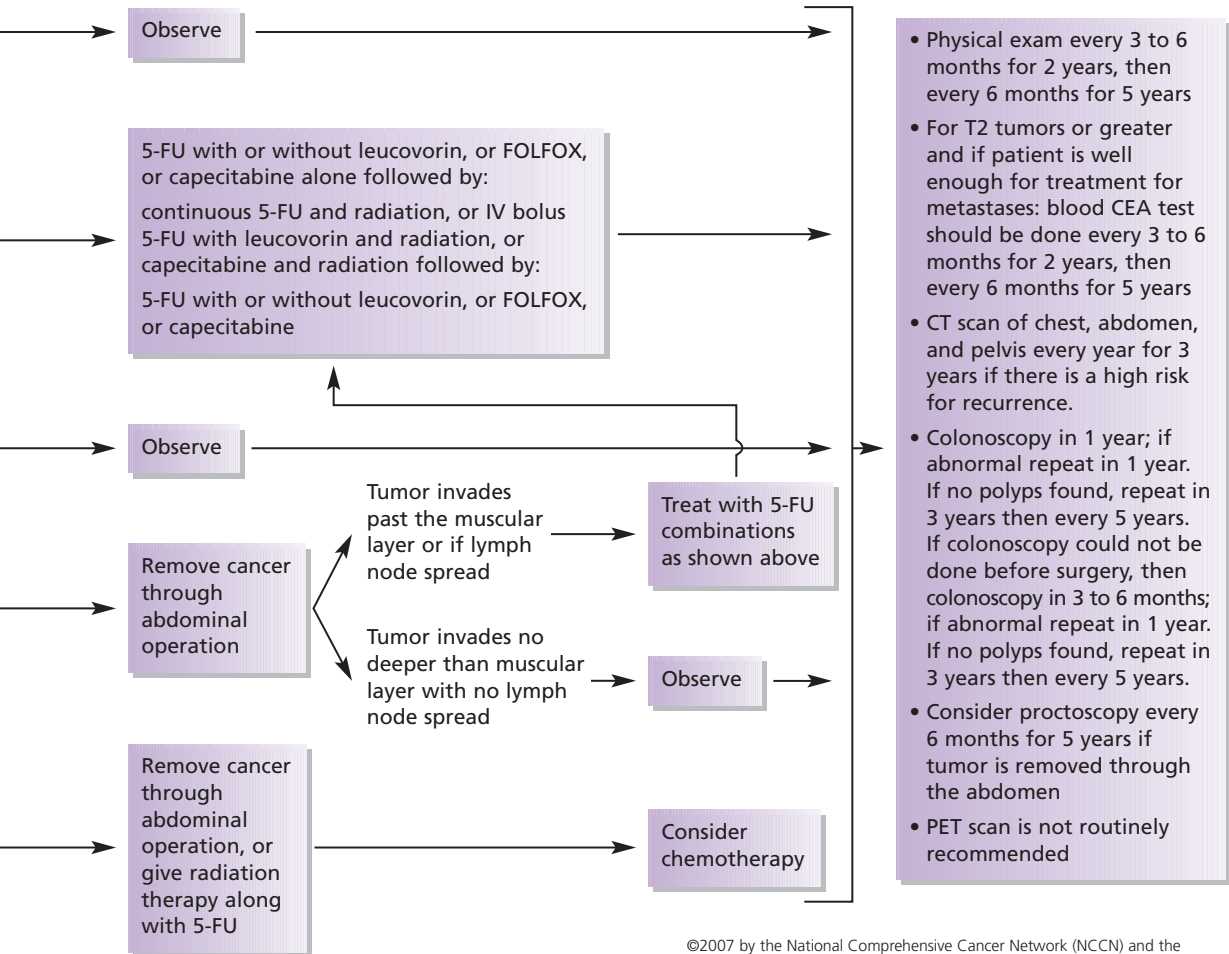
If the cancer does not invade deeper than the muscular layer of the rectal wall (T1, T2) and doesn't appear to have spread to nearby lymph nodes (N0), surgery is the first treatment recommended.

An abdominal operation, either low abdominal resection (done through the lower belly) or an abdominoperineal resection (done through incisions made in the abdomen and the *perineum*), is appropriate depending on where the cancer lies in the rectum. But if the tumor is small enough — less than 3 cm

Treatment of Early Stage Rectal Cancer

Adjuvant Treatment

Follow-up Tests



FOLFOX = Continuous infusion 5-FU and leucovorin and oxaliplatin

©2007 by the National Comprehensive Cancer Network (NCCN) and the American Cancer Society (ACS). All rights reserved. The information herein may not be reproduced in any form for commercial purposes without the expressed written permission of the NCCN and the ACS. Single copies of each page may be reproduced for personal and non-commercial uses by the reader.

(about an inch) and less than 8 cm from the anus (about 3 inches) and has no bad features such as very abnormal cells or invasion of blood

or lymphatic vessels — the cancer might be surgically removed through the anus. This procedure is called transanal resection.

After surgery, the stage of the cancer is determined by the pathologist who examines the tumor and lymph nodes under the microscope.

If the cancer is removed by an abdominal operation and has not grown past the muscle layer or spread to lymph nodes, then no further treatment is needed.

If the pathologist finds that the cancer has spread into the muscle layer or to lymph nodes, further treatment is needed in 3 different stages. First, chemotherapy is given. The second stage is radiation combined with additional 5-FU or capecitabine. Finally, when radiation is completed, another course of chemotherapy is

given. The different options for chemotherapy are listed in the Decision Tree.

If the cancer is removed through the anus and does not invade the muscle layer and the edges of the specimen are free of cancer, no further treatment is needed.

But, if the cancer is present at edges of the specimen or the cancer has invaded lymphatic or blood vessels, or the cells look very abnormal, then an abdominal operation should be done to remove more tissue. After the abdominal surgery, treatment options are the same as for patients who underwent an initial abdominal resection.

NOTES

Treatment of Early Stage Rectal Cancer (continued)

If the tumor has invaded the muscle layer and the doctors cannot determine whether the cancer had spread to lymph nodes, then either an abdominal operation should be done with similar postoperative treatment, or the patient should receive combined 5-FU and radiation treatment to the pelvis, followed by chemotherapy.

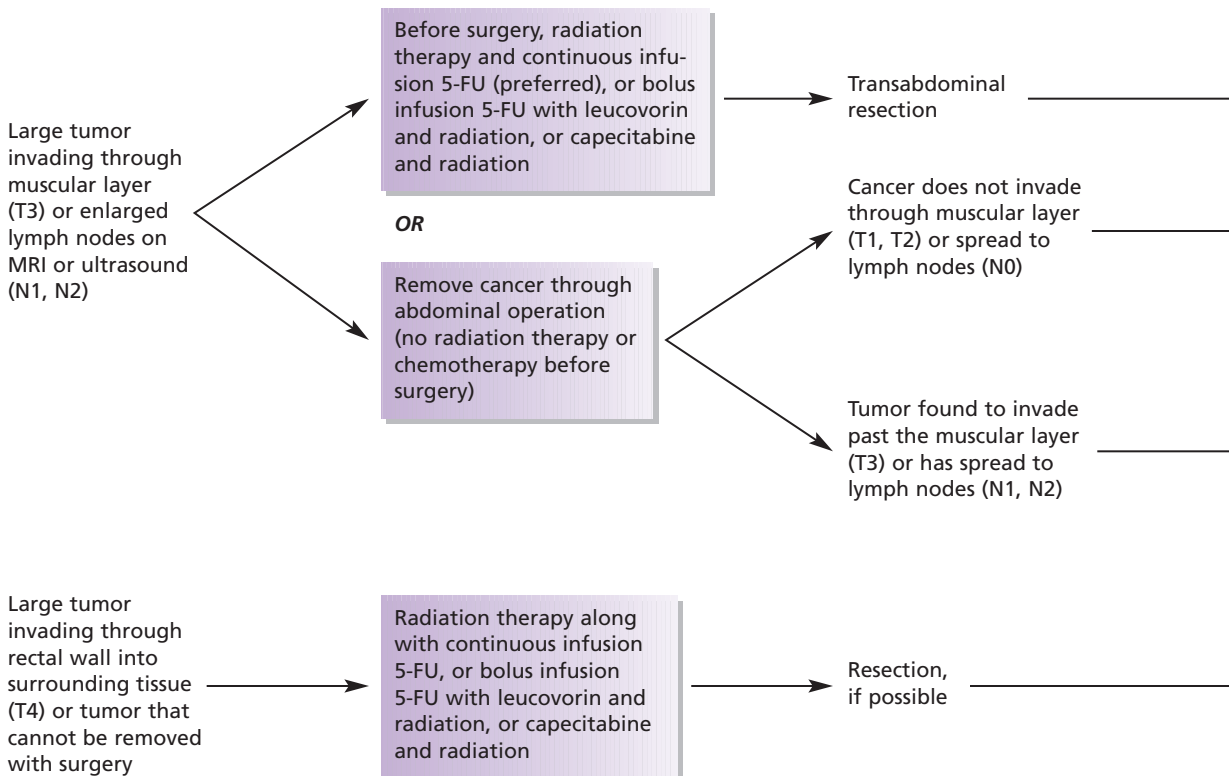
After treatment, patients should return to their doctor for a check-up every 3 to 6 months for 2 years, then every 6 months for at least 5 years. CEA blood tests should be done along with the check-ups for tumors that are T2 or greater, but only in patients who are well enough to consider further therapy if the cancer

recurs. A CT scan of the chest, abdomen, and pelvis may be done every year for 3 years in patients considered to be at high risk for recurrence. Colonoscopy should be done 1 year after surgery. If polyps are found, a colonoscopy should be repeated in 1 year. If the colonoscopy is normal, it can be repeated in 3 years and then every 5 years. If colonoscopy could not be done before surgery, then the first one should be done within 3 to 6 months after surgery. If the tumor was removed through the abdomen, a proctoscopy may be recommended every 6 months for 5 years. PET scans are not recommended for routine follow-up.

NOTES

Clinical Stage

Primary Treatment



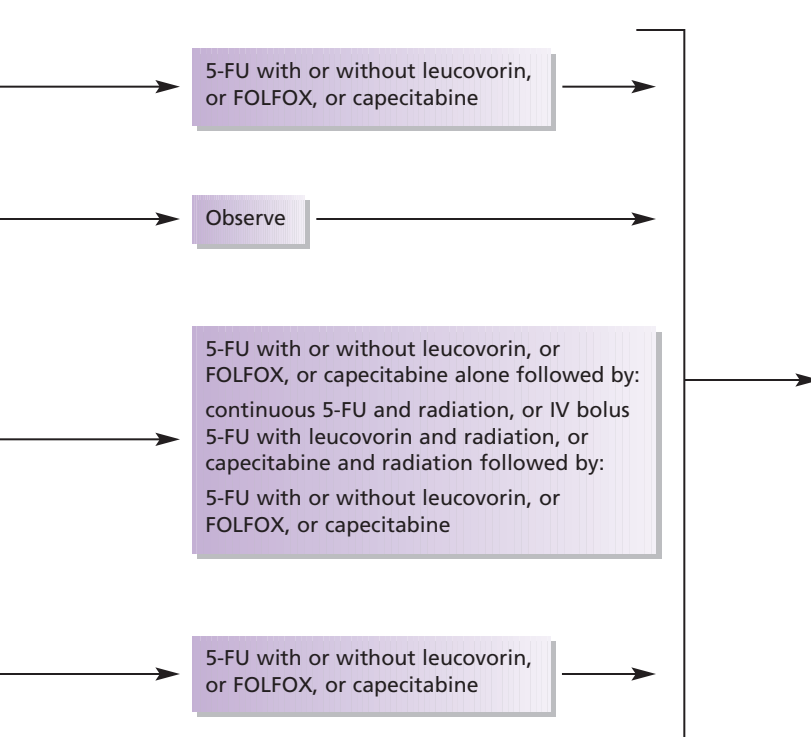
Treatment of Large Rectal Cancers

There are several initial treatment options if the cancer has grown through the muscle layer (T3) or there are enlarged lymph nodes on MRI or ultrasound (N1-2). One option is radiation therapy first, either with continuous 5-FU, or with a bolus infusion of 5-FU combined

with leucovorin, or with capecitabine. Of these chemotherapy plus radiation options, continuous 5-FU is preferred if the cancer has spread to the lymph nodes. This initial treatment is followed by a transabdominal resection, with more chemotherapy after surgery.

Treatment of Large Rectal Cancers

Adjuvant Treatment



Follow-up Tests

- Physical exam every 3 to 6 months for 2 years, then every 6 months for 5 years
- For T2 tumors or greater and if patient is well enough for treatment for metastases: blood CEA test should be done every 3 to 6 months for 2 years, then every 6 months for 5 years
- CT scan of chest, abdomen, and pelvis every year for 3 years if there is a high risk for recurrence.
- Colonoscopy in 1 year; if abnormal repeat in 1 year. If no polyps found, repeat in 3 years then every 5 years. If colonoscopy could not be done before surgery, then colonoscopy in 3 to 6 months; if abnormal repeat in 1 year. If no polyps found, repeat in 3 years then every 5 years
- Consider proctoscopy every 6 months for 5 years if tumor is removed through the abdomen
- PET scan is not routinely recommended

FOLFOX = Continuous infusion 5-FU and leucovorin and oxaliplatin

©2007 by the National Comprehensive Cancer Network (NCCN) and the American Cancer Society (ACS). All rights reserved. The information herein may not be reproduced in any form for commercial purposes without the expressed written permission of the NCCN and the ACS. Single copies of each page may be reproduced for personal and non-commercial uses by the reader.

Or, a transabdominal resection may be done first. Further treatment depends on the pathologist's findings. If it turns out that the tumor has not invaded through the muscle layer or spread to lymph nodes, no further

treatment is recommended. If the tumor has spread through the muscle layer or involves lymph nodes, chemo and radiation treatment is delivered in 3 phases, as described in the Decision Tree.

If the cancer has invaded through the rectal wall into nearby tissues or organs and cannot be removed, the NCCN recommends that treatment begin with radiation therapy to the pelvis combined with continuous 5-FU, or a single injection of 5-FU with leucovorin, or capecitabine pills. Afterward, the tumor should be removed by an abdominal operation,

if possible. Following surgery, 5-FU with or without leucovorin should be given. FOLFOX or capecitabine may also be considered.

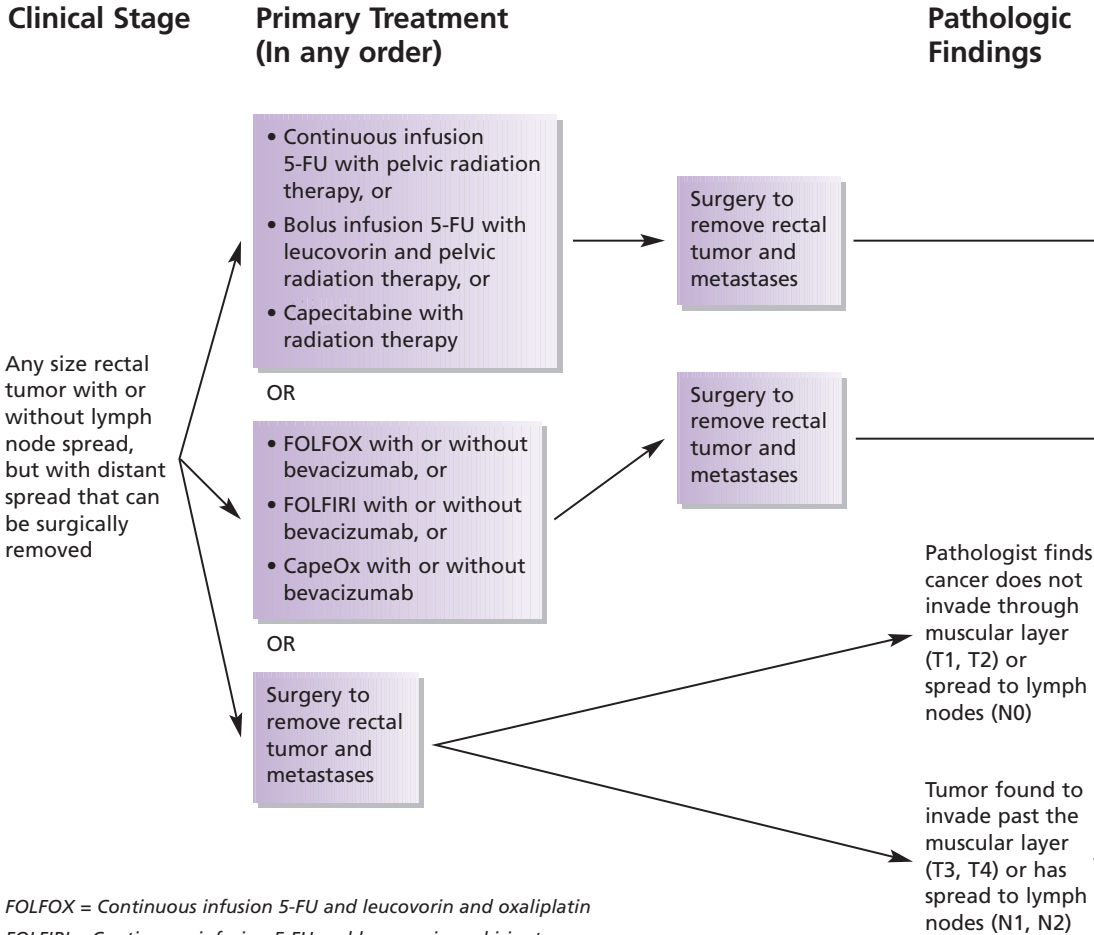
After treatment, patients should see their doctor for a check-up every 3 to 6 months for 2 years, then every 6 months for at least 5 years. CEA blood tests should be done along with the check-ups for tumors that are T2 or

NOTES

greater, but only in patients who are well enough to consider further therapy if the cancer recurs. A CT scan of the chest, abdomen, and pelvis may be done yearly for 3 years in patients considered to be at high risk for recurrence. Colonoscopy should be done 1 year after surgery. If polyps are found, it should be repeated in 1 year. If the colonos-

copy is normal, it can be repeated in 3 years and then every 5 years. If colonoscopy could not be done before surgery, then the first one should be done within 3 to 6 months after surgery. If the tumor was removed through the abdomen, a proctoscopy may be recommended every 6 months for 5 years. PET scans are not recommended for routine follow-up.

NOTES



FOLFOX = Continuous infusion 5-FU and leucovorin and oxaliplatin
 FOLFIRI = Continuous infusion 5-FU and leucovorin and irinotecan
 CapeOx = Capecitabine and oxaliplatin

Rectal Cancer With Spread to Distant Sites (Metastases)

Treatment for people whose rectal cancer has spread to distant organs such as the lungs or liver (M1 cancers) depends on whether the metastases can be completely removed (resected) by surgery. If the metastases are resectable, then there are a variety of combi-

nations of chemotherapy, radiation therapy, and surgical removal of both the metastases and the rectal tumor that can be used.

One option is radiation therapy along with either continuous infusion 5-FU, or a bolus infusion of 5-FU combined with leucovorin, or capecitabine. These patients then undergo resection of all tumors, either all at once or in

Rectal Cancer With Spread to Distant Sites (Metastases)

Adjuvant Treatment

- 5-FU with or without leucovorin, or
- FOLFOX with or without bevacizumab, or
- FOLFIRI with or without bevacizumab, or
- CapeOx with or without bevacizumab

- Continuous infusion 5-FU with pelvic radiation therapy, or
- Bolus infusion 5-FU with leucovorin and pelvic radiation therapy, or
- Capecitabine with radiation therapy

- 5-FU with or without leucovorin, or
- FOLFOX with or without bevacizumab, or
- FOLFIRI with or without bevacizumab, or
- CapeOx with or without bevacizumab

5-FU with or without leucovorin, or FOLFOX, or capecitabine followed by: continuous 5-FU and radiation, or IV bolus 5-FU with leucovorin and radiation, or capecitabine and radiation followed by: 5-FU with or without leucovorin, or FOLFOX, or capecitabine

Follow-up Tests

- Physical examination every 3 to 6 months for 2 years, then every 6 months for 5 years
- For T2 tumors or greater and if patient is well enough for treatment for metastases: blood CEA test should be done every 3 to 6 months for 2 years, then every 6 months for 5 years
- CT scan of chest, abdomen, and pelvis every year for 3 years if there is a high risk for recurrence.
- Colonoscopy in 1 year; if abnormal repeat in 1 year. If no polyps found repeat in 3 years then every 5 years. If colonoscopy could not be done before surgery, then colonoscopy in 3 to 6 months; if abnormal repeat in 1 year. If no polyps found repeat in 3 years then every 5 years.
- Consider proctoscopy every 6 months for 5 years if tumor is removed through the abdomen
- PET scan is not routinely recommended

©2007 by the National Comprehensive Cancer Network (NCCN) and the American Cancer Society (ACS). All rights reserved. The information herein may not be reproduced in any form for commercial purposes without the expressed written permission of the NCCN and the ACS. Single copies of each page may be reproduced for personal and non-commercial uses by the reader.

two separate surgeries. The surgery is then followed with more chemotherapy, consisting of 5-FU with or without leucovorin, or the regimens FOLFOX, FOLFIRI, or CapeOx (the latter 3 may be combined with bevacizumab).

Another option is to reverse the order, with treatment starting with any of the chemo-

therapy regimens listed on the decision tree, followed by surgery, and then radiation therapy combined with chemotherapy.

The third option is to do the surgery first and remove the rectal tumor and the metastases. Additional treatment is based on what the pathologist finds. If the tumor is early

stage and has not grown past the muscle layer or into lymph nodes then the only treatment after surgery would be chemotherapy. If the cancer has grown through the muscular layer or spread to lymph nodes, then the NCCN recommends additional therapy in 3 stages; initial chemotherapy, followed by chemotherapy given with radiation therapy, and then

finally additional chemotherapy. The chemotherapy options are listed in the Decision Tree.

After treatment, patients should see their doctor for a check-up every 3 to 6 months for 2 years, then every 6 months for at least 5 years. For tumors that are T2 or greater, CEA blood tests should be done along with the check-ups but only in patients who are well

NOTES

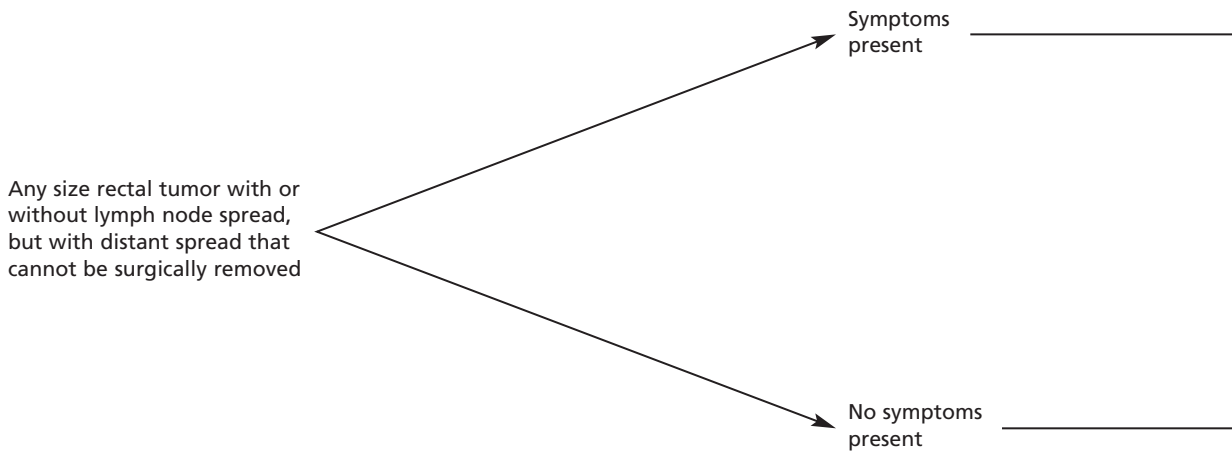
Rectal Cancer With Spread to Distant Sites (Metastases) (continued)

enough to consider further therapy if the cancer recurs. A CT scan of the chest, abdomen, and pelvis may be done once a year for 3 years in patients considered to be at high risk for recurrence. Colonoscopy should be done 1 year after surgery. If polyps are found, it should be repeated in 1 year. If the colonoscopy is normal, it can be repeated

in 3 years and then every 5 years. If colonoscopy could not be done before surgery, then the first one should be done within 3 to 6 months after surgery. If the tumor was removed through the abdomen, a proctoscopy may be recommended every 6 months for 5 years. PET scans are not recommended for routine follow-up.

NOTES

Clinical Stage



Rectal Cancer With Spread to Distant Sites That Cannot Be Removed

Treating a rectal tumor that has already spread to distant sites that cannot be removed with surgery depends on whether the rectal tumor itself is causing any symptoms. If the

rectal tumor is not causing symptoms, the patient is treated according to the Decision Tree for advanced disease on page 74–77. After chemotherapy, the patient can be further evaluated to determine if the tumor has shrunk enough to be resectable.

Rectal Cancer With Spread to Distant Sites That Cannot Be Removed

Primary Treatment

Surgery to remove rectal tumor
OR
Destroy tumor with laser photocoagulation
OR
Perform colostomy to bypass rectal tumor
OR
Place a tube (stent) through the rectal tumor to prevent blockage
OR
Radiation therapy along with infusion 5-FU or capecitabine
OR
Chemotherapy alone (See Decision Tree for Chemotherapy for Advanced Disease or Distant Spread That Cannot Be Removed on pages 74–77)

See the Decision Tree for Chemotherapy for Advanced Disease or Distant Spread That Cannot Be Removed on pages 74–77

If metastases shrink, consider surgery (see the previous Decision Tree, pages 64–67)

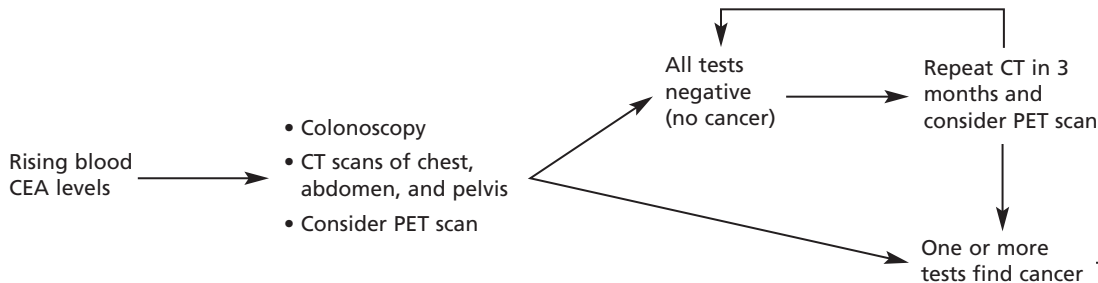
©2007 by the National Comprehensive Cancer Network (NCCN) and the American Cancer Society (ACS). All rights reserved. The information herein may not be reproduced in any form for commercial purposes without the expressed written permission of the NCCN and the ACS. Single copies of each page may be reproduced for personal and non-commercial uses by the reader.

If the rectal tumor is causing symptoms there are several options available to relieve them. The rectal tumor can be removed surgically or it may be treated with a laser. Other options are to simply go around the tumor

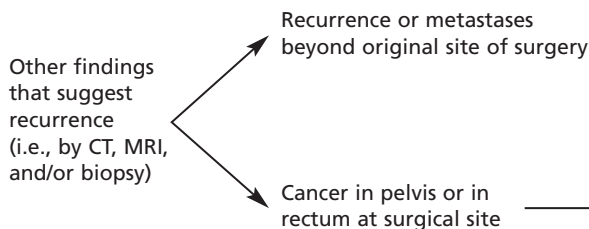
with a diverting colostomy or to keep the rectum open with a stent. The tumor may be treated with radiation therapy combined with 5-FU or capecitabine. Or, chemotherapy may be given alone, as described on pages 74–77.

Clinical Presentation

Work-up (Evaluation)



OR



Treatment of Recurrent Rectal Cancer

After surgery or radiation therapy and any adjuvant chemotherapy treatments are finished, check-ups and follow-up tests are routinely done. The purpose of these tests is to find rectal cancer that has recurred (come back) as soon as possible, when further treatments are most likely to be helpful.

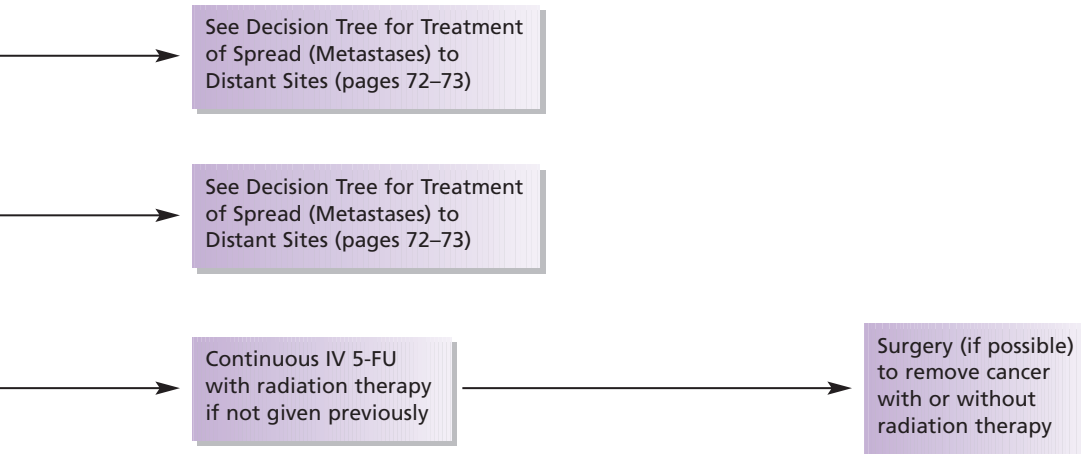
CEA levels that rise steadily after the first treatment strongly suggest that a colorectal cancer is coming back or regrowing. The search for the recurrence site should include

colonoscopy, CT scans of the chest, abdomen, and pelvis, and possibly a PET scan. If no cancer is found, the abdomen and pelvic CT test and possibly the PET scan are repeated every 3 months. Some patients may have an elevated CEA level for months or years before clinical evidence (imaging test or physical exam results) of recurrent disease is found. Patients are not given chemotherapy based on a rising CEA level alone.

There also may be other reasons to suspect a recurrence. Symptoms or something abnormal found when the doctor examines the

Treatment of Recurrent Rectal Cancer

Treatment



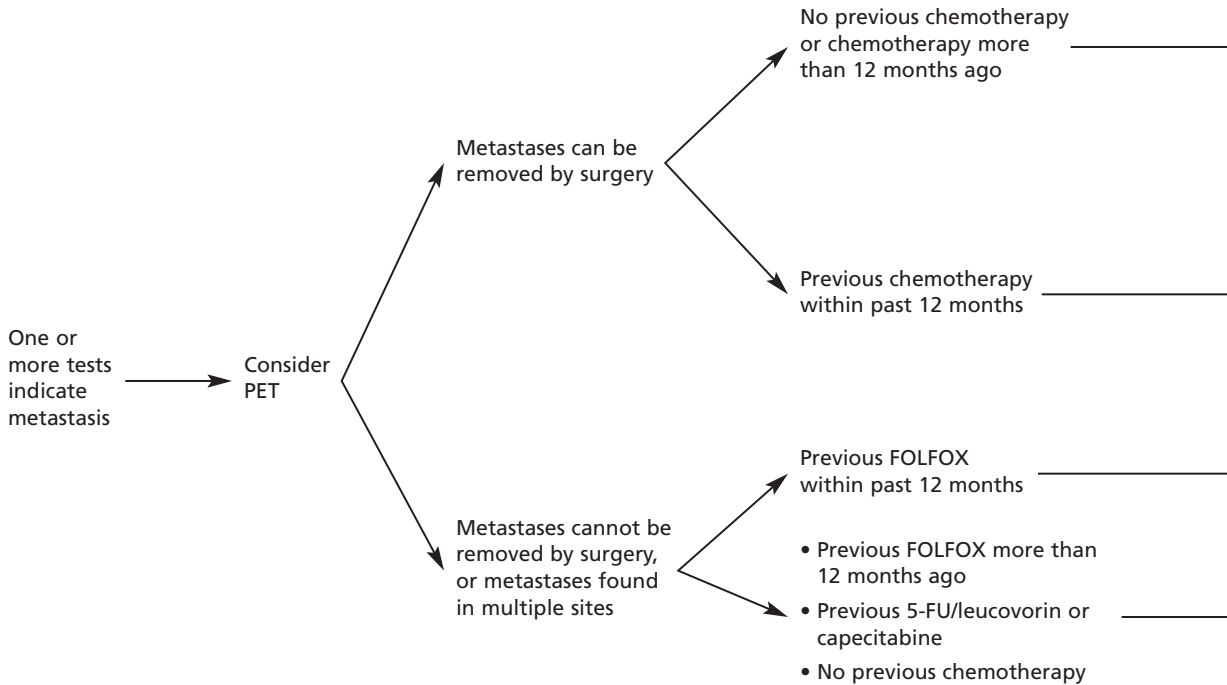
©2007 by the National Comprehensive Cancer Network (NCCN) and the American Cancer Society (ACS). All rights reserved. The information herein may not be reproduced in any form for commercial purposes without the expressed written permission of the NCCN and the ACS. Single copies of each page may be reproduced for personal and non-commercial uses by the reader.

patient should be further evaluated by CT or MRI. If recurrent cancer is found by imaging tests, a biopsy may be done to confirm rectal cancer, not some other disease. In most cases, this involves a needle biopsy procedure that uses a CT scan for guidance. Recurrent cancer located in the pelvis, rectum, or at the site of the original surgery is initially treated with

intravenous 5-FU and radiation therapy — if radiation was not given before. If possible, surgery to remove the cancer is recommended, with or without further radiation therapy.

For all other sites of recurrence, the first consideration is whether or not the tumor is limited to one organ and can be surgically removed. This is discussed on the next page.

Work-up



Treatment of Spread (Metastases) to Distant Sites

If one or more imaging tests show cancer recurrence, a PET scan is recommended to make sure that cancer has not spread widely. The location and number of metastases determines whether or not they can be removed with surgery.

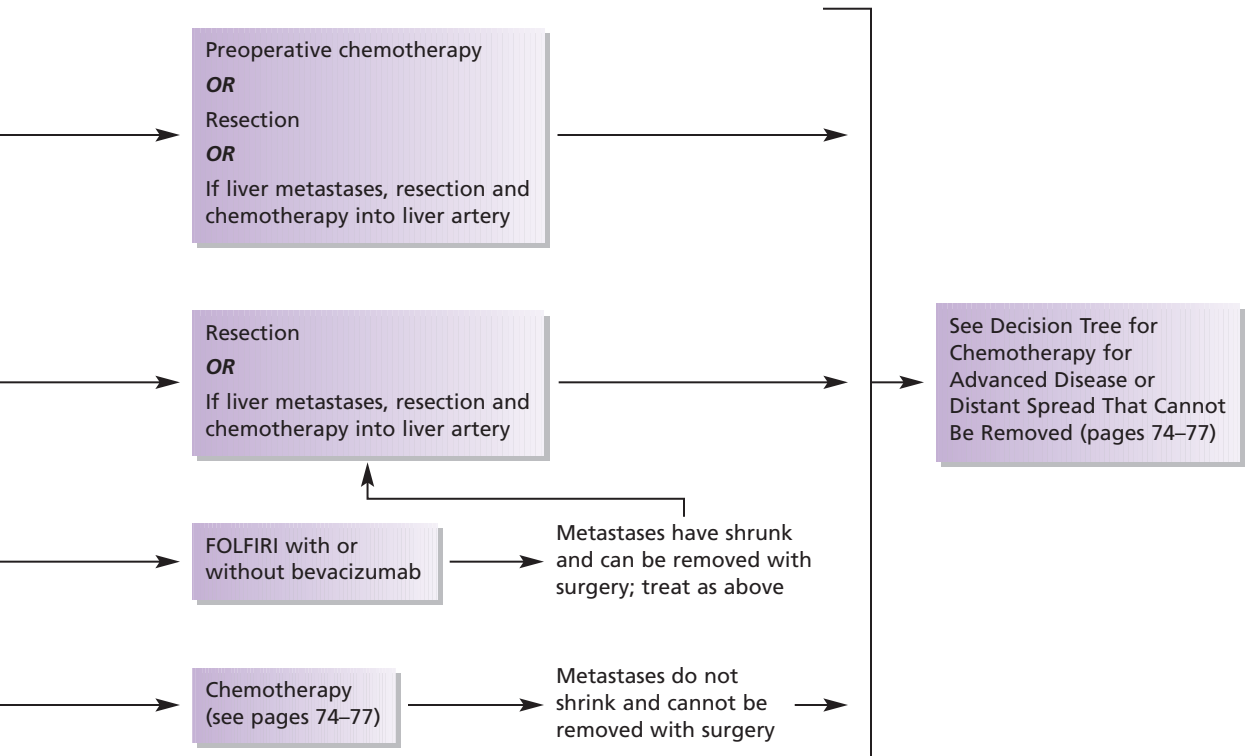
If surgery is possible, chemotherapy may be given prior to the surgery if the patient has

not had chemotherapy previously or if it was given more than 12 months before. If the metastases are located in the liver, surgery to remove them can be followed by chemotherapy directly delivered to the liver artery to treat any malignant cells that remain. After surgery, further systemic chemotherapy is recommended, as described on pages 74–77.

If the metastases cannot be removed with surgery or the PET scan shows multiple sites

Treatment of Spread (Metastases) to Distant Sites

Primary Treatment



FOLFOX = Continuous infusion 5-FU and leucovorin and oxaliplatin

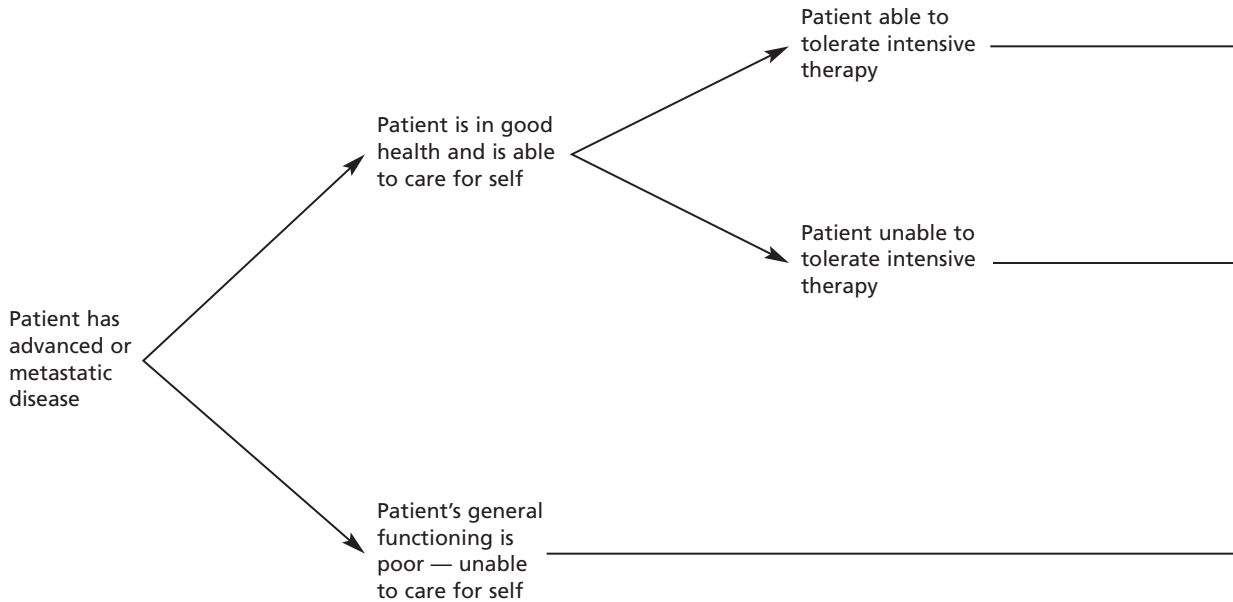
FOLFIRI = Continuous infusion 5-FU and leucovorin and irinotecan

©2007 by the National Comprehensive Cancer Network (NCCN) and the American Cancer Society (ACS). All rights reserved. The information herein may not be reproduced in any form for commercial purposes without the expressed written permission of the NCCN and the ACS. Single copies of each page may be reproduced for personal and non-commercial uses by the reader.

of disease, treatment is based on what type of chemotherapy the patient has received previously. If the patient has had FOLFOX therapy within the past 12 months, chemotherapy can be switched to FOLFIRI with or without bevacizumab. In all other cases, chemotherapy

as described on pages 74–77 is recommended. Sometimes chemotherapy can shrink the metastasis enough that it can be resected. If so, surgery as described previously is recommended. If they do not shrink, further chemotherapy is an option.

Work-up



Chemotherapy for Advanced Disease or Distant Spread That Cannot Be Removed

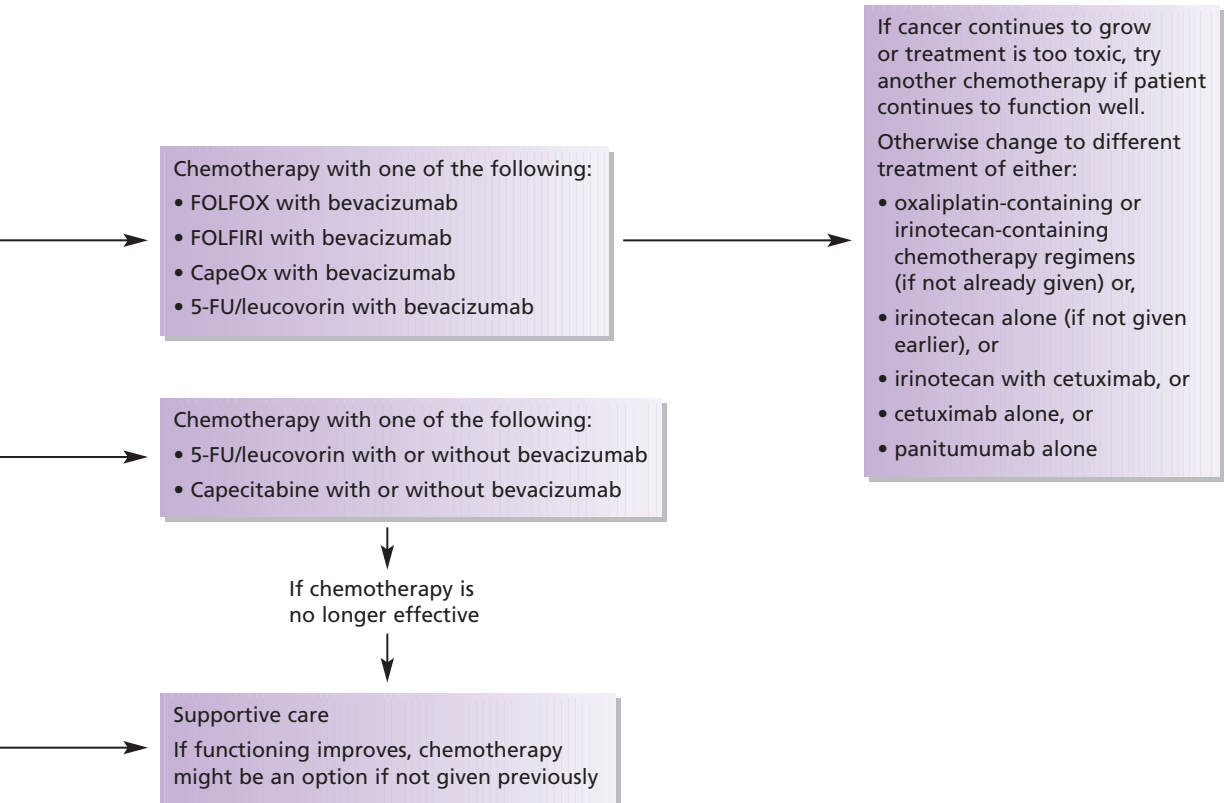
For patients whose cancer is too large or widely spread to remove completely, treatment options depend on whether they are in good health apart from the cancer and are able to care for themselves. Many studies

have shown that patients who are too ill to care for themselves are not likely to benefit from chemotherapy.

For patients with widespread disease who are able to tolerate intensive chemotherapy, the recommended initial chemotherapy combinations are:

Chemotherapy for Advanced Disease or Distant Spread That Cannot Be Removed

Treatment



FOLFOX = Continuous infusion 5-FU and leucovorin and oxaliplatin

FOLFIRI = Continuous infusion 5-FU and leucovorin and irinotecan

CapeOx = Capecitabine and oxaliplatin

©2007 by the National Comprehensive Cancer Network (NCCN) and the American Cancer Society (ACS). All rights reserved. The information herein may not be reproduced in any form for commercial purposes without the expressed written permission of the NCCN and the ACS. Single copies of each page may be reproduced for personal and non-commercial uses by the reader.

- FOLFOX plus bevacizumab
- FOLFIRI plus bevacizumab
- Capecitabine and oxaliplatin (CapeOx) plus bevacizumab
- 5-FU and leucovorin plus bevacizumab.

If less intense therapy is more appropriate, the options are:

- 5-FU and leucovorin, with or without bevacizumab,
- Capecitabine, with or without bevacizumab

In either case, if the cancer continues to grow, begins to grow again after shrinking, or the side effects become serious, a chemotherapy combination different from the one first used may be given if the patient remains well. If the cancer grows after this therapy,

another different course can be tried. These therapies include FOLFIRI, FOLFOX, or CapeOx without bevacizumab (if not already given), single agent irinotecan (if not already given), irinotecan with cetuximab, cetuximab alone, or panitumumab alone. If chemotherapy

NOTES

Chemotherapy for Advanced Disease or Distant Spread That Cannot Be Removed (continued)

is no longer effective, then supportive care only should be given.

For patients who are in poor health and unable to care for themselves, supportive care

to relieve symptoms and maintain a patient's well-being is recommended. If a patient's function improves with supportive care, chemotherapy can be reconsidered.

NOTES

Glossary

Abdominoperineal (AP) resection

Surgery that removes cancer located in the lower part of the rectum, close to its outer connection to the anus.

Ablation

Destroying a tumor by heating it with microwaves or freezing. This does not usually involve surgery, but may sometimes be done during surgery.

Adenocarcinoma

Cancer of the glandular cells, for example, those that line the inside of the colon and rectum.

Adenomatous polyp or adenoma

A benign growth of glandular cells, for example, those that line the inside of the colon or rectum. There are 3 types of colorectal adenomas: tubular, villous, and tubervillous. See benign.

Adjuvant treatment

Treatment used in addition to the main treatment. It usually refers to chemotherapy, radiation therapy, immunotherapy, or hormonal therapy added after surgery to increase the chances of curing the disease or keeping it in check. Adjuvant therapy is given to treat the small number of tumor cells that may remain after surgery but cannot be detected.

Alternative therapy

Use of an unproven treatment *instead of* standard (proven) treatment. Some alternative therapies have dangerous or even life-threatening side effects. With others, the main danger is that the patient may lose the opportunity to benefit from standard therapy.

Anus

The outlet of the digestive tract through which stool passes out of the body.

Ascending colon

The first of the 4 sections of the colon. It extends upward on the right side of the abdomen and leads to the transverse colon.

Benign

Not cancer; not malignant.

Biopsy

The removal of a sample of tissue to see whether cancer cells are present. There are several kinds of biopsies. In an endoscopic biopsy, a small sample of tissue is removed using instruments operated through a colonoscope.

Bowel

The intestine.

Colectomy

Surgical removal of all (total) or part (partial colectomy or hemicolectomy, for example) of the colon.

Colon

Part of the large intestine. The colon is a muscular tube about 5 feet long. It is further divided into 4 sections: the ascending, transverse, descending, and sigmoid colon. It continues the process of absorbing water and mineral nutrients from food.

Colonoscopy

A slender, flexible, hollow lighted tube about the thickness of a finger. It is inserted through the rectum up into the colon. A colonoscopy is much longer than a sigmoidoscopy and usually allows the doctor to see the entire lining of the colon. The colonoscopy is connected to a video camera and video display monitor so that the doctor can look closely at the inside of the colon. If abnormalities are found, the doctor can take a biopsy (tissue sample) or remove polyps, using instruments operated through the colonoscopy. See sigmoidoscopy.

Colostomy

An opening from the colon onto the skin of the abdomen (stomach) for getting rid of body waste (stool). A colostomy is sometimes needed after surgery for cancer of the rectum. People with colon cancer sometimes have a temporary colostomy, but they rarely need a permanent one.

Complementary therapy

Therapies used *in addition to* standard treatments. Some complementary therapies may help relieve certain symptoms of cancer, relieve side effects of standard cancer therapy, or improve a patient's sense of well-being.

Descending colon

The third section of the colon. It comes after the transverse colon, continues downward on the left side of the abdomen, and leads to the sigmoid colon.

Digestive system

Also called the gastrointestinal tract, or GI tract. It processes food to give the body energy and rids the body of solid waste matter.

Enterostomal therapist

A health professional, often a nurse, who teaches people how to care for ostomies (surgically created openings, such as a colostomy) and other wounds.

External beam radiation

The most common way to deliver radiation to a cancer. Radiation is focused from a source outside the body on the area affected by the cancer. It is much like getting a diagnostic x-ray, but for a longer time.

Feces

Solid waste matter; bowel movement or stool.

Immunotherapy

Treatments to help the immune system recognize and destroy cancer cells more effectively. These may include cancer vaccines and monoclonal antibody therapy.

Laparoscope

A long, slender tube inserted into the abdomen through a very small incision. Surgeons with experience in laparoscopy can do some types of surgery for colorectal cancer using special surgical instruments operated through the laparoscope.

Low anterior (LA) resection

Surgery that removes a cancer and the normal tissue around it near the upper part of the rectum, close to where it connects with the sigmoid colon.

Lymph nodes

Small bean-shaped collections of immune system cells that help fight infections and also have a role in fighting cancer. Also called lymph glands. Cancers of the colon and rectum may spread to regional (nearby) lymph nodes.

Margin

Edge of the tissue removed during surgery. A positive surgical margin indicates that cancer cells are found at the outer edge of the tissue removed and is usually a sign that some cancer remains in the body. A negative surgical margin is usually a sign that no cancer was left behind near the area it was removed from. A negative surgical margin does not guarantee a cure because cancer cells may have spread to other areas of the body before surgery.

Metastasize

The spread of cancer cells to distant areas of the body by way of the lymph system or bloodstream.

Monoclonal antibody

Immune substance made in the laboratory that attacks cancer cells

Neoadjuvant treatment

Chemotherapy or chemoradiotherapy treatment given before the definitive or primary treatment with surgery.

Pathologist

A doctor who specializes in diagnosis and classification of diseases by laboratory tests such as examination of tissue and cells under a microscope. The pathologist determines whether a tumor is benign or cancerous, and, if cancerous, the exact cell type and grade.

Perineum

The region between the thighs, in the female between the vulva and the anus, in males, between the scrotum and the anus.

Polyp

A benign growth commonly found in the rectum or the colon. Adenomatous polyps sometimes turn into cancer. Many other types of polyps (inflammatory polyps, hyperplastic polyps) do not. See adenomatous polyps.

Proctoscopy

An examination of the lining of the rectum using a thin, lighted tube called a proctoscope.

Radiation colitis

Irritation of the colon caused by radiation therapy. Problems can include pain, cramping, and diarrhea.

Radiation proctitis

Irritation of the rectum caused by radiation therapy. Problems can include pain, bowel frequency, bowel urgency, bleeding, chronic burning, or rectal leakage.

Rectum

The lower part of the large intestine, just above the anus.

Recurrence

Cancer that has come back after treatment. Local recurrence means that the cancer has come back at the same place as the original cancer. Regional recurrence means that the cancer has come back in the lymph nodes or tissues near the primary site after treatment. Distant recurrence is when cancer metastasizes to organs or tissues (such as the lungs, liver, bone marrow, or brain) farther from the original site than the regional lymph nodes after treatment.

Risk factor

Anything that increases a person's chance of getting a disease such as cancer. Different cancers have different risk factors. For example, unprotected exposure to strong sunlight is a risk factor for skin cancer. Some risk factors, such as smoking or an unhealthy diet, can be controlled. Others, like a person's age or family history, can't be changed.

Screening

The search for disease, such as cancer, in people without symptoms. For example, screening tests for early detection of colorectal cancer include fecal occult blood test, flexible sigmoidoscopy, colonoscopy, and double contrast barium enema.

Segmental resection

In this surgery, the cancer and a length of normal tissue on either side of the cancer, as well as the nearby lymph nodes are removed. The remaining sections of the colon are then re-attached. This is also called a partial colectomy.

Sigmoid colon

The fourth section of the colon is known as the sigmoid colon because of its S-shape. The sigmoid colon joins the rectum, which in turn joins the anus, or the opening where waste matter passes out of the body.

Sigmoidoscope

A slender, flexible, hollow, lighted tube about the thickness of a finger. It is shorter than a colonoscope. It is inserted through the rectum up into the colon. This allows the doctor to look at the inside of the rectum and part of the colon for cancer or for polyps. See colonoscope.

Small intestine

The small intestine is the longest section of the GI tract. It breaks down food and absorbs most of the nutrients. The small intestine joins the colon.

Stage

Extent of disease. *Clinical stage* refers to the extent of disease determined by the physical examination and imaging tests. The *pathologic stage* is determined by examination of the tissue after surgery.

Stool

Solid waste matter; feces.

Supportive care

Treatment directed at keeping a patient feeling as well as possible without specifically treating the underlying disease (in this case, cancer).

Transanal Resection

A procedure performed through the anus in which the doctor cuts through all layers of the rectum, without cutting through the abdomen in order to remove cancerous tissue.

The *Colon and Rectal Cancer Treatment Guidelines for Patients* were developed by a diverse group of experts and were based on the NCCN clinical practice guidelines. These patient guidelines were translated, reviewed, and published with help from the following individuals:

Terri Ades, MS, APRN-BC, AOCN
American Cancer Society

Al B. Benson III, MD
Robert H. Lurie Comprehensive
Cancer Center of Northwestern
University

Elizabeth Brown, MD
National Comprehensive
Cancer Network

Paul F. Engstrom, MD, FACP
Fox Chase Cancer Center

Pamela McAllister, PhD
Colon Cancer Survivor

Joan McClure, MS
National Comprehensive
Cancer Network

Dorothy Shead, MS
National Comprehensive
Cancer Network

**Kimberly A. Stump-Sutliff,
MSN, AOCNS**
American Cancer Society

The *NCCN Colon and Rectal Cancer Clinical Practice Guidelines* were developed by the following NCCN Panel Members.

Juan Pablo Arnoletti, MD
University of Alabama at
Birmingham Comprehensive
Cancer Center

Al B. Benson III, MD
Robert H. Lurie Comprehensive
Cancer Center of Northwestern
University

Yi-Jen Chen, MD, PhD
City of Hope

Michael A. Choti, MD
The Sidney Kimmel Comprehensive
Cancer Center at Johns Hopkins

Harry S. Cooper, MD
Fox Chase Cancer Center

Raza A. Dilawari, MD
St. Jude Children's Research
Hospital/University of Tennessee
Cancer Institute

Dayna Early, MD
Siteman Cancer Center at Barnes-
Jewish Hospital and Washington
University School of Medicine

Paul F. Engstrom, MD/Chair
Fox Chase Cancer Center

Marwan Fakih, MD
Roswell Park Cancer Institute

Charles Fuchs, MD
Dana-Farber/Brigham and Women's
Cancer Center | Massachusetts
General Hospital Cancer Center

Jean L. Grem, MD
UNMC Eppley Cancer Center at
the Nebraska Medical Center

Krystyna Kiel, MD
Robert H. Lurie Comprehensive
Cancer Center of Northwestern
University

James A. Knol, MD
University of Michigan
Comprehensive Cancer Center

Lucille Leong, MD
City of Hope

Kirk Ludwig, MD
Duke Comprehensive Cancer Center

Edward W. Martin Jr., MD
Arthur G. James Cancer Hospital &
Richard J. Solove Research Institute
at The Ohio State University

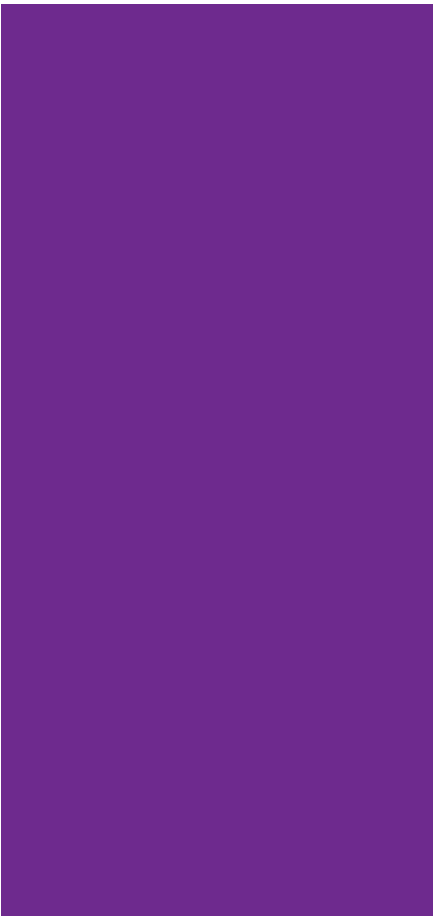
Sujata Rao, MD
Fred Hutchinson Cancer Research
Center/Seattle Cancer Care Alliance

Leonard Saltz, MD
Memorial Sloan-Kettering
Cancer Center

David Shibata, MD
Timothy J. Yeatman, MD
H. Lee Moffitt Cancer Center &
Research Institute at the University
of South Florida

John M. Skibber, MD
The University of Texas
M. D. Anderson Cancer Center

Alan Venook, MD
UCSF Comprehensive Cancer Center



1.800.ACS.2345
www.cancer.org



1.888.909.NCCN
www.nccn.org