

## Pancreatic Cancer Treatment

### What is pancreatic cancer?

Pancreatic cancer begins in the pancreas, an organ located deep in the abdomen behind the stomach. The pancreas releases hormones called insulin and glucagon to help the body process sugar. It also produces enzymes to help the body digest fats, carbohydrates and proteins.

Pancreatic cancer affects about 46,000 Americans a year, making it the twelfth most common type of cancer in the United States. Pancreatic cancer usually does not produce symptoms in the early stages of the disease, and its cells do not produce substances that are easily measured.

As a result, patients often experience no symptoms until the tumor has spread into surrounding organs. Eight out of ten patients are diagnosed after the cancer has spread (or metastasized) beyond the pancreas. Research is ongoing to help better understand the disease and to identify new and more effective treatments.



### What are my treatment options?

- Treatment options overview (<http://www.radiologyinfo.org#treatment-options-overview>)
- How can I choose from among the options? (<http://www.radiologyinfo.org#choose-options>)
- If I choose surgery, will I need radiation therapy or vice versa? (<http://www.radiologyinfo.org#choose-surgery>)
- How effective is modern radiation treatment of pancreatic cancer? (<http://www.radiologyinfo.org#treatment-pancreatic-cancer>)

### Treatment options overview

Pancreatic cancer is usually treated with a combination of surgery, radiation and chemotherapy. The type of treatment depends on the stage of the tumor (how far it has spread) and how close it is to blood vessels. Your physician will help you weigh the treatment options as they relate to your age, overall health and personal preferences.

Standard treatment options include:

#### Surgery

Patients with pancreatic cancer often have some form of surgery as part of their treatment plan. These surgeries are complicated and patients are urged to choose a hospital that performs pancreatic surgeries on a regular basis. The pancreas is divided into three parts: the head, the body and the tail. The type of surgery performed depends on the location of the tumor within the pancreas and whether the tumor has affected blood vessels and other organs near the pancreas.

- The Whipple Procedure: This surgery is performed on tumors located in the head of the pancreas. During this surgery, the head of the pancreas is removed as well as the first part of the small intestine (also known as the duodenum), the gallbladder and part of the bile duct. Sometimes parts of the stomach and nearby lymph nodes are also removed. The remaining part of the pancreas, the stomach and the intestine are reconnected so you can still digest food.
- Distal Pancreatectomy: This surgery is performed on tumors that are located in the body or tail of the pancreas. During this surgery, the body and tail are removed. The spleen is often removed as well.

- **Total Pancreatectomy:** This surgery is performed on tumors located in all three areas of the pancreas. During this surgery, the entire pancreas is removed as well as the gallbladder, spleen, nearby lymph nodes and parts of the stomach, small intestine, and bile duct. It is possible to live without a pancreas but patients will need insulin treatment and enzyme replacement for the rest of their lives.

Sometimes, patients may have tumors blocking the gallbladder or the stomach, and surgery may be performed to bypass the blockages. While these surgeries don't eliminate the cancerous tumor, they can greatly improve quality of life for the patient.

## Radiation Therapy

Radiation therapy uses high-energy x-rays or other forms of radiation to kill cancer cells or keep the tumors from growing. Some patients undergo radiation therapy in order to shrink tumors before surgery. Three types of radiation are typically used to treat pancreatic cancer: external beam therapy (EBT), stereotactic body radiotherapy (SBRT) and proton therapy. Radiation therapies are often used in combination with surgery and/or chemotherapy.

- **External beam therapy (EBT):** During EBT, high-energy x-ray beams are delivered to the tumor. Beams are usually generated by a linear accelerator and targeted to destroy cancer cells while sparing surrounding normal tissues. Most pancreatic cancer patients receive a type of external beam therapy called Intensity-Modulated Radiation Therapy (IMRT). IMRT is a type of 3-D radiation that uses linear accelerators to safely and painlessly deliver precise radiation doses to a tumor while minimizing the dose to surrounding normal tissue. EBT typically requires daily treatment over a period of three to six weeks. *See the External Beam Therapy (<https://www.radiologyinfo.org/en/info/ebt>) page for more information. See the Intensity-Modulated Radiation Therapy (<https://www.radiologyinfo.org/en/info/imrt>) page for more information about IMRT.*
- **Stereotactic body radiotherapy (SBRT):** SBRT is a newer type of radiation therapy which uses special equipment to deliver precisely-targeted radiation in fewer high-dose treatments than traditional EBT. The total dose of radiation is divided into smaller "fractionated" doses given over several days instead of several weeks. This helps preserve healthy tissue. The use of SBRT for pancreatic cancer is only used in specialized cancer centers. *See the Stereotactic body radiotherapy (<https://www.radiologyinfo.org/en/info/stereotactic>) page for more information about SBRT.*
- **Proton beam radiation therapy:** Proton beam radiation therapy delivers radiation to the tumor in a much more confined way than conventional radiation therapy. It allows the radiation oncologist to deliver a higher dose to the tumor while still minimizing side effects. This can be especially helpful in treating pancreatic cancer since the pancreas is located so closely to other essential organs. Proton beam radiation therapy still requires daily treatment over a period of four to five weeks and is only available at specialized cancer centers. *See the Proton Therapy (<https://www.radiologyinfo.org/en/info/protonthera>) page for more information.*

## Chemotherapy

This treatment involves the use of drugs given intravenously (by vein) or orally to kill cancer cells or to keep them from dividing and multiplying. Chemotherapy may be used alone or in combination with radiation. Like radiation therapy, chemotherapy can ease symptoms and increase survival for patients with tumors that have spread (metastasized). Patients usually receive chemotherapy treatment sessions over a set period of time with breaks in between to alleviate potential side effects, such as abnormal blood-cell counts, fatigue, diarrhea, mouth sores, and a weakened immune system.

Newer, advanced chemotherapy options have recently been developed. These newer options help avoid damaging normal, healthy tissues while stopping cancer cells from spreading and multiplying.

## How can I choose from among the options?

In addition to talking with family and friends, you will need a team of doctors to help advise you. This team will include a medical oncologist, a radiation oncologist, a surgeon and a palliative (pain) care doctor. A medical oncologist specializes in using chemotherapy to treat cancer. A radiation oncologist specializes in using radiation to treat cancer. The surgeon removes cancer or performs surgical procedures to bypass blockages from pancreatic cancer tumors. The palliative care doctor specializes in reducing

or eliminating pain and other symptoms associated with the cancer.

You and your care team will create a treatment plan, which will be determined in part by the stage and severity of your cancer. Most patients with pancreatic cancer will be treated with a combination of surgery, radiation and chemotherapy. It is also possible for patients to choose no treatment if the cancer is very advanced. These patients will work closely with the palliative care doctor to minimize pain and preserve their quality of life.

### **If I choose surgery, will I need radiation therapy or vice versa?**

Pancreatic cancer is rarely diagnosed in its early stages. Therefore, most patients will undergo some combination of surgery, radiation and chemotherapy. In many cases, the goal of the surgery is not to remove the cancerous tumor but to help reduce pain and other symptoms caused by the tumor. A combination of radiation therapy and chemotherapy is often used to shrink a tumor prior to surgery or to keep a tumor from growing. Radiation therapy may also be used to prevent the tumor from coming back.

### **How effective is modern radiation treatment of pancreatic cancer?**

With modern technology and recent advances in treatment software, physicians can deliver more of the radiation dose directly to the tumor while avoiding healthy tissue nearby. Doctors use 3-D imaging techniques to visualize the area of the body being treated and surrounding tissue so that the radiation dose can be precisely targeted at the diseased cells. Both stereotactic body radiotherapy and proton therapy help minimize the radiation dose that is delivered to healthy tissue, reducing the risk of side effects and complications. The goal of treatment today is to safely provide radiation, reduce pain and extend life.

### **What happens during radiation therapy?**

Radiation therapy uses high-energy x-rays (photons) or a stream of particles (protons). Radiation at high doses can destroy abnormal cells at the microscopic level. Patients will hear some electrical noise and see lights on the machine but will not feel the radiation during treatment. Radiation treatment is typically given to patients in multiple sessions over a course of weeks.

### **What are possible side effects of radiation therapy?**

After multiple radiation therapy sessions, patients often become tired. While adequate rest is important, doctors usually advise patients to try to stay as active as possible. Patients may have an upset stomach, diarrhea or loose stools, nausea, vomiting and loss of appetite while being treated with radiation therapy. Sometimes patients will have skin changes or irritation in the area where the radiation beam enters the body. Patients may also experience low levels of red blood cells and/or white blood cells, increasing their risk of infection. These side effects are generally short term, lasting two to three weeks after treatment.

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

Once your pancreatic cancer treatment is complete, you and your treatment team will decide on a follow-up plan. Patients with early stage cancers and neuroendocrine tumors will typically follow up with a medical oncologist or family doctor every six months for the two years after treatment and then every year after. All pancreatic cancer patients will need to have regular blood tests. If the pancreas no longer functions properly or has been removed, pancreatic enzyme replacement therapy and insulin treatment may be required. Living with cancer can be emotionally difficult for you and your loved ones. Finding a therapist who specializes in treating cancer patients is highly recommended.

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

#### **Clinical Trials**

For information and resources about clinical trials and to learn about current clinical trials being conducted, visit:

- RadiologyInfo's Clinical Trials (<https://www.radiologyinfo.org/en/info/screening-clinical-trials>) page.

- Clinical Trials (<https://www.cancer.gov/about-cancer/treatment/clinical-trials/search>) - from the National Cancer Institute's Web site

## Which test, procedure or treatment is best for me?

- *Staging of Pancreatic Ductal Adenocarcinoma* (<https://www.radiologyinfo.org/en/info/acs-staging-pancreatic-ductal-adenocarcinoma>)

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