Pancreatic Cancer

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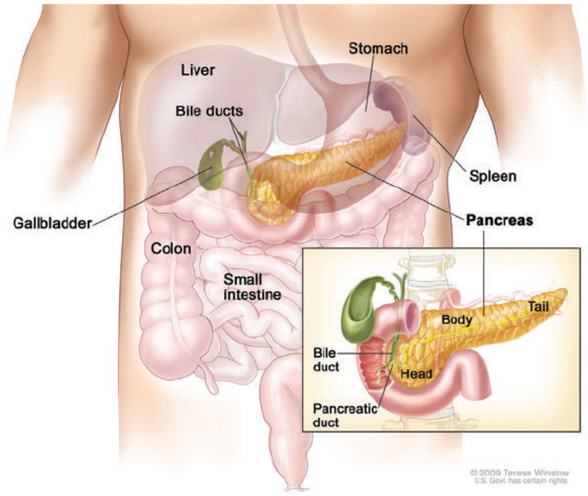
General Information About Pancreatic Cancer

KEY POINTS

- Pancreatic cancer is a disease in which malignant (cancer) cells form in the tissues of the pancreas.
- Smoking and health history can affect the risk of pancreatic cancer.
- Signs and symptoms of pancreatic cancer include jaundice, pain, and weight loss.
- Pancreatic cancer is difficult to diagnose early.
- Tests that examine the pancreas are used to diagnose and stage pancreatic cancer.
- Certain factors affect prognosis (chance of recovery) and treatment options.

Pancreatic cancer is a disease in which malignant (cancer) cells form in the tissues of the pancreas. The pancreas is a gland about 6 inches long that is shaped like a thin pear lying on its side. The wider end of the pancreas is called the head, the middle section is called the body, and the narrow end is called the tail. The pancreas lies between the stomach and the spine.

Anatomy of the Pancreas



The pancreas has three areas: head, body, and tail. It is found in the abdomen near the stomach, intestines, and other organs.

The pancreas has two main jobs in the body:

- To make juices that help digest (break down) food.
- To make hormones such as insulin and glucagon that help control blood sugar levels. Both of these hormones help the body use and store the energy it gets from food.

The digestive juices are made by exocrine pancreas cells, and the hormones are made by endocrine pancreas cells. About 95% of pancreatic cancers begin in exocrine cells.

Health history affects the risk of developing pancreatic cancer.

Risk factors for pancreatic cancer include the following:

- Smoking.
- Being very overweight.
- Having a personal history of diabetes or chronic pancreatitis.
- Having a family history of pancreatic cancer or pancreatitis.
- Having certain hereditary conditions such as:
  - Multiple endocrine neoplasia type 1 (MEN1) syndrome.
  - Hereditary nonpolyposis colon cancer (HNPCC) also known as Lynch syndrome.
  - Von Hippel Lindau syndrome.
  - Peutz Jeghers syndrome.
  - Hereditary breast and ovarian cancer syndrome.
  - Familial atypical multiple mole melanoma (FAMMM) syndrome.
  - Ataxia telangiectasia.

Signs and Symptoms

Pancreatic cancer may not cause early signs or symptoms. Signs and symptoms may be caused by pancreatic cancer or by other conditions. Check with your doctor if you have any of the following:

- Jaundice (yellowing of the skin and whites of the eyes).
- Light colored stools.
- Dark urine.
- Pain in the upper or middle abdomen and back.
- Weight loss for no known reason.
- Loss of appetite.
- Feeling very tired.

Pancreatic cancer is difficult to detect and diagnose for the following reasons:

- There are not any noticeable signs or symptoms in the early stages of pancreatic cancer.
- When signs and symptoms of pancreatic cancer are present, they are like the signs and symptoms of many other illnesses.
- The pancreas is hidden behind other organs such as the stomach, small intestine, liver, gallbladder, spleen, and bile ducts.

Testing

Tests that examine the pancreas are used to diagnose and stage pancreatic cancer. The following are tests and procedures that may be used:

- **Physical exam and health history:** An exam of the body to check general signs of health including checking for signs of disease such as lumps or anything else that seems unusual. A history of the patient's health habits and past illnesses and treatments will also be taken.
- **Blood chemistry studies:** A procedure in which a blood sample is checked to measure the amounts of certain substances such as bilirubin released into the blood by organs and tissues in the body. An unusual (higher or lower than normal) amount of a substance can be a sign of disease.
- **Tumor marker test:** A procedure in which a sample of blood, urine, or tissue is checked to measure the amounts of certain substances such as CA 19 9 and carcinoembryonic antigen (CEA) made by organs, tissues, or tumor cells in the body. Certain substances are linked to specific types of cancer when found in increased levels in the body. These are called tumor markers.
- **MRI (magnetic resonance imaging):** A procedure that uses a magnet, radio waves, and a computer to make a series of detailed pictures of areas inside the body. This procedure is also called nuclear magnetic resonance imaging (NMRI).
- **CT scan (CAT scan):** A procedure that makes a series of detailed pictures of areas inside the body taken from different angles. The pictures are made by a computer linked to an x ray machine. A dye may be injected into a vein or swallowed to help the organs or tissues show up more clearly. This procedure is also called computed tomography, computerized tomography, or computerized axial tomography. A spiral or helical CT scan makes a series of very detailed pictures of areas inside the body using an x ray machine that scans the body in a spiral path.
- **PET scan (positron emission tomography scan):** A procedure to find malignant tumor cells in the body. A small amount of radioactive glucose (sugar) is injected into a vein. The PET scanner rotates around the body and makes a picture of where glucose is being used in the body. Malignant tumor cells show up brighter in the picture because they are more active and take up more glucose than normal cells do. A PET scan and CT scan may be done at the same time. This is called a PET CT.
- **Abdominal ultrasound:** An ultrasound exam used to make pictures of the inside of the abdomen. The ultrasound transducer is pressed against the skin of the abdomen and directs high energy sound waves (ultrasound) into the abdomen. The sound waves bounce off the internal tissues and organs and make echoes. The transducer receives the echoes and sends them to a computer which uses the echoes to make pictures called sonograms. The picture can be printed to be looked at later.
- **Endoscopic ultrasound (EUS):** A procedure in which an endoscope is inserted into the body usually through the mouth or rectum. An endoscope is a thin, tube like instrument with a light and a lens for viewing. A probe at the end of the endoscope is used to bounce high energy sound waves (ultrasound) off internal tissues or organs and make echoes. The echoes form a picture of body tissues called a sonogram. This procedure is also called endosonography.
- **Endoscopic retrograde cholangiopancreatography (ERCP):** A procedure used to x ray the ducts (tubes) that carry bile from the liver to the gallbladder and from the gallbladder to the small intestine. Sometimes pancreatic cancer causes these ducts to narrow and block or slow the flow of bile causing jaundice. An endoscope (a thin, lighted tube) is passed through the mouth, esophagus, and stomach into the first part of the small intestine. A catheter (a smaller tube) is then inserted through the endoscope into the pancreatic ducts. A dye is injected through the catheter into the ducts, and an x ray is taken. If the ducts are blocked by a tumor, a fine tube may be inserted into the duct to unblock it. This tube (or stent) may be left in place to keep the duct open. Tissue samples may also be taken.
- **Percutaneous transhepatic cholangiography (PTC):** A procedure used to x ray the liver and bile ducts. A thin needle is inserted through the skin below the ribs and into the liver. Dye is injected into the liver or bile ducts, and an x ray is taken. If a blockage is found, a thin, flexible tube called a stent is sometimes left in the liver to drain bile into the small intestine or a collection bag outside the body. This test is done only if an ERCP cannot be done.
- **Laparoscopy:** A surgical procedure to look at the organs inside the abdomen to check for signs of disease. Small incisions (cuts) are made in the wall of the abdomen, and a laparoscope (a thin, lighted tube) is inserted into one of the incisions. The laparoscope may have an ultrasound probe at the end in order to bounce high energy sound waves off internal organs such as the pancreas. This is called laparoscopic ultrasound. Other instruments may be inserted through the same or other incisions to perform procedures such as taking tissue samples from the pancreas or a sample of fluid from the abdomen to check for cancer.
- **Biopsy:** The removal of cells or tissues, so they can be viewed under a microscope by a pathologist to check for signs of cancer. There are several ways to do a biopsy for pancreatic cancer. A fine needle or a core needle may be inserted into the pancreas during an x ray or ultrasound to remove cells. Tissue may also be removed during a laparoscopy or surgery to remove the tumor.

Prognosis Factors

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

- Whether or not the tumor can be removed by surgery.
- The stage of the cancer (the size of the tumor and whether the cancer has spread outside the pancreas to nearby tissues or lymph nodes or to other places in the body).
- The patient's general health.
- Whether the cancer has just been diagnosed or has recurred (come back).

Pancreatic cancer can be controlled only if it is found before it has spread and when it can be completely removed by surgery. If the cancer has spread, palliative treatment can improve the patient's quality of life by controlling the symptoms and complications of this disease.

Stages of Pancreatic Cancer

KEY POINTS

- Tests and procedures to stage pancreatic cancer are usually done at the same time as diagnosis.
- There are three ways that cancer spreads in the body.
- Cancer may spread from where it began to other parts of the body.
- The following stages are used for pancreatic cancer:

  Stage 0 (Carcinoma in Situ)

  Stage I

  Stage II

  Stage III

  Stage IV

- The following groups are used to plan treatment:
  - Resectable pancreatic cancer
  - Borderline resectable pancreatic cancer
  - Locally advanced pancreatic cancer
  - Metastatic pancreatic cancer
  - Recurrent pancreatic cancer

After pancreatic cancer has been diagnosed, tests are done to find out if cancer cells have spread to other parts of the body.

Possible Spreading of Cancer

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

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

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

Stages Used for Pancreatic Cancer

Stage 0 (Carcinoma in Situ)

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

Stage I

In stage I, cancer has formed and is found in the pancreas only. Stage I is divided into stages IA and IB, depending on the size of the tumor.

Stage IA: The tumor is 2 centimeters or smaller.

Stage IB: The tumor is larger than 2 centimeters but not larger than 4 centimeters.

Stage II

Stage II is divided into stages IIA and IIB depending on the size of the tumor and where the cancer has spread.

Stage IIA: The tumor is larger than 4 centimeters.

Stage IIB: The tumor is any size, and cancer has spread to 1 to 3 nearby lymph nodes.

Stage III

In stage III, the tumor is any size, and cancer has spread to 4 or more nearby lymph nodes or has spread to the major blood vessels near the pancreas.

Stage IV

In stage IV, the tumor is any size, and cancer has spread to other parts of the body such as the liver, lung, or peritoneal cavity (the body cavity that contains most of the organs in the abdomen).

Different pancreatic cancer diagnoses are placed in specific groups which are used to plan treatment. Those groups are described below:

- **Resectable pancreatic cancer:** Pancreatic cancer can be removed by surgery because it has not grown into important blood vessels near the tumor.
- **Borderline resectable pancreatic cancer:** Pancreatic cancer has grown into a major blood vessel or nearby tissue or organs. It may be possible to remove the tumor, but there is a high risk that all of the cancer cells will not be removed with surgery.
- **Locally advanced pancreatic cancer:** Pancreatic cancer has grown into or close to nearby lymph nodes or blood vessels, so surgery cannot completely remove the cancer.
- **Metastatic pancreatic cancer:** Pancreatic cancer has spread to other organs, so surgery cannot completely remove the cancer.
- **Recurrent pancreatic cancer:** Pancreatic cancer has recurred (come back) after it has been treated. The cancer may come back in the pancreas or in other parts of the body.

Treatment Option Overview

KEY POINTS

- There are different types of treatments for patients with pancreatic cancer.
- Five types of standard treatments are used:
  - Surgery
  - Radiation therapy
  - Chemotherapy
  - Chemoradiation therapy
  - Targeted therapy
- There are treatments for pain caused by pancreatic cancer.
- Patients with pancreatic cancer have special nutritional needs.
- New types of treatments are being tested in clinical trials.
- Treatment for pancreatic cancer may cause side effects.
- Patients may want to think about taking part in a clinical trial.
- Patients can enter clinical trials before, during, or after starting their cancer treatment.
- Follow up tests may be needed.

Treatment Options for Patients with Pancreatic Cancer

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

Five types of standard treatments are used:

Surgery

One of the following types of surgery may be used to take out the tumor:

- **Whipple procedure:** A surgical procedure in which the head of the pancreas, the gallbladder, part of the stomach, part of the small intestine, and the bile duct are removed. Enough of the pancreas is left to produce digestive juices and insulin.
- **Total pancreatectomy:** This operation removes the whole pancreas, part of the stomach, part of the small intestine, the common bile duct, the gallbladder, the spleen, and nearby lymph nodes.
- **Distal pancreatectomy:** Surgery to remove the body and the tail of the pancreas. The spleen may also be removed if cancer has spread to the spleen.

If the cancer has spread and cannot be removed, the following types of palliative surgery may be done to relieve symptoms and improve quality of life:

- **Biliary bypass:** If cancer is blocking the bile duct and bile is building up in the gallbladder, a biliary bypass may be done. During this operation, the doctor will cut the gallbladder or bile duct in the area before the blockage and sew it to the small intestine to create a new pathway around the blocked area.
- **Endoscopic stent placement:** If the tumor is blocking the bile duct, surgery may be done to put in a stent (a thin tube) to drain bile that has built up in the area. The doctor may place the stent through a catheter that drains the bile into a bag on the outside of the body, or the stent may go around the blocked area and drain the bile into the small intestine.
- **Gastric bypass:** If the tumor is blocking the flow of food from the stomach, the stomach may be sewn directly to the small intestine, so the patient can continue to eat normally.

Radiation Therapy

Radiation therapy is a cancer treatment that uses high energy x rays or other types of radiation to kill cancer cells or keep them from growing. External radiation therapy uses a machine outside the body to send radiation toward the area of the body with cancer.

Chemotherapy

Chemotherapy is a cancer treatment that uses drugs to stop the growth of cancer cells either by killing the cells or by stopping them from dividing. When chemotherapy is taken by mouth or injected into a vein or muscle, the drugs enter the bloodstream and can reach cancer cells throughout the body (systemic chemotherapy). Combination chemotherapy is treatment using more than one anticancer drug.

Chemoradiation Therapy

Chemoradiation therapy combines chemotherapy and radiation therapy to increase the effects of both.

Targeted Therapy

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

There are treatments for pain caused by pancreatic cancer.

Pain can occur when the tumor presses on nerves or other organs near the pancreas. When pain medicine is not enough, there are treatments that act on nerves in the abdomen to relieve the pain. The doctor may inject medicine into the area around affected nerves or may cut the nerves to block the feeling of pain. Radiation therapy with or without chemotherapy can also help relieve pain by shrinking the tumor.

Pancreatic cancer patients have special nutritional needs.

Surgery to remove the pancreas may affect its ability to make pancreatic enzymes that help to digest food. As a result, patients may have problems digesting food and absorbing nutrients into the body. To prevent malnutrition, the doctor may prescribe medicines that replace these enzymes.

Clinical Trials

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

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

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

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

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

Follow-up tests may be needed.

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

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

Treatment of Resectable or Borderline Resectable Pancreatic Cancer

Treatment of resectable or borderline resectable pancreatic cancer may include the following:

- Chemotherapy with or without radiation therapy followed by surgery.
- Surgery (Whipple procedure, total pancreatectomy, or distal pancreatectomy).
- Surgery followed by chemotherapy.
- Surgery followed by chemoradiation.
- A clinical trial of chemotherapy and/or radiation therapy before surgery.
- A clinical trial of different ways of giving radiation therapy.

Treatment of Locally Advanced Pancreatic Cancer

Treatment of pancreatic cancer that is locally advanced may include the following:

- Chemotherapy with or without targeted therapy.
- Chemotherapy and chemoradiation.
- Surgery (Whipple procedure, total pancreatectomy, or distal pancreatectomy).
- Palliative surgery or stent placement to bypass blocked areas in ducts or the small intestine. Some patients may also receive chemotherapy and chemoradiation to shrink the tumor to allow for surgery.
- A clinical trial of new anticancer therapies together with chemotherapy or chemoradiation.
- A clinical trial of radiation therapy given during surgery or internal radiation therapy.

Treatment of Metastatic or Recurrent Pancreatic Cancer

Treatment of pancreatic cancer that has metastasized or recurred may include the following:

- Chemotherapy with or without targeted therapy.
- Clinical trials of new anticancer agents with or without chemotherapy.

Palliative Therapy

Palliative therapy can improve the patient's quality of life by controlling the symptoms and complications of pancreatic cancer. Palliative therapy can be started at any stage of disease. Palliative therapy for pancreatic cancer includes the following:

- Palliative surgery or stent placement to bypass blocked areas in ducts or the small intestine.
- Palliative radiation therapy to help relieve pain by shrinking the tumor.
- An injection of medicine to help relieve pain by blocking nerves in the abdomen.
- Other palliative medical care alone.

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

Notes

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

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

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Cancer Support Services