

Radiation Medicine

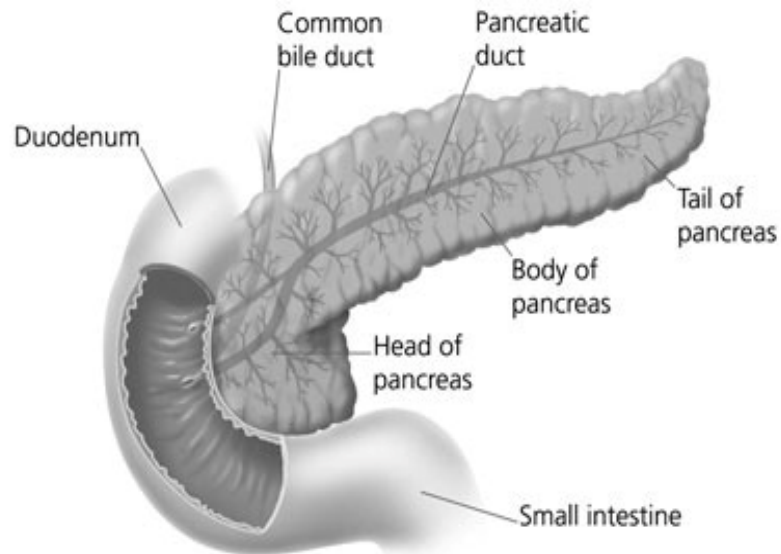
Pancreatic Cancer: Overview

Overview

The pancreas is a gland located deep in the abdomen between the stomach and the spine (backbone). The liver, intestine, and other organs surround the pancreas. The pancreas is about 6 inches long and is shaped like a flat pear. The widest part of the pancreas is the head, the middle section is the body, and the thinnest part is the tail.

The pancreas makes insulin and other hormones. These hormones enter the bloodstream and travel throughout the body. They help the body use or store the energy that comes from food. For example, insulin helps control the amount of sugar in the blood.

The pancreas also makes pancreatic juices. These juices contain enzymes that help digest food. The pancreas releases the juices into a system of ducts leading to the common bile duct. The common bile duct empties into the duodenum, the first section of the small intestine.



Symptoms

Pancreatic cancer is sometimes called a "silent disease" because early pancreatic cancer often does not cause symptoms. But, as the cancer grows, symptoms may include:

- Pain in the upper abdomen or upper back
- Yellow skin and eyes, and dark urine from jaundice
- Weakness
- Loss of appetite
- Nausea and vomiting
- Weight loss

These symptoms are not sure signs of pancreatic cancer. An infection or other problem could also cause these symptoms. Only a doctor can diagnose the cause.

Diagnosis

Pancreatic cancer is usually diagnosed with tests and procedures that produce pictures of the pancreas and the area around it. The process used to find out if cancer cells have spread within and around the pancreas is called staging. Tests and procedures to detect, diagnose, and stage pancreatic cancer are usually done at the same time. In order to plan the best treatment, it is important to know the stage of the disease and whether or not the pancreatic cancer can be removed by surgery. The following tests and procedures may be used:

- **Physical exam** - The doctor examines the skin and eyes for signs of jaundice. The doctor then feels the abdomen to check for changes in the area near the pancreas, liver, and gallbladder. The doctor also checks for ascites, an abnormal buildup of fluid in the abdomen.
- **Lab tests** -The doctor may take blood, urine, and stool samples to check for bilirubin and other substances. Bilirubin is a substance that passes from the liver to the gallbladder to the intestine. If the common bile duct is blocked by a tumor, the bilirubin cannot pass through normally. Blockage may cause the level of bilirubin in the blood, stool, or urine to become very high. High bilirubin levels can result from cancer or from noncancerous conditions.
- **Chest x-ray** - An x-ray of the organs and bones inside the chest.
- **CT Scan** (Computed tomography) - A procedure that makes a series of detailed pictures of areas inside the body, taken from different angles. A computer linked to an x-ray machine makes the pictures. A dye may be injected into a vein or swallowed to help the organs or tissues show up more clearly.
- **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.

- **ERCP** (Endoscopic retrograde cholangiopancreatography) - 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.
- **PTC** (percutaneous transhepatic cholangiography) - 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 ERCP cannot be done.
- **PET Scan** (positron emission tomography scan) - A procedure to find malignant tumor cells in the body. A small amount of radionuclide 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.
- **Laparoscopy** - A surgical procedure to look at the organs inside the abdomen to check for abnormal areas. An incision (cut) is made in the abdominal wall and a laparoscope (a thin, lighted tube) is inserted into the abdomen. Tissue samples and lymph nodes may be removed for biopsy.
- **Biopsy** -In some cases, the doctor may remove cells or tissue to check for signs of cancer. The doctor may obtain tissue in several ways. One way is by inserting a needle into the pancreas to remove cells. This is called fine-needle aspiration. The doctor uses x-ray or ultrasound to guide the needle. Sometimes the doctor obtains a sample of tissue during EUS or ERCP. Another way is to open the abdomen during an operation. (laparoscopy)
- **Ultrasonography** -The ultrasound device uses sound waves that cannot be heard by humans. The sound waves produce a pattern of echoes as they bounce off internal organs. The echoes create a picture of the pancreas and other organs inside the abdomen. The echoes from tumors are different from echoes made by healthy tissues.

The ultrasound procedure may use an external or internal device, or both types:

- *Transabdominal ultrasound*: To make images of the pancreas, the doctor places the ultrasound device on the abdomen and slowly moves it around.
- *EUS (Endoscopic ultrasound)*: A procedure in which an endoscope (a thin, lighted tube) is inserted into the body. 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.
- Tests and procedures to stage pancreatic cancer are usually done at the same time as diagnosis.

The Stages of Pancreatic Cancer

Stage I – the cancer is found in the pancreas only.

Stage I is divided into stage IA and stage IB, depending on where the cancer has spread.

- Stage IA: Cancer is found only in the pancreas and is 2 centimeters or less in size.
- Stage IB: Cancer is found only in the pancreas and is greater than 2 centimeters in size.

Stage II, cancer may have spread to nearby tissue and organs, and may have spread to lymph nodes near the pancreas. Stage II is divided into stage IIA and stage IIB, depending on where the cancer has spread.

- Stage IIA: Cancer has spread to nearby tissue and organs but has not spread to nearby lymph nodes.
- Stage IIB: Cancer has spread to nearby lymph nodes and may have spread to nearby tissue and organs.

Stage III, the cancer has spread to the major blood vessels near the pancreas, such as the celiac axis (the junction where the celiac artery branches off from the aorta, just below the diaphragm) and the superior mesenteric vein (the vein that returns blood from the rectum and colon to the heart) and aorta, and may have spread to nearby lymph nodes.

Stage IV, cancer may be of any size and has spread to distant organs, such as the liver, lung, and peritoneal cavity (the body cavity that contains most of the organs in the abdomen (such as the lungs)). It may have also spread to organs and tissues near the pancreas or to lymph nodes.

Recurrent pancreatic cancer is cancer that has recurred (come back) after it has been treated. The cancer may come back in the pancreas or in other parts of the body.