

DiagnosisandPrognosisofPancreaticCancer

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Theprocessofdiagnosisincludesthefollowing:

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- [Cytology](#)
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ReviewofYourMedicalHistory

Yourdoctorwillaskyoutodescribeyoursymptomsindetail.You'llbeaskedaboutyoursmokingandalcoholhabits(pastandpresent),historyofexposuretochemicals,personalmedicalhistory,andfamilymedicalhistory.

PhysicalExam

Yourdoctorwillperformacompletephysicalexamination,payingparticularattentiontotheabdominalexam>Yourdoctorwillfeelforamassinyourabdomen,andaskifyouhaveanypainortendernessduringthecourseoftheexam.

DiagnosticTesting

Thefollowingtestsmaybedone:

BloodTests —Anumberofbloodtestsmaybepreformed,althoughtheycannotbeusedtodefinitivelydiagnosepancreaticcancer.Thetestsmayshowsomeofthechangesthatoccurduringpancreaticcancer,suchaselevatedlevelsoftheenzymesamylaseandlipase,increasedbilirubin,elevatedglucose,andchangesinliverfunctiontests.Thesechangescanoccurinotherconditionsaswell.

Specificbloodtestsforspecificpancreaticcancerincludetumormarkercancerantigens,CA19-9,CA72-4,andalsohumanchorionicgonadotropin(hCG).Thesetestsarereusefulinpredictingprognosisandidentifyingrelapseaftersurgicalresection.

ImagingStudies —Imagingstudiesareveryimportantfordiagnosingpancreaticcancer.Anumberofdifferenttypesofimagingmaybepreformed,suchas:

- **[ComputedTomography\(CT\)Scan](#)** —Thisisatypeofx-raythatusesacomputertoproducecross-sectionalimagesoftheinsideofthebody.AspecialCT,calledthedualphasehelicalCT,isthebesttestfordiagnosingthiscondition.Thescancanshowtheinteriorofthepancreasindetail,allowingatumor

tobe diagnosed in approximately 98% of the time. CT is also very useful for diagnosing the spread of cancer beyond the pancreas.

- **Ultrasound**—This test uses sound waves to identify tumors and other conditions. Ultrasound studies can be performed by placing the transducer (the tool that produces the sound waves and generates a picture on a monitor) on the outside of the abdomen.
- **Endoscopic Ultrasound** —This is a more detailed form of ultrasound. A thin, lighted tube (endoscope) is passed down your throat, through your stomach, and into your intestine. The endoscope has a tiny ultrasound transducer within it, allowing the pancreas and surrounding organs to be viewed on the monitor. This test can help identify the presence of a tumor in or around some of the major vessels surrounding the pancreas, surrounding organs, and in lymph nodes surrounding the pancreas.
- **Magnetic Resonance Imaging (MRI) Scan** —An MRI uses magnetic waves to produce images of the inside of the body. Using a large magnet, radio waves, and a computer, an MRI produces 2-D and 3-D pictures. This test can identify a tumor within the pancreas, as well as determine if the tumor has spread outside of the pancreas. For example, MRI is particularly good at showing the major blood vessels outside of the pancreas to see if they are being compressed or invaded by pancreatic cancer.
- **Endoscopic Retrograde Cholangiopancreatography (ERCP)** —a thin, lighted tube (endoscope) is passed down your throat, through your stomach, into your intestine, and to the location of the common bile duct. Dye is squirted through the endoscope and into the common bile duct. X-ray pictures are taken. The dye outlines the common bile duct and the pancreatic duct, so that any abnormal areas stand out more clearly on the x-rays. Biopsy samples and fluid can also be taken through the endoscope.
- **Angiography**—During this test, a dye is injected into an artery, and a series of x-rays are taken. The dye coats the blood vessels and the pancreas, making it easier to see if a tumor has invaded, compressed, or otherwise interfered with the normal functioning of blood vessels. Due to the high quality images of current CT scans, angiography is rarely necessary.
- **Positron Emission Tomographic Scan (PET)** —This special scanning technique is especially useful for staging pancreatic cancer.

Laparoscopy—Tiny incisions are made in the abdomen, and a small fiberoptic tube with a lighted tip (a laparoscope) is inserted. The scope can be used to look at the pancreas, the surrounding tissues, the liver, and the wall of the abdomen for the presence of tumor. Miniature surgical tools can also be inserted into the abdomen to remove tissue samples (biopsies). The tissue samples will be checked for cancer cells. Laparoscopy is useful for both diagnosing pancreatic cancer, and determining whether the cancer has spread outside of the pancreas. This can be done as an outpatient procedure.

Biopsy—This involves the removal of a small sample of pancreatic tissue and examination under a microscope to check for the presence and type of cancer cells. This is an important part of diagnosing pancreatic cancer.

The tissue sample may be obtained during the course of an endoscopic retrograde cholangiopancreatography exam, during laparoscopy, or through fine needle aspiration (FNA). During fine needle aspiration, a tiny needle is inserted directly through the skin of the abdomen and into the pancreas in order to withdraw a sample of pancreatic tissue. Some researchers believe that FNA should not be performed unless the tumor is inoperable because the cancer cells may accidentally be spread along the track of the needle. If an abnormality is seen in another organ (such as the liver), a biopsy of that abnormality may be done instead.

Cytology

Cytology is the study of cells. The cytology of cancer cells differs significantly from normal cells, and physicians use the unique cellular features seen on biopsy samples to determine the diagnosis and assess the prognosis of a cancer.

The first thing that cytology studies will do is determine what type of pancreatic cell the cancer involves. Exocrine cells are much more commonly involved in pancreatic cancer than endocrine cells. Cytology will also try to determine the degree of abnormality and aggressiveness of the cancer cells.

Staging

Staging is the process by which physicians determine the prognosis of a cancer that has already been diagnosed. Staging is essential for making treatment decisions (eg, surgery or chemotherapy). Several features of the cancer are used to arrive at a staging classification, the most common being the size of the original tumor, extent of local invasion, and spread to distant sites (metastasis). Low staging classifications (0-1) imply a favorable prognosis, where as high staging classifications (4-5) imply an unfavorable prognosis.

Information to aid in staging pancreatic cancer can come from the results of imaging studies (CT scans, MRI, ultrasound, angiography, endoscopic retrograde cholangiopancreatography) and laparoscopy. These studies help detail whether the pancreatic cancer is contained within the pancreas, or whether it has begun to invade blood vessels, lymph nodes, or other organs and tissues surrounding the pancreas. If your doctor is suspicious that the cancer has spread to distant areas of your body (such as the liver, lungs, bone, or brain), then other tests may be done to study those organs.

Once all the information has been collected, your doctor will put it all together to determine the stage of your cancer. A common system used for staging is called the TNM system. This system characterizes three aspects of pancreatic cancer: information about the tumor (T), the lymph nodes (N), and the presence of distant metastasis (M). As with grading, the higher numbers reflect a greater degree of abnormality and spread.

Pancreatic Tumor (T)

The T stages are as follows:

- TX: Tumor cannot be evaluated.
- T0: There is no evidence of tumor.
- Tis: There is minimal tumor without invasion (*in situ*).
- T1: Pancreatic tumor measures 2 centimeters (cm) or less and has not spread outside of the pancreas.
- T2: Pancreatic tumor is greater than 2 cm, but has not spread outside of the pancreas.
- T3: The pancreatic tumor extends beyond the pancreas but does not involve the superior mesenteric artery or the vessel of the celiac axis, both of which are located in the abdomen.
- T4: The pancreatic tumor extends beyond the pancreas and involves the superior mesenteric artery or vessels of the celiac axis.

Lymph Nodes (N)

The N stages are as follows:

- NX: Nodes cannot be evaluated.
- N0: There are no cancer cells in the regional lymph nodes.
- N1: There are cancer cells in lymph nodes surrounding the pancreas.

Distant Metastasis (M)

The M stages are as follows:

- MX: Presence of metastasis cannot be evaluated.
- M0: There are no distant metastasis.
- M1: There are distant metastasis, such as to distant lymph nodes, liver, lungs, and/or brain.

Determining the Stage

Once the T, N, and M categories have been determined, the information is grouped together to determine your stage. The groupings are as follows:

Stage	T,N,andMClassifications
StageIA	T1,N0,M0
StageIB	T2,N0,M0
StageIIA	T3,N0,M0
StageIIB	T1,T2,orT3;N1;M0
StageIII	T4;N0orN1;M0
StageIV	T1,T2,T3,orT4;N0orN1;M1

An Alternate Method of Staging

Another method of staging addresses whether the original pancreatic tumor can be surgically removed or not. Most physicians believe that tumors that have invaded major blood vessels (T4 or Stage III) cannot be removed. Therefore, this method of staging utilizes information about blood vessel invasion. This system has three designations:

- **Resectable Pancreatic Cancer** —Visible tumors can be removed.
- **Locally Advanced or Unresectable Pancreatic Cancer** —The cancer has spread to neighboring tissues or invaded into blood vessels, therefore the cancer cannot be removed through surgery. However, no distant spread has been diagnosed.
- **Metastatic**—The cancer has been found in distant sites; it has spread well beyond the pancreas.

Prognosis

Prognosis is a forecast of the probable course and/or outcome of a disease or condition. Prognosis is most often expressed as the percentage of patients who are expected to survive over five or ten years. Cancer prognosis is a notoriously inexact process. This is because the predictions are based on the experience of large groups of patients suffering from cancers at various stages. Using this information to predict the future of an individual patient is always imperfect and often flawed, but it is the only method available.

Unfortunately, pancreatic cancer is often relatively advanced at the time that it is diagnosed. As a result, the number of patients who survive for five years or more after diagnosis is very small, perhaps as low as 5%. About 21% of all patients diagnosed with pancreatic cancer survive for a year after diagnosis.

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