

Pancreatic cysts and cystic tumours

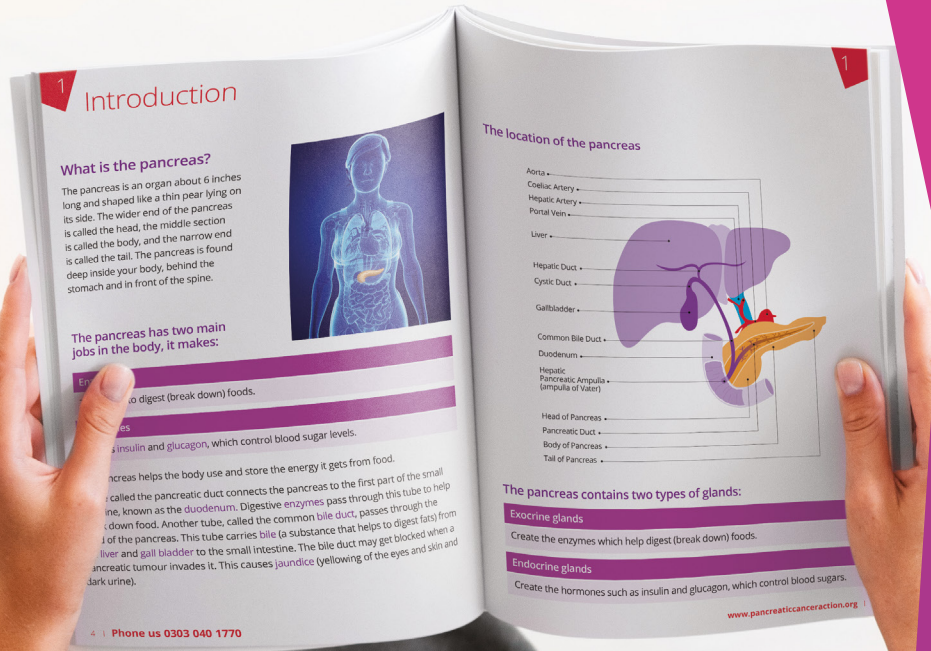


Types of pancreatic cyst, diagnosis and treatment.



Pancreatic cysts and cystic tumours

In this booklet you will find information about pancreatic cysts, the different types and how they are diagnosed and treated.



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What is the pancreas?

The pancreas is an organ about 6 inches long and 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 is found deep inside your body, behind the stomach and in front of the spine.



The pancreas has two main jobs in the body, it makes:

Enzymes

These help to digest (break down) foods.

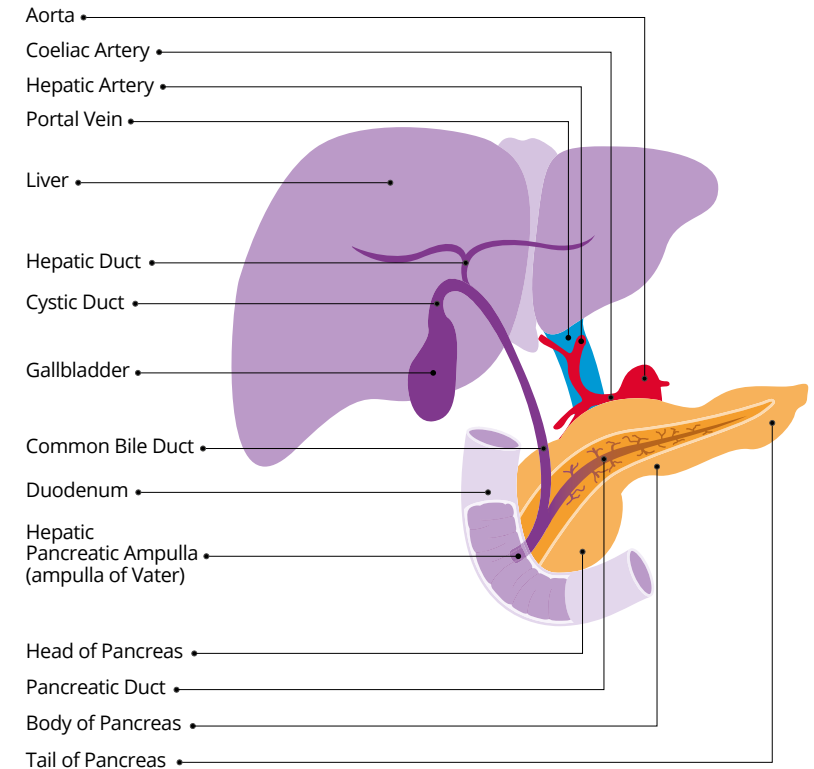
Hormones

Such as **insulin** and **glucagon**, which control blood sugar levels.

The pancreas helps the body use and store the energy it gets from food.

A tube called the pancreatic duct connects the pancreas to the first part of the small intestine, known as the **duodenum**. Digestive **enzymes** pass through this tube to help break down food. Another tube, called the common **bile duct**, passes through the head of the pancreas. This tube carries **bile** (a substance that helps to digest fats) from the **liver** and **gall bladder** to the small intestine. The bile duct may get blocked when a pancreatic tumour invades it. This causes **jaundice** (yellowing of the eyes and skin and dark urine).

The location of the pancreas



The pancreas contains two types of glands:

Exocrine glands

Create the enzymes which help digest (break down) foods.

Endocrine glands

Create the hormones such as insulin and glucagon, which control blood sugars.

What is a pancreatic cyst?

A pancreatic cyst is a fluid-filled sac that forms on or within the pancreas. Pancreatic cysts can range in size from just a few millimetres to several centimetres wide. However the majority are small and less than a centimetre or two in diameter. Most cysts are identified when a patient is given a CT scan or an MRI scan of their **abdomen**.

Why is it important to diagnose pancreatic cysts?

Many cysts do not cause symptoms and pose no particular risk to health. Some cysts however, contain cancer cells or cells that may turn into cancer over time. It is therefore important to detect and investigate all pancreatic cysts, and to treat the ones which pose a risk.

Types of pancreatic cyst

There are more than 20 different types of pancreatic cyst, which are categorised by their shape and contents. They fit into two main groups:

False cysts - of which the most common type is an inflammatory pseudocyst;

True pancreatic cysts - of which there are many types.

As far as possible it is important to determine which type of cyst you have. Different cysts have different risks and require different management.

Inflammatory pseudocysts (False cysts)

Pseudocysts or inflammatory cysts are common lesions of the pancreas. They normally develop some weeks or months after an episode of **acute pancreatitis** or a flare of **chronic pancreatitis**. Inflammatory Pseudocysts can occur at any age and in any part of the pancreas. They may occur as a single cyst or as multiple cysts and can range in size. They are not cancerous.

The term pseudo means false. Pseudocysts are not true cysts – they are distinguished from true cysts because they lack a specialised lining to the cyst wall. They contain fluid that is full of digestive enzymes.

Small inflammatory pseudocysts do not usually cause you symptoms and as long as they can be clearly distinguished from true cysts, no further follow up or treatment is required.

Larger pseudocysts can be more troublesome. They can cause you pain, they can block your bile duct leading to jaundice and they can compress your stomach and small bowel causing vomiting. They can become infected leading to fever. If you experience any of these symptoms, drainage of the cyst may be recommended.

True pancreatic cysts

There are many types of true pancreatic cyst. They are all lined by a special layer of cells that secrete fluid into the cyst and are broadly divided into two groups: mucinous cysts which are filled with **mucus** and non-mucinous cysts.

Mucinous cysts

Intraductal papillary mucinous neoplasm (IPMN)

IPMNs result from abnormal growth of cells in the ducts of your pancreas. As the abnormal cells grow they secrete a thick fluid called mucin leading to the formation of a cyst. These cysts are equally common in men and women. They can occur at any age but are more commonly found in older people. These cysts often produce no symptoms. Sometimes they can cause you abdominal pain, jaundice, or pancreatitis. Over time a small proportion of these cysts may change and develop into pancreatic cancer.

The number and location of your IPMNs will determine how you are treated. If your IPMNs are in the side branches of your pancreatic duct (branch-duct IPMN) they carry a low risk of becoming cancerous so are generally monitored with regular imaging.

In contrast, if your IPMNs come from your main pancreatic duct (main-duct IPMN) or from both your main duct and side branches (combined-type IPMN), they are more likely to become cancerous. In this case you will nearly always be referred for immediate surgery to remove them (see surgical treatment on page 19).

Sometimes, multiple IPMNs can develop simultaneously in different parts of your pancreas. In this situation each cyst will be assessed and you will be treated according to the risk each one may pose.

Mucinous cyst neoplasms (MCN)

These cysts normally occur in the body or tail of your pancreas. The space within these cysts is filled with mucus but, unlike IPMN, the cyst is not connected to the pancreatic ducts. These cysts are almost always found in middle-aged women. They normally cause non-specific symptoms such as abdominal discomfort, but can also cause nausea, vomiting, weight loss or on rare occasions jaundice. Over time, a proportion of these cysts may change and develop into a cancer.

Non-mucinous cysts

Serous cystadenoma (SCA)

These are almost all benign (non-cancerous) cysts that commonly occur in middle-aged women. They are usually located in the body or tail of your pancreas. Typically they are small, cause no symptoms and contain a watery clear fluid. If these cysts grow very large, they can give you compressive symptoms (because they press on other important organs) so may need to be removed by surgery.

Occasionally these cysts are associated with rare inherited conditions e.g. Von Hippel Lindau syndrome.

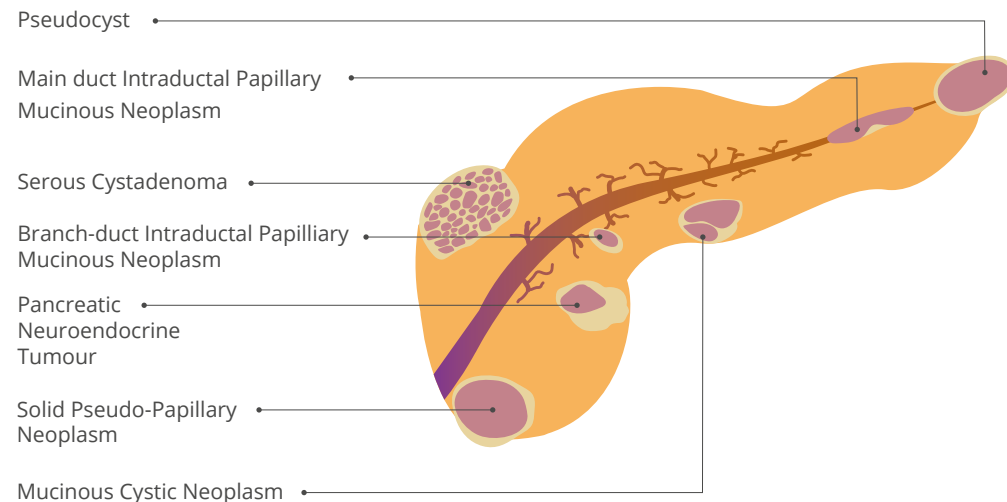
Solid pseudo-papillary neoplasm (SPPN)

These are rare cystic growths most commonly found in young women. They can be large (1-30cm) and are associated with non-specific symptoms such as abdominal pain, nausea, vomiting and a feeling of fullness.

These cysts are malignant (cancerous) tumours. However, they develop very slowly and patients have a very good prognosis once they are removed.

Pancreatic neuroendocrine tumour (PNET)

These are tumours of the hormone-producing parts of the pancreas – the **Islets of Langerhans**. Rarely, these tumours contain fluid-filled cavities (cysts) within them. These cysts are equally common in men and women and are more common in older age. Although these cysts are pre-malignant or malignant, patients have a very good prognosis once they are removed.



What is an indeterminate pancreatic cyst?

Although every effort is made to identify which type of cyst you have, it is sometimes not possible to do so unless surgery is performed. Cysts which cannot be classified are called indeterminate cysts. As they generally do not pose an immediate risk, indeterminate cysts tend to be managed by surveillance in the same way as small mucinous cystic lesions (see Section 9: Treatment - Surveillance on page 21).

Risk factors for developing a pancreatic cyst

Pseudocysts almost always occur following a bout of acute pancreatitis, a painful condition in which digestive enzymes become prematurely active and irritate the pancreas. Common risk factors for pancreatitis include heavy alcohol use and gallstones.

The risk of developing many pancreatic cysts e.g. IPMN, increases with age. Some cysts are seen almost exclusively in women, like mucinous cystic neoplasms (more than 90%) and serous cystadenoma (more than 70%).

What symptoms might I notice from my pancreatic cyst?

Although pancreatic cysts can cause symptoms such as jaundice, acute pancreatitis, back or abdominal pain, the majority of patients experience few or no symptoms, and increasingly many pancreatic cysts are found by chance during investigations for an unrelated complaint.

Pain

Small cysts e.g. less than 2cm, usually do not cause pain. However as cysts enlarge they may exert pressure on the surrounding tissues and nerves, leading to abdominal or back pain.

Acute or recurrent pancreatitis

Pancreatitis is a painful inflammatory condition of the pancreas. Repeated bouts of pancreatitis can be caused by the cyst or mucus secreted by the cyst blocking the pancreatic ducts.

Jaundice

Jaundice is a condition in which the skin and whites of the eyes become yellow and the urine becomes darker. It happens due to a build-up of bilirubin (a chemical constituent of bile) in the blood. Jaundice can occur if a cyst in the pancreatic head compresses or blocks the ducts carrying bile from the liver. Jaundice is a rare symptom in patients with pancreatic cysts (less than 1%), however it is a more common feature if cysts are very large or if cysts contain cancer cells.

Weight loss

Weight loss is a relatively rare feature in most patients because their cyst is only a few centimetres in size. However if cysts are very large they can reduce the ability of the pancreas to produce digestive enzymes. This can cause poor digestion of food resulting in weight loss. Large cysts can also cause compression of the stomach leading to vomiting and a loss of appetite which in turn can cause weight loss. Weight loss is more common in patients with cysts that have undergone cancerous change.

Diagnosis and referral

Your general practitioner or hospital consultant who has identified the pancreatic cyst will generally refer you to see a **hepatobiliary surgeon** or a **gastroenterologist** to investigate your cyst and recommend further treatment as necessary. Hepatobiliary surgeons and gastroenterologists are specialists in diseases and disorders of the digestive system, including the liver and pancreas.

What will happen when I attend outpatients?

The doctor will begin by asking you questions about your health in general, focusing on any symptoms you may currently be experiencing. They will also ask about any medical conditions you have, medications you are taking, and if you are aware of any diseases that run in your family, in particular any pancreatic problems. They will then go on to examine you, which will include an examination of your abdomen to look for any tenderness or lumps.

Blood tests

At your outpatient appointment you are likely to be asked to provide a sample of blood for various tests to check your blood count, liver and kidney function. Blood tests can also be performed to check levels of pancreatic tumour markers. These are chemical substances produced by cancers that can be detected in the blood. For example, CA19-9 is a tumour marker linked to pancreatic cancer. However, not all pancreatic cancers produce it and it may also occur with other illnesses that are not cancer. This means that blood tests are not used alone to make a diagnosis.



Imaging

Pancreatic cysts are usually first diagnosed on an ultrasound or computerised tomography (CT) scan of the abdomen. To try and identify which type of pancreatic cyst you have, further investigations may be arranged, such as a magnetic resonance imaging (MRI) or endoscopic ultrasound (EUS).

Ultrasound scan

An abdominal **ultrasound** uses sound waves to create a picture of your pancreas and the area surrounding it, including your liver. This is normally done in the x-ray department of the hospital.

The procedure is completely painless. You will be taken into a scanning room and asked to lie on the couch next to the ultrasound machine.

A clear gel will be spread onto the skin of your abdomen. A small device called a transducer will be moved across your abdomen. The transducer creates sound waves that echo when they meet an organ or tumour. The computer will turn these echoes into pictures, which the radiographer or doctor will interpret and the results will be sent to either your GP or your specialist.

CT scan

CT stands for computed tomography. It is really a more detailed and specialist type of x-ray. The CT unit is linked to a sophisticated computer that builds up lots of very detailed images from inside your body. Having a CT scan is completely painless.

What will happen?

Preparation for a CT scan can vary from patient to patient. In the x-ray department, your doctor or nurse will tell you what you need to do before you go for your scan.

Please tell your doctor or nurse if you:

- Have any allergies
- Have asthma
- Have diabetes
- Have kidney problems
- Are taking any medication
- Are pregnant
- Are afraid of needles
- Have had any problems before with any type of x-ray or radiology examination

You might be asked to drink and/or have an injection of dye. This allows the doctor to see the area being scanned more clearly.

If you are allergic to iodine, fish or dyes, you need to tell the person doing the CT scan in advance, as you may not be able to have the dye, drink or injection.

The scanner is shaped like a doughnut. It is about three feet wide and open at both ends. All you need to do is lie still on a table, which slides into the scanner. If necessary, your head and neck will be supported. The scan usually lasts from 15 to 45 minutes, but it depends on the area to be examined. If you need a CT scan, your local scanning department will offer you more detailed written information. When you go for your scan the radiographers will do their best to help you relax.



Remember, you will not be enclosed in any way and most people do not have a problem with having a CT scan.

MRI scan

MRI stands for **Magnetic Resonance Imaging**. This type of scan is quite common. It produces detailed pictures of the body. Instead of x-rays it uses a large magnet and radio waves that are fed into a computer. The computer then builds up cross-sectional images of your body. If you need an MRI scan, more written information will be available from your local scanning department. There are only a certain number of appointments for MRI scans, so it is very important that you do not miss your appointment.

Safety

There is no special preparation for an MRI. However, because of the powerful magnet used to produce the scans, safety guidelines must be followed. You may have to fill in a questionnaire before the scan can be carried out.

It may not be possible to have an MRI scan if you have:

- A heart pacemaker
- Some types of surgical clips inside your head
- Metal fragments in your eyes or elsewhere
- Neuron-stimulator implants

Please tell your doctor or nurse if you:

- Have any allergies
- Have asthma
- Have diabetes
- Have kidney problems
- Are taking any medication
- Are pregnant
- Have had any surgery in the past 12 weeks
- Are in any doubt about your suitability for an MRI scan
- Have had any problems before with any type of x-ray or radiology examination

For the scan:

- Wear something loose without metal zips or buttons
- Remove all metal objects, including rings, before scanning
- Remember to check that you do not have credit cards in your pockets as the magnetic strip is affected by the scan

If necessary, you will have an injection of dye into a vein in your arm. This can help improve the images. You will be asked to lie on a scan table in a type of tunnel. The table contains the magnet and the part of your body to be scanned lies directly over its centre. The table moves into position inside the tunnel and although you will not feel anything, there will be quite a lot of noise. All you need to do is try to relax and keep still while the pictures are being taken.

Because of the noise, you will be given earplugs and headphones may be available so you can listen to your own music or an audiobook. An MRI scan usually takes about 20-30 minutes, but it may be much shorter or can take up to an hour. The radiographer stays outside the room but you can talk with them through a microphone. The radiographers are very experienced and will do all they can to help you relax.

If you are allergic to iodine, fish or dyes, you need to tell the person doing the MRI scan in advance, as you may not be able to have the dye, drink or injection.

4 Diagnosis and Investigations

You may be able to bring a friend or relative with you when you go to the clinic. They can wait in the waiting room while you have your scan. Please check with the radiology department first in case the clinic is very busy.

When will I get the results?

At the end of the scan there could be up to 100 images for the radiologist to look at. Once these have been carefully studied, a report will be sent to your consultant. Make sure you have an appointment to get the result.

Endoscopic ultrasound (EUS)

Endoscopic ultrasound (EUS) is a type of **endoscopy** where the doctor uses a thin flexible camera with a small ultrasound probe at the tip. During the test, the doctor will look at the lining of your pancreas, as well as examining the **lymph nodes**. Everything will be magnified on a television screen and images will also appear on the ultrasound machine.

The test takes between 20-30 minutes.

If necessary, your doctor will take samples of cells from the area, by means of a fine needle aspiration (FNA), and send them to the laboratory for examination.

You cannot eat or drink for several hours before an endoscopy. You will have a sedative and a local **anaesthetic** to make you feel as comfortable as possible. Because of the sedative you should not drive or operate machinery within 24 hours.

When will I get the results?

If you have had biopsies taken it may take 7 to 10 days before the results are available. Before you leave the hospital after your endoscopy, make sure you have an appointment to go back and see your doctor for the results.

If, after the procedure you develop a high temperature, have difficulty swallowing or have increasing throat or chest pain, contact your doctor immediately.

5 Deciding on the best treatment

Multi-disciplinary team

The hepatobiliary surgeon or gastroenterologist you will have seen in clinic will have primary responsibility for your care. However, they work as part of a much larger Multi-disciplinary team (MDT) who will also be involved in arranging some of your tests and guiding your overall care. When planning your care, your doctor will wish to discuss your medical problem at a weekly meeting with other specialists. This means that your planned treatment is a joint decision by your doctor and several other specialists. Members of the MDT include:

- **Hepatobiliary surgeons** (doctors who specialise in operations involving the liver, pancreas and biliary tree)
- **Gastroenterologists** (medical doctors who look after conditions involving the liver, pancreas, biliary tree and gut)
- **Radiologist** (a specialised x-ray doctor)
- **Pathologist** (a doctor who studies body tissues)
- **Oncologist** (a specialist cancer doctor)
- **Clinical Nurse Specialists**



How is treatment decided?

Management of pancreatic cysts depends on the type of cyst you have, the results of your investigations and your general health and fitness as well as your treatment preferences after careful discussion with your doctor.

The most important aspect of the initial assessment and management of a pancreatic cyst is to determine if the cyst contains any cancer cells. However this is a rare occurrence, as the majority of cysts are benign and usually just require monitoring with imaging from time to time.

Treatment of cysts without cancer

The way non cancerous cysts are treated depends on whether they cause you significant symptoms and whether they carry a risk of developing into pancreatic cancer. Only a few pancreatic cysts have the potential to develop cancer (in particular mucinous cystic neoplasms (MCN) and intraductal papillary mucinous neoplasms (IPMN)).

Cysts that require further management

Mucinous cysts (MCN or IPMN) may develop into cancer over time, so they require regular surveillance and sometimes require surgery to remove them.

Serous cysts that are not causing any symptoms have an extremely low risk of turning into a cancer. Further surveillance, surgery and follow up is therefore not needed and so patients are usually discharged.

Treatment of cancerous cysts

What is pancreatic cancer?

Pancreatic cancer occurs when a **malignant tumour** forms in the pancreas.

Worldwide there are around 496,000 new cases each year; in Europe that figure is more than 104,000. In the UK, approximately 10,500 people are newly diagnosed each year.

Pancreatic cancer affects men and women equally with incidence increasing from the age of 45. The average age at **diagnosis** is 72.

There are two main types of pancreatic cancer:

Exocrine tumours

These make up the vast majority of all pancreatic cancers (around 95%) and come from the **cells** that line the ducts in the pancreas which carry digestive juices into the intestine.

These are called pancreatic ductal **adenocarcinomas**.

Other exocrine tumours of the pancreas are rarer, and include **adenosquamous carcinomas** and **undifferentiated carcinomas**.

Endocrine tumours

These are also known as **neuroendocrine tumours**, (NETS) and are much less common. The neuroendocrine tumours we discuss here are found in the pancreas and are called pancreatic neuroendocrine tumours (pNETS).

These are tumours that develop in our endocrine glands that release hormones (which regulate some processes in our bodies), these are then circulated around the body.

Other rare tumours that can affect the pancreas include **pancreatic lymphoma**, a cancer that arises from the lymphatic **tissue** in the pancreas; various cystic tumours and **pancreatic sarcomas**, which develop in the tissue that holds cells in the pancreas together.

Tumours that arise from tissues close to the pancreas, such as the bile duct (cholangiocarcinoma), **Ampulla of Vater** (**ampullary adenocarcinoma**), or duodenum (duodenal adenocarcinoma), may cause similar symptoms to pancreatic cancer but have different treatments and outcomes.



What proportion of pancreatic cancers develops from a pancreatic cyst?

Of all cases of pancreatic cancer less than 10% develop from a pancreatic cyst.

Surgery

The only treatment for curing pancreatic cancer is to have surgery to completely remove the cancer and to stop it returning. If an operation is possible the site of the tumour and the extent of the spread of the disease will determine what type of operation your surgeon performs.

Chemotherapy

After your operation, your consultant will discuss the need for further treatment with an oncologist, who may prescribe chemotherapy for you, which is the use of anti-cancer drugs to destroy any remaining cancer cells. If this is needed an appointment will be made for you to attend outpatients once you go home.

More detailed information about treatment for pancreatic cancer can be found at panact.org



Which cysts require surgery?

If there is evidence of cancer or a strong likelihood of the cyst becoming cancerous, surgery is usually recommended. Surgery may be suggested for non-cancerous cysts if significant symptoms need to be relieved.

Features of a cyst that suggest it is likely to become cancerous

- Size (3cm or over) or cysts with rapid increase in size
- Dilatation of the main pancreatic duct to greater than 1cm
- Symptomatic cysts (eg. causing jaundice, diabetes, acute pancreatitis)
- Cysts with a solid component
- Elevated levels of CA19-9 in the blood

What operation might I need?

Whipple's operation (also known as a pancreatoduodenectomy)

During this operation, the head of the pancreas, gall bladder, duodenum and part of the bile duct are removed. The remaining pancreas, stomach and bile duct are joined up to the intestine, so that bile, pancreatic juices and food are able to flow normally and digestion can take place, following the operation.

Distal or left pancreatectomy

Removal of the tail and/or body of the pancreas. This procedure may include a splenectomy (removal of the spleen) and can be done by open or laparoscopic (keyhole) surgery.

Total pancreatectomy

This operation removes the entire pancreatic gland.

Completion pancreatectomy

This operation removes the remaining pancreas e.g. if you develop recurrence of your cystic lesion or pancreatic cancer in the remaining pancreas after your original operation, your surgeon may recommend the removal of the remaining gland.

You can read more details about surgery in the booklet: Understanding Pancreatic Cancer: Surgery for Pancreatic Cancer.

The booklet is available online at panact.org/patient-booklets

Follow up after surgery

After your operation, the pancreas that is removed is sent to the laboratory for careful examination by a pathologist. They will determine the exact type of cyst you had and if malignant cells were present or not. You will be informed of the results by your surgical team as soon as they are available, which is generally before you leave hospital.

The results will determine further treatment and how often you are followed up. Your first outpatient appointment is generally a few weeks after discharge and, at this appointment, your doctor will go through with you in detail what further management is needed - if any.

If you are found to have a serous cystadenoma or a mucinous cystic neoplasm (MCN), without any cancerous cells, which has been completely removed, this surgery is curative, so no further treatment is required. You will likely be given one further follow up appointment a year later, and if you are well, then you will be discharged.

If you are found to have had an IPMN, further IPMNs may occur in your remaining pancreas so, if you have not had a total pancreatectomy, follow-up with an MRI scan is usually recommended every 6-12 months to detect any new lesions that may develop.

If cancer cells are found in the pancreas at the time of the surgery, you will be referred to an oncologist for consideration for chemotherapy and regular follow-up will be needed over the next few years.

Which cysts require surveillance?

Intraductal papillary mucinous neoplasm (IPMN), mucinous cystic neoplasms (MCN) and Indeterminate cysts.

If I have a pre-malignant cyst, what is the risk of it developing into cancer?

The natural history of pre-malignant cysts (MCNs and IPMNs) is poorly understood but patients are thought to develop cancer at a rate of less than 1% per year.

How will surveillance be performed?

There are various methods of performing pancreatic surveillance and guidelines differ on what tests should be used and how often surveillance should be done, so there may be small differences in how your cyst is monitored depending on the hospital.

However in most hospitals, when you are first diagnosed your doctor will recommend an MRI scan every 6-12 months. If your cyst changes during follow up and needs closer observation, sometimes scans are done sooner (e.g. in 3 months' time for a while).

Once your cyst has been shown to be stable for a period, scans may be carried out less frequently (e.g. every 1-2 years). In some cases your doctor may recommend performing a CT or EUS in addition to your MRI. These tests can also be used instead of MRI if you cannot tolerate this test.

How long do I need to be followed up for?

Surveillance is generally undertaken for as long as you are fit to undergo an operation on your pancreas, if needed. In most people this is for a period of several years.

Will I need surgery in the future?

Patients with larger cysts require more frequent follow-up. If the cyst does grow or change during follow up you may require surgery to remove it.

Research, clinical trials and new treatment

Doctors are still learning which treatments work best for pancreatic cysts. There are many studies underway testing different treatments. For example, some are looking at better ways of diagnosing pancreatic cysts, while others will ask you about your experience as a patient or will be testing new minimally invasive treatments, which may be an alternative to surgery.

The only way you can get some of these treatments is to take part in a clinical trial or study. Your doctor will be able to tell you if there are trials going on in your area which might be suitable for you. When considering participating in a clinical trial, you have to bear in mind that you may not get the new treatment as studies usually compare a new treatment with a standard treatment. Nobody knows before the study which treatment will come out best. For more information visit: panact.org/clinical-trials



Questions

What questions should I think about asking when I attend outpatients with a pancreatic cyst?

- What type of pancreatic cyst do I have?
- Where in the pancreas is the cyst?
- What size is my cyst?
- Does it have any features which are worrying?
- Am I likely to need an operation?
- Do I need further follow up?

Please write down any questions you may have and bring this with you to your next appointment.

abdomen

This is the part of the body below the rib cage and above the pelvis where most digestive organs are located.

acute pancreatitis

Inflammation of the pancreas. This can occur for several reasons but common causes include alcoholism and gallstones.

adenocarcinoma

This is cancer of the exocrine cells that line the pancreatic ducts. The majority of pancreatic cancers are this type.

adenosquamous carcinoma

A very rare aggressive form of pancreatic cancer.

ampullary adenocarcinoma

Cancer that develops in the ampulla of Vater (where pancreatic ducts and bile ducts merge).

anaesthetic

A drug that stops a person feeling pain during a medical procedure. A local anaesthetic numbs part of the body; a general anaesthetic causes a person to lose consciousness for a period of time.

benign lesion/tumour

An abnormal growth which does not spread or invade neighbouring tissues and so is unlikely to be harmful.

bile

A dark green fluid which helps in fat digestion. It is made in the liver and stored in the gallbladder, and flows through ducts within the head of the pancreas to the small intestine.

bile duct

The passage leading from the liver and gall bladder to the duodenum. Bile travels through the bile duct.

chronic pancreatitis

A progressive inflammatory disease of the pancreas, characterised by irreversible structural changes and gradual scarring of the gland, which may lead to malabsorption and diabetes.

cells

Cells are the basic building blocks of all living things. The human body is composed of trillions of cells. They provide structure for the body, take in nutrients from food, convert those nutrients into energy, and carry out specialised functions. Cells also contain the body's hereditary material and can make copies of themselves.

computed tomography (CT) scan

This is a process which uses X-rays to create three-dimensional images of the inside of the body.

diagnosis

The identification and naming of a person's disease.

duodenum

The first section of the small bowel (small intestine).

endocrine cells

In the healthy pancreas, endocrine cells (also called islet cells or Islet of Langerhans cells) produce hormones including insulin, glucagon and somatostatin. These hormones regulate different functions in the body, such as blood sugar levels.

endoscopy

A type of examination or diagnostic test. A thin, flexible tube with a camera on the tip – called an endoscope – is used to examine the inside of the body.

enzymes

Proteins that are essential for the normal functioning and performance of the body. Enzymes aid digestion.

gall bladder

A pear-shaped organ on the underside of the liver that stores bile. Bile is transferred from the gall bladder to the duodenum via the bile duct.

gastroenterologist

A doctor who specialises in diseases of the stomach, intestines and related organs including the pancreas.

glucagon

Is a hormone that is naturally made in the pancreas and works to raise blood sugar.

hepatobiliary surgeon

A doctor who treats diseases of the liver, bile ducts, gallbladder and related organs including the pancreas.

insulin

A chemical messenger (hormone) secreted by the pancreas to regulate the amount of sugar (glucose) in the blood. If the body does not produce enough insulin, diabetes will develop.

intraductal papillary mucinous neoplasm (IPMN)

IPMNs result from abnormal growth of cells in ducts within the pancreas. As the abnormal cells grow they secrete a thick fluid called mucin leading to the formation of a cyst. IPMNs normally occur in older adults. They can be found anywhere in the pancreas but are slightly more common in the head of the pancreas. Sometimes, multiple IPMNs occur simultaneously in different parts of the pancreas. Some IPMNs have a higher risk of developing into cancer e.g those arising from the main pancreatic duct (main-duct IPMN).

islets of langerhans

Areas of the pancreas that produce hormones – such as insulin and glucagon.

jaundice

Yellowing of the skin and whites of the eyes. Usually means there is something wrong with the liver, pancreas or gall bladder, causing a blockage.

lymph nodes

Small, bean-shaped structures that form part of the lymphatic system and help fight infections. Also called lymph glands.

magnetic resonance imaging (MRI) scan

This is a process, which uses strong magnets and radio waves to create three-dimensional images of the inside of the body.

malignant

Cancer. Malignant cells can spread (metastasise) and can eventually cause death if they cannot be treated.

mucinous cystic neoplasms (MCN)

An MCN is a mucinous cyst that is not connected to the pancreatic ducts. These cysts are usually less than a few centimetres in size but can occasionally grow to up to 35cm. They normally occur in the body or tail of the pancreas and are most commonly found in middle-aged women. They are classified as a premalignant lesion.

mucus

A thick, gelatinous fluid containing lots of proteins.

neuroendocrine tumours

Neuroendocrine tumours (NETs) start in the cells of the neuroendocrine system. The neuroendocrine system is a network of endocrine glands and cells throughout the body.

pancreatic ductal adenocarcinoma (PDAC)

Pancreatic ductal adenocarcinoma is the commonest form of pancreatic cancer. It develops from cells lining the pancreatic ducts. These tumours can develop anywhere in the pancreas, but are most commonly found in the head of the pancreas.

pancreatic lymphoma

Is very rare. Pancreatic lymphoma, or primary pancreatic lymphoma (PPL) is a cancer of the lymphatic system of the body that originates as a pancreatic mass.

pancreatic sarcomas

Tumours that form in the connective tissue that holds together the pancreatic cells. This is very rare.

PNET

PNETs arise from the hormone producing cells of the pancreas. They account for less than 5% of all pancreatic tumours. These rare tumours sometimes occur in people with the genetic condition Multiple Endocrine Neoplasia, type 1 (MEN1) or in Von Hippel-Lindau (VHL) Syndrome, but most are not related to any inherited syndromes. They may be functioning (producing hormones which lead to symptoms e.g. flushing) or non-functioning. PNETs can be benign (non-cancerous) or malignant (cancerous).

prognosis

How you are expected to do after a disease is diagnosed.

sepsis

A whole-body inflammation caused by an infection. Common signs and symptoms include fever, increased heart rate, increased breathing rate, and confusion.

serous cystadenoma (SCA)

An SCA is a benign cystic lesion of the pancreas. They are more commonly found in women than men. As long as they are not causing any symptoms, no further treatment or surveillance is required.

solid pseudopapillary neoplasm (SPPN)

SPPN almost always occur in young women. These tumours are often large and can occur anywhere in the pancreas. Parts of the tumour are solid and parts are cystic with papillary (finger-like) components. Although these cysts are classified as malignant they are usually not an aggressive tumour, although surgical removal is recommended.

tissue

A collection of cells that make up a part of the body.

tumour

A new or abnormal growth of tissue on or in the body. A tumour may be benign or malignant.

ultrasound

A non-invasive scan that uses sound waves to create a picture of part of the body. An ultrasound scan can be used to measure the size and position of a tumour.

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Pancreatic Cancer Action

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If you would like to support us or find out more, please contact us at:
enquiries@panact.org or visit panact.org

If you are unsure of anything at any time please consult your own doctor, dietitian or Cancer Nurse Specialist (CNS)



If you would like to help us by either holding an awareness event or by fundraising, please email enquiries@panact.org or call 0303 040 1770. For more information or to donate directly please visit panact.org



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Saving lives through early diagnosis

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