PROCEDURE

Pleural needle biopsy

A pleural needle biopsy removes small tissue samples from the lining around a lung for laboratory testing.

PURPOSE
Obtain pleural tissue to identify disease

PROCEDURE TYPE
Diagnostic; minimally invasive and often image-guided

WHERE IT IS DONE
Outpatient radiology suite, procedure room, or bedside

ANAESTHESIA
Local anaesthesia, sometimes with moderate sedation

HOW LONG IT TAKES
30 to 60 minutes

PREPARATION
Blood thinner review; fasting only if sedation is planned

RECOVERY
Same day; no driving after sedation

MAIN RISKS
Pneumothorax, bleeding, infection, nearby organ injury

RESULTS
Initial findings in days; cultures may take longer

Overview

The pleura is a thin, two-layered membrane around each lung. A pleural needle biopsy removes small pieces of this tissue so they can be examined in a laboratory.

The biopsy is usually taken through the skin between the ribs. Ultrasound or CT imaging may guide the needle to an area of thickened or abnormal pleura. This is called an image-guided biopsy. In some situations, a specially designed needle is used without continuous imaging.

A pleural biopsy is different from a thoracentesis. Thoracentesis removes fluid from around the lung. A biopsy removes tissue. The two procedures may be performed during the same appointment.

Why the procedure is performed

Your healthcare team may recommend a pleural needle biopsy when scans or pleural fluid tests have not explained an abnormality around a lung.

It can help investigate:

The laboratory can examine the cells and structure of the tissue. Samples may also be sent for tests that look for bacteria or other organisms.

The result may guide treatment, but a biopsy does not always provide a definite answer. The chance of obtaining useful tissue is usually better when imaging can identify a clear target.

- Pleural thickening, nodules, or a mass seen on imaging
- Fluid around a lung that remains unexplained
- Possible cancer involving the pleura
- Possible tuberculosis or another pleural infection
- Inflammation or scarring of the pleura

Who should and should not have it

A pleural needle biopsy may be appropriate if tissue is needed and the abnormal area can be reached safely through the chest wall. It may offer a less invasive way to obtain tissue than surgery or thoracoscopy.

It may not be the right test if fluid analysis or another easier test is likely to answer the question. A very small or difficult-to-reach abnormality may be better sampled using thoracoscopy or surgery.

The procedure may be avoided or delayed if:

These are not always permanent barriers. Your team may change the plan, treat a problem first, or recommend another way to obtain tissue.

- There is no safe route for the needle
- A bleeding or clotting problem has not been corrected
- Blood-thinning medicine creates an unacceptable bleeding risk
- There is an infection in the skin where the needle would enter
- You cannot safely remain in the required position

- Your breathing or general condition is too unstable
- You cannot follow breathing instructions needed for safe needle placement

How to prepare

The treating facility's own instructions take priority because preparation differs according to the biopsy method, your medicines, and whether sedation is planned.

Tell the team about all prescription medicines, over-the-counter products, and supplements you take. This is especially important for anticoagulants and antiplatelet medicines, often called blood thinners. Do not stop them unless the team responsible for your procedure gives you specific instructions.

You may need blood tests to check blood cell counts and clotting. The team will review recent chest imaging and choose the safest biopsy site.

Fasting may not be necessary for a biopsy performed with local anaesthetic alone. If you will receive sedation, you will be told when to stop eating and drinking.

Arrange for someone to take you home if sedation is planned. Tell the team about allergies, previous problems with anaesthesia, pregnancy, or any change in your breathing before the appointment.

What happens during the procedure

You may sit upright or lie on your side, back, or front. Your position is chosen to provide the safest route to the pleura.

The team checks your identity, the planned biopsy site, and your consent. Your blood pressure, pulse, and oxygen level may be monitored. Ultrasound or CT may be used to locate the target and mark the skin.

The skin is cleaned, and sterile coverings are placed around the area. Local anaesthetic is injected to numb the skin and deeper tissues. This can sting briefly.

A small cut may be made in the skin. The biopsy needle is then passed between the ribs into the pleura. You may feel pressure or a pushing sensation. You may be asked to hold your breath or avoid moving for a few seconds while a sample is taken.

Several samples are often collected through the same entry point. You may hear a click if an automated biopsy device is used. Pleural fluid may also be removed for testing.

After the needle is taken out, pressure and a dressing are applied. The team may use

ultrasound or a chest X-ray afterward to look for air around the lung, particularly if you develop symptoms or the local protocol requires imaging.

Recovery and what to expect afterward

Pain: Mild soreness at the biopsy site is common. It should gradually improve. Your team will tell you which pain medicine is suitable. Avoid taking medicines that could increase bleeding unless they have been approved.

Eating: If you had only local anaesthetic, you can usually eat and drink normally. After sedation, begin according to the recovery team's instructions.

Activity: Rest for the remainder of the day. Avoid strenuous exercise, heavy lifting, and activities that sharply increase chest strain for the period given by your facility. Keep the dressing clean and dry as instructed.

Driving: Do not drive home after sedation. Sedation can affect judgment and reaction time even when you feel awake. If no sedation was used, follow the facility's driving advice, especially if you have pain or limited movement.

Work: Many people return to light or office work within a day or two. A longer break may be needed for physically demanding work or if you have ongoing discomfort.

Most people go home the same day after a period of monitoring. An overnight stay may be needed if there is a complication, your breathing needs observation, or you have other health concerns.

Risks and possible complications

Your team should explain how the risks apply to your biopsy site and general health.

Possible complications include:

Rarely, cancer cells can grow along a needle path. Your specialist can explain whether this is relevant to the condition being investigated.

- Pneumothorax: Air enters the space around the lung and may partly collapse it. A small pneumothorax may only need monitoring. A larger one may require a tube to remove the air.
- Bleeding: Minor bruising or bleeding at the skin is possible. Bleeding into the chest is less common but may require treatment.

- Infection: Infection can develop at the skin or within the chest.
- Pain: The needle can irritate the chest wall or pleura.
- Injury to nearby structures: The lung, diaphragm, liver, spleen, nerves, or blood vessels can be injured, depending on the biopsy location.
- An inadequate sample: The tissue may be too small or may not contain the abnormal area. Another biopsy may then be needed.
- Sedation-related problems: If sedation is used, it can affect breathing, blood pressure, or alertness.

Results and follow up

A pathologist, a doctor who examines tissue, studies the samples under a microscope. The report may identify cancer, infection, inflammation, or scarring.

Results usually take several working days. Extra stains, molecular tests, or a second specialist review can take longer. Cultures for slow-growing organisms, including tuberculosis bacteria, may take considerably longer than the tissue examination.

Your team should tell you how and when you will receive the result. A routine follow-up appointment may cover:

An inconclusive result does not mean that nothing is wrong. It means the sample did not provide enough information, so repeat imaging, another biopsy, or a different procedure may be considered.

- What the tissue showed
- Whether the sample was adequate
- Whether further tests are needed
- The available treatment or monitoring options

Alternatives

The realistic alternatives depend on what is being investigated and where the abnormality is located.

Ask what information each option is expected to provide and how that information would change your care.

- Pleural fluid testing: Thoracentesis is generally simpler and can test fluid for cancer cells or infection. It provides less tissue and can miss conditions that mainly affect the pleural lining.
- Repeat imaging or observation: This avoids an immediate invasive test. It may be reasonable for a low-concern abnormality, but it delays tissue diagnosis and may not show exactly what the abnormality is.
- CT or PET imaging: Scans can show the location and activity of pleural changes. They cannot usually confirm the cell type or replace tissue testing when a definite diagnosis is needed.
- Medical thoracoscopy: A camera is passed into the pleural space through the chest wall. It provides larger, targeted biopsies and can sometimes drain fluid or treat fluid recurrence. It is more invasive and usually requires sedation or anaesthesia.
- Video-assisted thoracic surgery: Surgery provides direct access and larger samples. It requires general anaesthesia, an operating theatre, and a longer recovery.
- Bronchoscopy: A camera is passed through the mouth or nose into the airways. It may be useful when imaging shows an airway or central lung abnormality, but it may not reach disease limited to the pleura.

When to call your healthcare team

Contact your healthcare team promptly the same day if you develop:

Call emergency services for severe or rapidly worsening breathlessness, intense chest pain, fainting, confusion, blue or grey lips, or coughing up more than a small streak of blood.

Mild tenderness and limited bruising can be part of routine recovery. Questions about the dressing, activity, or pending results can usually wait for normal office hours unless symptoms are worsening.

- Increasing pain that is not controlled by the recommended medicine
- Fever, spreading redness, warmth, swelling, or discharge at the biopsy site
- Bleeding that continues after firm pressure
- New mild breathlessness or a persistent new cough

Common questions

Will I be asleep?

Usually not. Local anaesthetic numbs the biopsy area, and you remain awake. Some facilities also offer moderate sedation, which makes you relaxed and drowsy but does not always make you fully unconscious.

Can I drive home?

Not if you receive sedation. Arrange for a responsible adult to take you home. If you have local anaesthetic only, follow the facility's advice before driving.

How painful is it?

The numbing injection may sting. During the biopsy, you may feel pressure, pulling, or brief discomfort. Tell the team if you feel sharp pain so they can assess it and provide more local anaesthetic if appropriate.

When will I know the result?

The main pathology result commonly takes several working days. Special testing and cultures can take longer. Ask before leaving how the result will be given to you.

What if the biopsy does not give an answer?

Your team will review whether the needle reached the intended area and whether enough tissue was collected. Options may include repeat imaging, another needle biopsy, thoracoscopy, surgery, or monitoring.

Will the biopsy spread cancer?

Spread along the needle path is considered uncommon, but it can occur with some pleural cancers. Your specialist can discuss this risk in relation to the suspected condition and the proposed biopsy route.

Sources

- Asciak R, Bedawi EO, Bhatnagar R, et al. British Thoracic Society Clinical Statement on pleural procedures. Thorax . 2023;78(Suppl 3):s43-s68.
- Roberts ME, Rahman NM, Maskell NA, et al. British Thoracic Society Guideline for pleural disease. Thorax . 2023;78(Suppl 3):s1-s42.
- Dixon G, de Fonseka D, Maskell N. Pleural controversies: image-guided biopsy versus thoracoscopy for undiagnosed pleural effusions? Journal of Thoracic Disease . 2015;7(6):1041-1051.

- Maskell NA, Gleeson FV, Davies RJO. Standard pleural biopsy versus CT-guided cutting-needle biopsy for diagnosis of malignant disease in pleural effusions: a randomised controlled trial. The Lancet . 2003;361(9366):1326-1330. 13079-6)