PROCEDURE

Lung needle biopsy

A lung needle biopsy uses imaging to guide a needle into an abnormal lung area and remove tissue for testing.

PURPOSE
Obtain lung tissue to identify an abnormal area

PROCEDURE TYPE
Diagnostic, minimally invasive, image-guided interventional radiology

WHERE IT IS DONE
Interventional radiology or CT suite, usually outpatient

ANAESTHESIA
Local, sometimes moderate sedation

HOW LONG IT TAKES
Usually 30 to 60 minutes

PREPARATION
Medication review; fasting if sedation is planned

RECOVERY
Usually same day; no driving home

MAIN RISKS
Collapsed lung, bleeding, infection, inconclusive sample

RESULTS
Imaging findings promptly; laboratory results usually within several days

Overview

A lung needle biopsy removes a small sample of tissue from an abnormal area in or near a lung. A laboratory examines the sample under a microscope and may perform other tests.

This article focuses on a percutaneous transthoracic lung biopsy . This means the needle passes through the skin and chest wall. A radiologist usually guides it with CT imaging, although ultrasound may be used for an abnormal area close to the chest wall.

The needle may collect cells, a narrow core of tissue, or both. A biopsy can help determine whether an abnormal area is cancer, infection, inflammation, scarring, or another condition. It does not always provide a definite answer.

Why the procedure is performed

You may be offered a lung needle biopsy after an X-ray or scan shows a lung nodule, mass, or other change that needs closer examination.

A biopsy may be used to:

Imaging alone often cannot confirm what an abnormal area is. The reason for recommending a biopsy should be considered alongside its risks and whether the result is likely to change your care.

- Find out whether an abnormal area is cancerous
- Identify certain infections or inflammatory conditions
- Determine the type of lung cancer
- Provide tissue for genetic or protein tests that may guide treatment
- Investigate a change that has grown or remained unexplained on follow-up scans

Who should and should not have it

A lung needle biopsy may be suitable when an abnormal area can be reached safely through the chest wall and a tissue diagnosis would help guide treatment. It is often used for abnormalities near the outside of the lung that may be difficult to reach through the breathing tubes.

It is not the best option for everyone. The procedure may be avoided, delayed, or replaced by another test if:

These are not always absolute barriers. Your team should weigh the biopsy's likely benefit against your individual risks and the available alternatives.

- There is no reasonably safe path for the needle
- A bleeding disorder has not been corrected
- Medicines affecting blood clotting cannot be paused safely
- You cannot remain still or follow brief breathing instructions
- Your breathing or heart condition is too unstable for the procedure
- A severe lung condition makes a collapsed lung especially risky
- Infection is present at the planned needle-entry site

- Pregnancy makes radiation exposure a concern, unless the biopsy is necessary

How to prepare

Follow the treating facility's own instructions, as they take priority over general information. Requirements differ according to the imaging method, sedation plan, and your medical history.

Give the team a complete list of medicines, supplements, allergies, and previous reactions to anaesthetics or contrast material. Tell them if you may be pregnant or have a bleeding disorder, heart condition, lung condition, or implanted medical device.

Some medicines increase bleeding risk. These include anticoagulants like warfarin or apixaban , often called blood thinners, and some antiplatelet medicines. Do not stop them on your own. The clinician who manages these medicines and the biopsy team will decide whether they should be paused and when they can be restarted.

You may need blood tests to check clotting and blood cell levels. If sedation is planned, you may be told not to eat or drink for a set period. Arrange for a responsible adult to take you home, particularly if you will receive sedation.

What happens during the procedure

Before the biopsy, the team reviews the plan and asks for your consent. You can ask questions before deciding whether to proceed. You may have an intravenous line placed if sedation or other medicine is needed.

You lie on the CT table in a position that gives the safest route to the abnormal area. This may be on your back, side, or front. Initial images are taken to plan the needle path.

The skin is cleaned, and sterile covers are placed around the site. Local anaesthetic is injected to numb the skin and deeper tissues. This may sting briefly. You will usually remain awake, although some people receive medicine to help them relax.

The radiologist makes a tiny skin opening and advances a biopsy needle while checking its position with imaging. You may be asked to hold your breath for a few seconds. It is important not to cough or move unless the team tells you to.

One or more samples are collected. You may feel pressure, but sharp pain should be reported. After the needle is removed, the team applies a small dressing. CT images or a chest X-ray may then be taken to check for bleeding or air around the lung.

Recovery and what to expect afterward

You may have mild soreness at the needle site or discomfort when taking a deep breath. Simple pain relief is often enough. Tell the team if pain is increasing rather than settling.

Once staff say it is safe, you can usually eat and drink normally. If you had sedation, nausea or sleepiness may briefly affect what you feel able to eat.

You will be monitored for several hours. Staff may check your breathing, oxygen level, pulse, and blood pressure. A follow-up chest image may be needed. Avoid strenuous exercise, heavy lifting, and air travel for the period specified by your facility.

Do not drive yourself home. Sedation can affect reaction time and judgment, and a lung complication can occasionally become apparent after discharge. Follow the facility's instructions about when driving can safely resume.

Many people return to desk-based work within a day or two. Work involving heavy lifting, physical effort, remote travel, or safety-sensitive duties may require more time off.

Risks and possible complications

The main risk is a pneumothorax , meaning air escapes from the lung into the space between the lung and chest wall. A small pneumothorax may need only observation. A larger one may require a tube through the chest wall to remove air and allow the lung to expand.

Bleeding can occur in the lung or at the needle site. A small amount of blood-streaked mucus may occur afterward, but heavier or persistent bleeding needs prompt assessment.

Other possible problems include infection, pain, a reaction to sedation, or injury to nearby structures. Air entering a blood vessel is a very uncommon but serious complication.

Sometimes the sample is too small or does not contain the abnormal tissue. An inconclusive result may lead to another biopsy, a different procedure, surgery, or imaging follow-up.

Risk is affected by factors such as emphysema, the size and depth of the abnormal area, its location, and the number of needle passes.

Results and follow up

The radiologist can usually tell you whether the procedure was completed and whether the immediate images show a complication. They generally cannot provide the tissue diagnosis at that time.

A pathologist examines the sample in a laboratory. Initial results are often available within several days, but infection studies and detailed cancer tests can take longer.

Your healthcare team should explain:

A negative result does not always rule out cancer or another condition. Your team will compare the laboratory findings with the scan and may recommend further investigation if they do not match.

- What the sample showed
- Whether the result is definite
- Whether enough tissue was collected for all needed tests
- What treatment, further testing, or scan follow-up is recommended

Alternatives

The most appropriate alternative depends on where the abnormal area is, how likely it is to be serious, your overall health, and what information is needed.

Repeat CT scans can show whether an abnormal area changes over time. This avoids an immediate invasive procedure, but it delays a tissue diagnosis and may not establish what the area is.

Bronchoscopy passes a flexible camera through the mouth or nose into the breathing tubes. Ultrasound or navigation technology may guide biopsy tools. It may have a lower risk of pneumothorax, but some small or outer lung abnormalities are difficult to reach.

Surgical biopsy removes a larger sample through keyhole chest surgery or, less often, an open incision. It is more invasive and usually requires general anaesthesia, but it can provide more tissue and may remove the abnormal area at the same time.

PET-CT or other imaging can estimate how active or suspicious an area appears and look for changes elsewhere. Imaging cannot reliably confirm the exact diagnosis.

Blood-based tumour testing , sometimes called liquid biopsy, may detect cancer-related DNA in selected situations. It does not usually replace tissue when the diagnosis itself remains uncertain.

You may also decide against further invasive testing after discussing what that choice could mean for diagnosis and treatment.

When to call your healthcare team

Contact the biopsy team promptly for a fever, increasing redness or drainage at the needle site, pain that is getting worse, or ongoing blood in your mucus.

Seek urgent medical assessment for new or increasing shortness of breath, worsening chest pain, dizziness, or repeated coughing of blood.

Call emergency services for severe difficulty breathing, fainting, confusion, blue or grey lips, or coughing up a large amount of blood. These symptoms should not wait for a routine follow-up appointment.

Common questions

Will I be asleep?

Usually not. Local anaesthetic numbs the biopsy area, and you remain awake so you can follow breathing instructions. Some facilities offer moderate sedation to make you relaxed and drowsy. General anaesthesia is uncommon.

Can I drive home?

No. Arrange for someone to take you home. This is especially important after sedation, but many facilities require an escort even when local anaesthetic is used alone.

How painful is a lung needle biopsy?

The local anaesthetic injection may sting. During the biopsy, you may feel pressure or brief discomfort. Mild soreness afterward is common, but worsening or severe pain needs assessment.

When will I know the results?

The radiologist may discuss the immediate procedure findings before you leave. Laboratory results usually take several days, and specialised tests may take longer.

What if the biopsy does not give an answer?

Your team will compare the sample with your scans. Options may include another needle biopsy, bronchoscopy, surgery, or repeat imaging. An inconclusive biopsy does not by itself show whether the area is benign or cancerous.

Will the needle spread cancer?

Spread of tumour cells along the needle path is considered very uncommon. The more immediate concerns are pneumothorax and bleeding. Your team should discuss how the expected diagnostic benefit compares with these risks.

Sources

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