PROCEDURE

Thoracentesis

Thoracentesis uses a needle or thin tube to remove fluid around a lung

PURPOSE
Diagnose or relieve fluid buildup around a lung

PROCEDURE TYPE
Both; minimally invasive needle drainage, usually ultrasound-guided

WHERE IT IS DONE
Procedure room, radiology department, outpatient clinic, or bedside

ANAESTHESIA
Local anaesthetic; sedation uncommon

HOW LONG IT TAKES
About 10 to 30 minutes

PREPARATION
Medication and bleeding-risk review; fasting only if sedation planned

RECOVERY
Usually same day; no driving after sedation

MAIN RISKS
Pneumothorax, bleeding, infection, lung injury

RESULTS
Appearance immediately; laboratory results within hours to several days

Overview

Thoracentesis is a procedure that removes fluid from the space between a lung and the inside of the chest wall. This space is called the pleural space. Fluid collecting there is called a pleural effusion.

A clinician passes a needle or a narrow flexible tube, called a catheter, between the ribs and into the fluid. Ultrasound is usually used to choose a safe entry point.

Thoracentesis may be diagnostic, therapeutic, or both. A diagnostic procedure collects fluid for laboratory testing. A therapeutic procedure removes enough fluid to ease pressure on the lung and improve breathing.

Thoracentesis is different from a chest drain. A thoracentesis catheter is usually removed when the procedure ends. A chest drain stays in place to provide continued drainage.

Why the procedure is performed

You may be offered thoracentesis when imaging shows fluid around a lung. The procedure can help determine why the fluid is present, especially when the cause is new or uncertain.

Laboratory tests may examine the fluid for:

Thoracentesis may also be used when a larger effusion is making breathing uncomfortable. Removing fluid gives the lung more room to expand, although it does not treat the condition that caused the fluid to collect.

The procedure is not always needed. For example, a small effusion with a likely cause may be watched or treated first.

- Signs of infection
- Cancer cells
- Protein and other chemicals that help classify the fluid
- Blood or unusual fluid types

Who should and should not have it

Thoracentesis may be appropriate if you have an unexplained pleural effusion, fluid that may be infected, or a larger effusion causing breathing difficulty.

It may be avoided or delayed when:

Blood-thinning medicines and abnormal blood-clotting tests do not always prevent thoracentesis. The decision depends on the medicine, your bleeding and clotting risks, and how urgently drainage is needed.

Fluid divided into small pockets may not drain well through a single needle. An image-guided chest drain, medication placed through a drain, or surgery may be more suitable.

People who are medically unstable or receiving mechanical ventilation may need additional monitoring and a different drainage plan.

- There is too little fluid to reach safely
- Ultrasound cannot identify a safe path
- The skin at the proposed entry site is infected
- Bleeding risk is unusually high
- You cannot remain in the necessary position

- You do not consent to the procedure

How to prepare

Follow the treating facility's own instructions first, because its preparation requirements take priority.

Tell the healthcare team about all prescription medicines, over-the-counter products, and supplements you take. In particular, mention blood thinners like warfarin or apixaban , aspirin, and medicines that affect blood clotting. Do not stop a prescribed medicine unless the team responsible for the procedure tells you to do so.

Thoracentesis performed with local anaesthetic alone usually does not require fasting. If sedation is planned, you may need to stop eating and drinking beforehand. You will also need someone to take you home after sedation.

Before the procedure, the team may review blood tests, chest imaging, allergies, and previous problems with bleeding or anaesthesia. Tell them if you are or might be pregnant.

Wear clothing that can be removed easily from the upper body. You may be asked to change into a gown.

What happens during the procedure

You will usually sit upright and lean forward with your arms supported on a table or pillow. If sitting is not possible, you may lie on your side.

The clinician uses ultrasound to locate the fluid and mark a safe entry point. Monitoring may include your oxygen level, pulse, and blood pressure.

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 briefly sting or burn.

A needle is guided between the ribs into the pleural space, usually with ultrasound guidance. The needle may then be exchanged for a small flexible catheter. Fluid is drawn into syringes or a collection container.

You may feel pressure or an urge to cough as the fluid drains. Tell the team immediately if you develop chest pain, marked coughing, dizziness, or worsening shortness of breath. They can slow or stop the drainage.

The catheter is removed when enough fluid has been collected. A small dressing is placed over the entry site. Stitches are not usually needed.

Recovery and what to expect afterward

Mild soreness around the puncture site is common. It should improve over the next day or two. Ask which pain medicine is suitable for you rather than assuming every over-the-counter product is safe.

You can usually eat and drink normally afterward unless another test, sedation, or medical condition requires restrictions.

Most people can resume light activity the same day. Keep the dressing clean and dry for the period given in your discharge instructions. Avoid strenuous activity until the treating team says it is appropriate.

Do not drive yourself home if you received sedation. If you did not receive sedation, ask the facility whether your breathing, pain, or underlying condition creates any driving restriction.

Many people return to desk-based work within a day. You may need longer if your work is physically demanding or if the condition that caused the effusion is still affecting you.

A routine chest X-ray is not always needed after an uncomplicated ultrasound-guided thoracentesis. Imaging may be arranged if you develop symptoms, the procedure was difficult, or the team needs to assess the remaining fluid.

Risks and possible complications

Thoracentesis is generally well tolerated, but complications can occur.

Pneumothorax means air has entered the pleural space and caused part of the lung to collapse. A small pneumothorax may only need monitoring. A larger one may require oxygen or a chest drain.

Other possible complications include:

Rarely, a lung that has been compressed may develop fluid within its tissue after expanding again. This is called re-expansion pulmonary oedema and can cause coughing, chest discomfort, and breathing difficulty.

Ultrasound guidance and stopping drainage when concerning symptoms appear help reduce risk.

- Bleeding or bruising at the puncture site
- Infection
- Injury to the lung or nearby organs

- Faintness or a drop in blood pressure
- Failure to obtain fluid
- Persistent fluid leakage from the puncture site

Results and follow up

The clinician can see the fluid's colour and appearance during the procedure, but appearance alone usually cannot identify the cause.

Cell counts and basic chemical results may be available within hours or by the next day. Tests for bacteria, tuberculosis, or cancer cells can take several days or longer. Sometimes the results do not provide a definite answer.

Routine follow-up should cover:

Further testing may include repeat imaging, another fluid sample, or a pleural biopsy, which removes a small piece of the lining around the lung.

- What the laboratory results mean
- Whether fluid remains or is returning
- Treatment for the likely underlying condition
- Whether more imaging or testing is needed

Alternatives

The alternatives depend on whether the goal is diagnosis, relief of symptoms, or both.

Observation with repeat imaging avoids an invasive procedure. It may be reasonable for a small, stable effusion, but it does not provide a fluid sample or immediate relief.

Treatment of a likely cause may reduce the fluid. For example, medicines that remove excess body fluid may help some effusions related to heart failure. This avoids needle drainage but may work slowly and cannot confirm another cause.

A chest drain provides ongoing drainage and is often better for infected, thick, rapidly returning, or pocketed fluid. It is more invasive and remains in place longer.

An indwelling pleural catheter can be used when fluid repeatedly returns. It allows drainage at home but requires ongoing catheter care and carries infection and blockage risks.

Pleurodesis uses medicine or surgery to make the pleural layers stick together, reducing the

space where fluid can return. It is more involved than thoracentesis.

Thoracoscopy or pleural biopsy can provide tissue when fluid tests are inconclusive. These options may give more diagnostic information but require a more invasive procedure.

When to call your healthcare team

Contact your healthcare team promptly if you develop increasing redness, swelling, warmth, drainage, or bleeding at the puncture site. Also call for fever, worsening cough, increasing pain, or shortness of breath that is new or getting worse.

Seek emergency medical help for severe breathing difficulty, sudden or intense chest pain, coughing up more than a small streak of blood, fainting, confusion, or blue or grey lips. These are not routine recovery symptoms.

For routine questions about the dressing, activity, test results, or follow-up appointments, use the contact details provided at discharge.

Common questions

Will I be asleep?

Usually not. Most thoracentesis procedures use local anaesthetic while you remain awake. Sedation is uncommon because you need to stay in position and may be asked to control your breathing briefly.

Can I drive home?

Not if you received sedation. Even without sedation, you may need someone else to drive if you remain short of breath, sore, or unwell. Follow the facility's discharge instructions.

How painful is it?

The numbing injection can sting. After that, people more often describe pressure, pulling, or an urge to cough rather than sharp pain. Tell the team if you feel significant pain.

When will I know the results?

Some measurements return within hours. Cell studies and cultures may take several days or longer. Ask when and how the team will contact you.

Will the fluid come back?

It can. Thoracentesis removes fluid but does not remove its underlying cause. If fluid returns, treatment may include another thoracentesis, a longer-term catheter, pleurodesis, or

treatment directed at the cause.

Will I breathe better right away?

Some people notice improvement during or soon after drainage. Relief may be limited if only a small amount was removed or if another heart or lung condition is also affecting breathing.

Sources

- British Thoracic Society. "British Thoracic Society Clinical Statement on Pleural Procedures." Thorax . 2023;78(Suppl 3):s43-s68.
- American Thoracic Society. "Thoracentesis." Patient Education Series, American Journal of Respiratory and Critical Care Medicine .
- Merck Manual Professional Edition. "How To Do Thoracentesis." Pulmonary Procedures.
- Shen-Wagner J, Gamble C, MacGilvray P. "Pleural Effusion: Diagnostic Approach in Adults." American Family Physician . 2023;108(5):464-475.
- National Library of Medicine. "Thoracentesis." MedlinePlus Medical Encyclopedia .