



## Thoracentesis

Thoracentesis uses imaging guidance and a needle to help diagnose and treat pleural effusions, a condition in which the space between the lungs and the inside of the chest wall contains excess fluid. It is performed to help determine the cause of the excess fluid and to ease any shortness of breath or pain by removing the fluid and relieving pressure on the lungs.



Your doctor will instruct you on how to prepare, including any changes to your medication schedule. Tell your doctor if there's a possibility you are pregnant and discuss any recent illnesses, medical conditions, allergies and medications you're taking, including herbal supplements and aspirin. You may be advised to stop taking aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs), or blood thinners several days prior to your procedure. Leave jewelry at home and wear loose, comfortable clothing. You may be asked to wear a gown.

## What is a Thoracentesis?

Thoracentesis is a minimally invasive procedure used to diagnose and treat pleural effusions, a condition in which there is excess fluid in the pleural space, also called the pleural cavity. This space exists between the outside of the lungs and the inside of the chest wall.

## What are some common uses of the procedure?

Thoracentesis is performed to:

- relieve pressure on the lungs
- treat symptoms such as shortness of breath and pain
- determine the cause of excess fluid in the pleural space.

## How should I prepare?

Prior to your procedure, your blood may be tested to determine how well your kidneys are functioning and whether your blood clots normally.

You should report to your doctor all medications that you are taking, including herbal supplements, and if you have any allergies, especially to local anesthetic medications, general anesthesia or to contrast materials containing iodine (sometimes referred to as "dye" or "x-ray dye"). Your physician may advise you to stop taking aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs) or blood thinners for a specified period of time before your procedure.

Also inform your doctor about recent illnesses or other medical conditions.

You should tell your physician if you have:

- bleeding problems or take blood thinners, such as aspirin, Lovenox®, Arixtra®, Fragmin®, Innohep®, Coumadin®, Pradaxa®, Xarelto®, or Eliquis®
- had lung surgery
- lung disease, such as emphysema.

Women should always inform their physician and x-ray technologist if there is any possibility that they are pregnant. Many imaging tests are not performed during pregnancy so as not to expose the fetus to radiation. If an x-ray is necessary, precautions will be taken to minimize radiation exposure to the baby. See the Safety page for more information about pregnancy and x-rays.

You will receive specific instructions on how to prepare, including any changes that need to be made to your regular medication schedule.

You may be asked to remove some or all of your clothes and to wear a gown during the exam. You may also be asked to remove jewelry, eye glasses and any metal objects or clothing that might interfere with the x-ray images.

If sedation is required, you will need to have a relative or friend accompany you and drive you home afterward.

## What does the equipment look like?

In this procedure, ultrasound, CT, or x-ray equipment may be used to guide a needle into the fluid within the pleural space. Thoracentesis is typically performed with ultrasound guidance. Occasionally, CT-guidance will be used.

Ultrasound scanners consist of a console containing a computer and electronics, a video display screen and a transducer that is used to do the scanning. The transducer is a small hand-held device that resembles a microphone, attached to the scanner by a cord. Some exams may use different transducers (with different capabilities) during a single exam. The transducer sends out high-frequency sound waves (that the human ear cannot hear) into the body and then listens for the returning echoes from the tissues in the body. The principles are similar to sonar used by boats and submarines.

The ultrasound image is immediately visible on a video display screen that looks like a computer or television monitor. The image is created based on the amplitude (loudness), frequency (pitch) and time it takes for the ultrasound signal to return from the area within the patient that is being examined to the transducer (the device placed on the patient's skin to send and receive the returning sound waves), as well as the type of body structure and composition of body tissue through which the sound travels. A small amount of gel is put on the skin to allow the sound waves to travel from the transducer to the examined area within the body and then back again. Ultrasound is an excellent modality for some areas of the body while other areas, especially air-filled lungs, are poorly suited for ultrasound.

The CT scanner is typically a large, box-like machine with a hole, or short tunnel, in the center. You will lie on a narrow examination table that slides into and out of this tunnel. Rotating around you, the x-ray tube and electronic x-ray detectors are located opposite each other in a ring, called a gantry. The computer workstation that processes the imaging information is located in a separate control room, where the technologist operates the scanner and monitors your examination in direct visual contact and usually with the ability to hear and talk to you with the use of a speaker and microphone.

A thoracentesis needle is generally several inches long and the barrel is about as wide as a large paper clip. The needle is hollow so fluid can be aspirated (drawn by suction) through it. In some instances, a small tube is advanced over the needle, and the fluid is removed through the tube after removing the needle.

## How is the procedure performed?

A chest x-ray may be performed before a thoracentesis.

This procedure is often done on an outpatient basis. However, some patients may require admission following the procedure. Please consult with your physician as to whether or not you will be admitted.

You will be positioned on the edge of a chair or bed with your head and arms resting on an examining table.

The area of your body where the needle is to be inserted will be sterilized and covered with a surgical drape.

Your physician will numb the area with a local anesthetic.

The needle is inserted through the skin between two ribs on your back. When the needle reaches the pleural space between the chest wall and lung, the pleural fluid is removed through a syringe or suction bottle.

Thoracentesis is usually completed within 15 minutes.

At the end of the procedure, the needle will be removed and pressure will be applied to stop any bleeding. The opening in the skin is then covered with a dressing. No sutures are needed.

A chest x-ray may be performed after thoracentesis to detect any complications.

## What will I experience during and after the procedure?

You will feel a slight pin prick when the needle is inserted into your vein for the intravenous line (IV) and when the local anesthetic is injected. Most of the sensation is at the skin incision site, which is numbed using local anesthetic. You may feel pressure when the catheter is inserted into the vein or artery.

You will be asked to remain still during the procedure and not to cough or breathe deeply in order to avoid injury to the lung.

You may feel pressure when the needle is inserted into the pleural space.

When the pleural fluid is removed, you may feel a pulling sensation or pressure in your chest. It is common to have the urge to cough as the fluid is removed and the lung re-expands. Tell your doctor or nurse if you feel faint or if you have any shortness of breath or chest pain.

## Who interprets the results and how do I get them?

The interventional radiologist or physician treating you will determine the results of the procedure and will send a report to your referring physician, who will share the results with you.

Your interventional radiologist may recommend a follow-up visit after your procedure or treatment is complete.

The visit may include a physical check-up, imaging procedure(s) and blood or other lab tests. During your follow-up visit, you may discuss with your doctor any changes or side effects you have experienced since your procedure or treatment.

## What are the benefits vs. risks?

### Benefits

- Thoracentesis is generally a safe procedure.
- No surgical incision is needed.

### Risks

- Any procedure where the skin is penetrated carries a risk of infection. The chance of infection requiring antibiotic treatment appears to be less than one in 1,000.

Complications may include:

- pneumothorax or a partial collapse of the lung caused by air entering the pleural space through the needle or rarely by the needle puncturing the lung allowing air to flow into the pleural space.
- pulmonary edema, which may occur if a large amount of fluid is removed too rapidly.
- infection and bleeding.

- breathing difficulty.

## What are the limitations of Thoracentesis?

Thoracentesis may not be performed on patients who have an uncorrectable bleeding disorder.

The accuracy of a thoracentesis may be affected by a patient's:

- use of antibiotics.
- inability to remain still.

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