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 doctor may test your blood to check your kidney function and to determine if your blood clots normally.

Tell your doctor about all the medications you take, including herbal supplements. List any allergies, especially to local anesthetic, general anesthesia, or contrast materials. Your doctor may tell you to stop taking aspirin, nonsteroidal anti-inflammatory drugs (NSAIDs) or blood thinners before your procedure.

Tell 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 tell their doctor and technologist if they are pregnant. Doctors will not perform many tests during pregnancy to avoid exposing the fetus to radiation. If an x-ray is necessary, the doctor will take precautions to minimize radiation exposure to the baby. See the Safety in X-ray, Interventional Radiology and Nuclear Medicine Procedures page (https://www.radiologyinfo.org/en/info/safety-radiation) for more information about pregnancy and x-rays.

You will receive specific instructions on how to prepare, including any changes you need to make to your regular medication schedule.

You may need to remove your clothes and change into a gown for the exam. You may also need to remove jewelry, eyeglasses, and any metal objects or clothing that might interfere with the x-ray images.

If you need sedation, have someone 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 machines consist of a computer console, video monitor and an attached transducer. The transducer is a small hand-held device that resembles a microphone. Some exams may use different transducers (with different capabilities) during a single exam. The transducer sends out inaudible, high-frequency sound waves into the body and listens for the returning echoes. The same principles apply to sonar used by boats and submarines.

The technologist applies a small amount of gel to the area under examination and places the transducer there. The gel allows sound waves to travel back and forth between the transducer and the area under examination. The ultrasound image is immediately visible on a video monitor. The computer creates the image based on the loudness (amplitude), pitch (frequency), and time it takes for the ultrasound signal to return to the transducer. It also considers what type of body structure and/or tissue the sound is traveling through.

The CT scanner is typically a large, donut-shaped machine with a short tunnel in the center. You will lie on a narrow table that slides in and out of this short 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 in a separate control room. This is where the technologist operates the scanner and monitors your exam in direct visual contact. The technologist will be able to hear and talk to you using 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. Ask your doctor if you will need to 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 doctor will numb the area with a local anesthetic. This may briefly burn or sting before the area becomes numb.

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 pinch when the nurse inserts the needle into your vein for the IV line and when they inject the local anesthetic. Most of the sensation is at the skin incision site. The doctor will numb this area using local anesthetic. You may feel pressure when the doctor inserts the catheter into the vein or artery. However, you will not feel serious discomfort.

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 doctor treating you will determine the results of the procedure. They will send a report to your referring physician, who will share the results with you.

Your interventional radiologist may recommend a follow-up visit.

This visit may include a physical check-up, imaging exam(s), and blood tests. During your follow-up visit, tell your doctor if you have noticed any side effects or changes.

**What are the benefits vs. risks?**

**Benefits**

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

**Risks**

- Any procedure that penetrates the skin 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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