Ultrasound - Thyroid

What is an Ultrasound of the Thyroid?

Ultrasound imaging, also called ultrasound scanning or sonography, involves exposing part of the body to high-frequency sound waves to produce pictures of the inside of the body. Ultrasound exams do not use ionizing radiation (as used in x-rays). Because ultrasound images are captured in real-time, they can show the structure and movement of the body's internal organs, as well as blood flowing through blood vessels.

Ultrasound imaging is a noninvasive medical test that helps physicians diagnose and treat medical conditions.

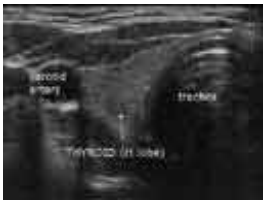
An ultrasound of the thyroid produces a picture of the thyroid gland. The thyroid gland is located in front of the neck just below the Adam's apple and is shaped like a butterfly, with two lobes on either side of the neck connected by a narrow band of tissue. It is one of nine endocrine glands located throughout the body that make and send hormones into the bloodstream.

What are some common uses of the procedure?

An ultrasound of the thyroid is typically used to help diagnose:

- a lump in the thyroid.
- a thyroid that is not functioning properly.

Because ultrasound provides real-time images, it also can be used to guide procedures such as needle biopsies, in which needles are used to extract sample cells from an abnormal area for laboratory testing. Ultrasound may also be used to guide the insertion of a catheter or drainage device and helps assure accurate placement.



How should I prepare?

You should wear comfortable, loose-fitting clothing for your ultrasound exam. You may need to remove all clothing and jewelry in the area to be examined.

You may be asked to wear a gown during the procedure.

No other preparation is required.

Ultrasound exams are very sensitive to motion and an active or crying child will slow the exam process.

To ensure a smooth experience, it would be beneficial to explain the procedure to the child prior to the exam. You may bring a book to read to the child to ease anxiety. Ultrasound departments often have a television in the examination room and the child's favorite show may be played if there are no other available distractions.

What does the equipment look like?

Ultrasound scanners consist of a console containing a computer and electronics, a video display screen and a transducer that is used to scan the body and blood vessels. The transducer is a small hand-held device that resembles a microphone, attached to the scanner by a cord. The transducer sends out high frequency sound waves 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 nearby video display screen that looks much like a computer or television monitor. The image is created based on the amplitude (strength), frequency and time it takes for the sound signal to return from the patient to the transducer and the type of body structure the sound travels through.

How does the procedure work?

Ultrasound imaging is based on the same principles involved in the sonar used by bats, ships and fishermen. When a sound wave strikes an object, it bounces back, or echoes. By measuring these echo waves it is possible to determine how far away the object is and its size, shape, and consistency (whether the object is solid, filled with fluid, or both).

In medicine, ultrasound is used to detect changes in appearance of organs, tissues, and vessels or detect abnormal masses, such as tumors.

In an ultrasound examination, a transducer both sends the sound waves and records the echoing waves. When the transducer is pressed against the skin, it directs small pulses of inaudible, high-frequency sound waves into the body. As the sound waves bounce off of internal organs, fluids and tissues, the sensitive microphone in the transducer records tiny changes in the sound's pitch and direction. These signature waves are instantly measured and displayed by a computer, which in turn creates a real-time picture on the monitor. One or more frames of the moving pictures are typically captured as still images.

How is the procedure performed?

For most ultrasound exams, the patient is positioned lying face-up on an examination table that can be tilted or moved.

A pillow will be placed behind the neck to extend the area to be scanned for a thyroid study. This is especially important for a small child with very little space between the chin and the chest.

A clear water-based gel is applied to the area of the body being studied to help the transducer make

secure contact with the body and eliminate air pockets between the transducer and the skin. The sonographer (ultrasound technologist) or radiologist then presses the transducer firmly against the skin in various locations, sweeping over the area of interest or angling the sound beam from a farther location to better see an area of concern.

When the examination is complete, the patient may be asked to dress and wait while the ultrasound images are reviewed. However, the sonographer or radiologist is often able to review the ultrasound images in real-time as they are acquired and the patient can be released immediately.

This ultrasound examination is usually completed within 30 minutes.

What will I experience during and after the procedure?

Most ultrasound examinations are painless, fast and easy.

After you are positioned on the examination table, the radiologist or sonographer will apply some warm water-based gel on your skin and then place the transducer firmly against your body, moving it back and forth over the area of interest until the desired images are captured. There is usually no discomfort from pressure as the transducer is pressed against the area being examined.

If scanning is performed over an area of tenderness, you may feel pressure or minor pain from the transducer.

You will need to extend your neck to gain appropriate access, which may be mildly uncomfortable.

Once the imaging is complete, the gel will be wiped off your skin.

After an ultrasound exam, you should be able to resume your normal activities immediately.

Who interprets the results and how do I get them?

A radiologist, a physician specifically trained to supervise and interpret radiology examinations, will analyze the images and send a signed report to your primary care physician or the physician who referred you for the exam, who will share the results with you. In some cases the radiologist may discuss results with you at the conclusion of your examination.

What are the benefits vs. risks?

Benefits

- Most ultrasound scanning is noninvasive (no needles or injections) and is usually painless.
- Ultrasound is widely available, easy-to-use and less expensive than other imaging methods.
- Ultrasound imaging does not use any ionizing radiation.
- Ultrasound scanning gives a clear picture of soft tissues that do not show up well on x-ray images.
- Ultrasound provides real-time imaging, making it a good tool for guiding minimally invasive procedures such as needle biopsies and needle aspiration.

Risks

- For standard diagnostic ultrasound there are no known harmful effects on humans.

What are the limitations of an Ultrasound of the Thyroid?

If a lump is detected on ultrasound within the thyroid gland, it is common that the radiologist cannot distinguish between benignand malignant lumps with complete certainty. A fine needle biopsy and review of tissue under a microscope is often necessary, while in some cases surveillance and a repeat sonogram after a few months looking for stability may suffice.

It is not possible to determine thyroid function—that is, whether the thyroid gland is underactive, overactive, or normal—with ultrasound. For that determination, your doctor may order a blood test or a radioactive iodine uptake test.

Additional Information and Resources

RadiologyInfo

Head and Neck Cancer:
www.RadiologyInfo.org/en/info.cfm?PG=hdneck

RTAnswers.org

Radiation Therapy for Head and Neck Cancer:
www.rtanswers.org/treatmentinformation/cancertypes/headneck/index.aspx