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General Ultrasound (Sonography) FAQ's

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What is Ultrasound Imaging?

Ultrasound imaging, also called ultrasound scanning or sonography, is a method of obtaining images from inside the human body through the use of high frequency sound waves. The reflected sound wave echoes are recorded and displayed as a real-time visual image. No ionizing radiation (x-ray) is involved in ultrasound imaging. Obstetric ultrasound refers to the specialized use of sound waves to visualize and thus determine the condition of a pregnant woman and her embryo or fetus.

Ultrasound is a useful way of examining many of the body's internal organs, including the heart, liver, gallbladder, spleen, pancreas, kidneys, and bladder. Because ultrasound images are captured in real-time, they can show movement of internal tissues and organs, and enable physicians to see blood flow and heart valve functions. This can help to diagnose a variety of heart conditions and to assess damage after a heart attack or other illness.

What are some common uses of Ultrasound?

Millions of expectant parents have seen the first "picture" of their unborn child with pelvic ultrasound examinations of the uterus and fetus. Ultrasound imaging is used extensively for evaluating the eyes, pelvic and abdominal organs, heart, and blood vessels, and can help a physician determine the source of pain, swelling, or infection in many parts of the body. Because

ultrasound provides real-time images, it can also be used to guide procedures such as needle biopsies, in which needles are used to sample cells from organs for laboratory testing. Ultrasound is now being used to image the breasts and to guide biopsy of breast cancer (see the Ultrasound-Guided Breast Biopsy page). Ultrasound is also used to evaluate superficial structures, such as the thyroid gland and scrotum (testicles).

Doppler ultrasound is a special technique used to examine blood flow. Doppler images can help the physician to see and evaluate:

- Blockages to blood flow (such as clots).
- Build-up of plaque inside the vessel.
- Congenital malformation.

How should I prepare for my Ultrasound procedure?

You should wear comfortable, loose-fitting clothing for your ultrasound exam. Other preparation depends on the type of examination you will have. For some scans, your doctor may instruct you not to eat or drink for as many as 12 hours before your appointment. For others, you may be asked to drink up to six glasses of water two hours prior to your exam and avoid urinating, so that your bladder is full when the scan begins.

What does the Ultrasound 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. The transducer is a small, hand-held device about the size of a bar of soap, attached to the scanner by a cord. The physician or technologist spreads a lubricating gel on the patient's abdomen in the area being examined, and then presses the transducer firmly against the skin to obtain images.

The ultrasound image is immediately visible on a nearby screen that looks much like a computer or television monitor. The physician or technologist watches this screen during an examination and captures representative images for storage. Often, the patient is able to see it as well.

An example of the ultrasound equipment that may be used is shown at the top of this page.

Ultrasound machine.

How does the Ultrasound procedure work?

Ultrasound imaging is based on the same principles involved in the sonar used by bats, ships at sea, and anglers with fish detectors. As the sound passes through the body, echoes are produced that can be used to identify how far away an object is, how large it is, its shape, and its consistency (fluid, solid or mixed).

The ultrasound transducer functions as both a generator of sound (like a speaker) and a detector (like a microphone). When the transducer is pressed against the skin, it directs inaudible, high-frequency sound waves into the body. As the sound echoes from the body's fluids and tissues, the transducer records the strength and character of the reflected waves. With Doppler ultrasound, the microphone captures and records tiny changes in the sound wave's pitch and direction of the sound. These echoes are instantly measured and displayed by a computer, which in turn creates a real-time picture on the monitor. The live images of the examination are usually recorded on videotape, but one or more frames of the moving picture may be "frozen" to capture a still image.

How is the Ultrasound performed?

The patient is usually positioned on an examination table. A clear gel is applied to the patient's body in the area to be examined, to help the

transducer make secure contact with the skin. The sound waves produced by the transducer cannot penetrate air, so the gel helps eliminate air pockets between the transducer and the skin. The technologist or radiologist presses the transducer firmly against the skin and sweeps it back and forth to image the area of interest.

When the examination is complete, the patient may be asked to dress and wait while the ultrasound images are reviewed, either on film or on a TV monitor. Often, though, the technologist or radiologist is able to review the ultrasound images in real time as they are acquired, and the patient can be released immediately.

What will I experience during my Ultrasound?

Most ultrasound examinations are painless, fast, and easy. You will lie on your back on an examining table. The technologist or doctor will spread some warm gel on your skin and then press the transducer firmly against your body, moving it until the desired images are captured. There may be varying degrees of discomfort from pressure as the technologist guides the transducer over your abdomen, especially if you are required to have a full bladder. The examination usually takes less than 30 minutes.

Who interprets the results of my Ultrasound and how do I get them?

A radiologist, or other physicians experienced in ultrasound and other radiology examinations, will analyze the images and send a signed report with his or her interpretation to the patient's personal physician. The patient receives ultrasound results from the referring physician who ordered the test results. In some cases the radiologist may discuss preliminary results with you at the conclusion of your examination. New technology also allows for distribution of diagnostic reports and referral images over the Internet at many facilities.

What are the benefits vs. risks of Ultrasound?

Benefits

- Ultrasound scanning is noninvasive (no needles or injections, in most cases) and is usually painless.
- Ultrasound is widely available and easy to use.
- Ultrasound uses no ionizing radiation, and is the preferred image modality for diagnosis and monitoring of pregnant women and their unborn infants.

- Ultrasound provides real-time imaging, making it a good tool for guiding minimally invasive procedures such as needle biopsies.
- Ultrasound images can visualize structure, movement and live function in the body's organs and blood vessels.

Risks

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

What are the limitations of General Ultrasound Imaging?

Ultrasound has difficulty penetrating bone and therefore can only see the outer surface of bony structures and not what lies within. For visualization of bone, other imaging modalities, such as magnetic resonance imaging (MRI), may be selected.

Ultrasound waves do not pass through air; therefore an evaluation of the stomach, small intestine and large intestine may be limited. Intestinal gas may also prevent visualization of deeper structures such as the pancreas and aorta. Patients suffering from obesity are more difficult to image—this is because tissue attenuates (weakens) the sound waves as they pass deeper into the body.