Ultrasound, Various Types

Diagnostic ultrasound imaging (done to diagnose a condition or disease) is commonly called *sonography* or *ultrasonography*. It creates an image of the internal structures on a viewing screen. This type of ultrasound is called 2D, or two-dimensional ultrasound. These changing images can be recorded on videotape or film.

WHAT IS DOPPLER ULTRASOUND?

Doppler ultrasound is a special form of ultrasound used to evaluate blood flow. There are several types of Doppler ultrasound in use:

- *CONTINUOUS WAVE DOPPLER ULTRASOUND.* This type of Doppler provides information about blood flow through a blood vessel. Your caregiver listens to the sounds to evaluate the blood flow through an area that may be blocked or narrowed. This type of ultrasound can provide a rapid estimate of blood vessel damage or disease.
- DUPLEX DOPPLER ULTRASOUND. Duplex Doppler ultrasound uses standard ultrasound methods to:
  - Produce a picture of a blood vessel and surrounding organs.
  - Create a graph that provides information about the speed and direction of blood flow through the blood vessel.
  - See the structures inside the body (2D) and evaluate blood flow (continuous wave) within those structures at the same time. To do this the ultrasound machine uses the 2 methods of ultrasound simultaneously. Blood flow in individual blood vessels is most commonly evaluated by duplex Doppler ultrasound.
- COLOR DOPPLER ULTRASOUND. A computer colors the image of the blood vessel that represent the speed and direction of blood flow through the vessel in 2D.
- *POWER DOPPLER ULTRASOUND.*
  - Up to 5 times more sensitive than color Doppler ultrasound.
  - Can get images impossible to obtain using standard color. Power Doppler ultrasound is commonly used to evaluate blood flow through vessels within organs such as the liver or kidneys.

WHY SHOULD I HAVE A DOPPLER ULTRASOUND EXAM?

A Doppler ultrasound exam, often called a scan, gives your caregiver information about:

- Your blood vessels.
- The way blood is passing through them.

We have blood vessels throughout our bodies, Doppler ultrasound may be used almost anywhere. Common sites where Doppler ultrasound is used are:

- Neck. In your neck, Doppler ultrasound is used to look at carotid arteries. These vessels supply large amounts of blood to your brain and may become blocked. Blockage can lead to stroke.
- Heart. In your heart, Doppler ultrasound can tell your caregiver about the flow of blood and whether it is directed correctly.
- Abdomen. In your abdomen or stomach, Doppler ultrasound can be used to help evaluate blood flow to the liver and many other organs in your abdomen.
- Legs. Doppler ultrasound also is used to evaluate blood flow in your legs and may be helpful in identifying blockages in your arteries and clots in your veins.

WILL IT HURT? ARE THERE ANY SPECIAL PREPARATIONS FOR THE EXAM?

There is no pain involved in an ultrasound examination. Your caregiver may ask you to not eat the morning of your exam if the ultrasound scan involves your upper abdomen. A gel is applied to your skin and an instrument, is then placed on the area to be examined. This gel may feel cool. Even though the gel wipes off easily, it is a good idea to wear clothing that is easily washable.

WHAT CAN I EXPECT DURING THE EXAM?

The images are displayed on one or more monitors that look like small television screens. The sounds may be

similar to the sound of wind blowing through the trees. The room is usually darkened during the examination. This makes it easier for the sonographer or caregiver to see the images on the monitor.

HOW LONG WILL THE EXAM TAKE?

The average Doppler ultrasound exam takes 30 to 60 minutes. The length of the exam depends on many factors including the portion of your body to be examined and the difficulty of the anatomy. With hardening of the arteries, the vessels may be very difficult to evaluate and may require more scanning time.

WHO WILL PERFORM THE EXAM?

A Doppler ultrasound examination may be performed by a doctor, a vascular technologist, or a sonographer. A sonographer is a person specially trained to perform ultrasound exams. A doctor will interpret the examination results. Not all test results are available during your visit. If your test results are not back during the visit, make an appointment with your caregiver to find out the results. Do not assume everything is normal if you have not heard from your caregiver or the medical facility. It is important for you to follow up on all of your test results.

WILL I NEED MORE THAN ONE EXAM?

Follow-up exams are often necessary to evaluate the progress of your condition or your response to therapy.

IS ULTRASOUND SAFE?

There are no known harmful effects associated with the medical use of sonography. Widespread clinical use of diagnostic ultrasound for many years has not revealed any harmful effects. Studies in humans have revealed no direct link between the use of diagnostic ultrasound and any adverse outcomes. Although the possibility exists that biological effects may be identified in the future, current information indicates that the benefits to patients far outweigh the risks, if any.

HOW MUCH DOES THE EXAM COST?

The price of an ultrasound scan varies widely depending on the reason for the exam, its complexity, and the type of equipment used. Insurance companies may help cover the cost of the examination.

Information courtesy of The American Institute of Ultrasound in Medicine (AIUM) - an association of doctors, sonographers, and scientists - AIUM has provided these questions and answers to explain how ultrasound works.

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