

## Echocardiography

**Background:** Heart diseases can take many shapes and forms. The most common heart problems in adults are due to blockage of the blood supply to the heart muscle and can cause heart pain (angina), weakening of the heart muscle, or heart attack. In addition, however, the heart can become ill in other ways. The heart can be congenitally malformed. The heart can become weak even if its blood supply is normal. The heart has four valves that keep blood flowing in the proper direction. These may become damaged and fail to function properly. High blood pressure or lung diseases can strain the heart. Inflammations, tumors, infections, or injuries may cause fluid collections around the heart that prevent it from filling properly. Each of these conditions has particular signs and symptoms, but they often overlap so that telling them apart can be difficult. Almost always, the best way to determine what is happening to the heart is look at in real time as it functions. Many techniques have been developed to do this including X-rays, dye tests (catheterization), and radioactive isotope pictures of the heart. In the last twenty years, however, the echocardiogram has emerged as the most frequently used procedure for looking at the heart.

**What is an echocardiogram?** Simply stated, an echocardiogram is a picture of the heart created by ultrasonic sound waves (sound waves that are too high a pitch to be heard by a human ear). A specially designed machine creates ultrasound waves with a probe called a transducer. The transducer is held against the patient's chest and the sound waves are sent into the chest. Some of the sound waves bounce off the heart and surrounding structures are "heard" by the transducer, which also functions as a microphone. These "echoes" are then converted into pictures that can be used to make diagnoses about the condition of the heart.

**Who can be tested?** The echocardiogram is a very versatile procedure. It is equally diagnostic in women or men of all ages. Some patients are more difficult to study due to their body build, but for the most part, a clinically useful study can be done on the majority of patients.

**What does the test show?** The echocardiogram is a remarkable tool that can obtain a wealth of information about the heart. It can tell the size and strength of the heart muscle, the condition of the heart valves, or if there is fluid around the heart. It can frequently show if the heart has any congenital malformations. It can demonstrate the effects of other diseases upon the heart such as high blood pressure, lung disease, thyroid disease, inflammatory diseases, etc. It can tell us if the patient has had a previous heart attack and the extent of the damage. It can demonstrate blood clots or infections in the heart.

**What does the patient feel?** An echocardiogram is done with the patient lying down on his or her left side or on their back. The technologist will have the patient undress from the waist up and usually have them put on a gown. He or she then attaches three wires to

the patient's chest using stick on electrodes to monitor the patient's electrocardiogram during the examination. An imaging probe called a transducer is used to take the pictures. A cool water-soluble gel is used to maintain a good contact between the transducer and the patient's chest. The patient will feel the transducer pressed against their chest. This may occasionally be uncomfortable if the technologist needs to hold the transducer in one spot for several minutes to get the best possible pictures. Aside from this, however, the test is painless.

**How long does it take?** The echocardiogram is a comprehensive evaluation of the heart. Depending on the patient's body build and the abnormalities present, the study can take from 15 to 30 minutes. The pictures are displayed on a TV monitor and recorded on videotape for later interpretation by a cardiologist. Usually, the cardiologist will interpret the study later the same day.

**Is it dangerous?** The echocardiogram is completely safe. No x-rays are used and no drugs are given during the examination.

**Conclusion:** Echocardiography is a versatile test for safely and accurately evaluating the heart for diseases including their risks and complications. It can be performed in a wide variety of patients in the cardiologist's office or at a patient's hospital bedside. It does not require the use of radioactive isotopes or x-rays, yet it provides an enormous amount of information about heart structure and function.