Obstetric Ultrasound

An ultrasound exam is used in pregnancy to evaluate the growth and development of the fetus. Ultrasound is energy in the form of sound waves. An ultrasound uses a transducer to send sound waves through the body. The sound waves hit tissues, body fluids, and bones. The waves bounce back, like echoes. The transducer receives the echoes, which are converted into images of the internal structures. In pregnancy, ultrasounds obtain images of the fetus.

The amount of information that an obstetrical ultrasound provides depends on the stage of pregnancy.

In the first trimester of pregnancy, ultrasound provides images of the uterus, ovaries, and pregnancy. An ultrasound will not be able to detect a pregnancy if you are less than five weeks from your last menstrual period. If you are between five and six weeks, it is often possible to see a gestational sac. Between six and seven weeks, fetal heart motion is often visible. From six to twelve weeks, it is possible to determine approximate fetal age by measuring the length of the fetus. In the first trimester, ultrasounds are performed with a transvaginal transducer, an instrument shaped like a wand, covered with a latex sheath, and lubricated before it is inserted into the vagina. The transvaginal transducer allows for visualization of early pregnancies. You are not required to fill your bladder. The exams are usually not painful.

In the second and third trimesters, we perform basic ultrasounds. These ultrasounds provide images to evaluate fetal number, fetal presentation, documentation of fetal life, placental location, assessment of gestational age, survey of fetal anatomy for gross malformations and evaluation of maternal pelvic masses. In the second and third trimesters, ultrasounds are performed using a transabdominal transducer, a hand held instrument that is moved along the abdomen. Your abdomen will be uncovered from the lower part of your ribs to your hips. You are not required to fill your bladder. The exams are not usually painful.

As it relates to detecting birth defects, it must be emphasized that with routine ultrasounds, it is unrealistic to expect to detect fetal anomalies with 100% accuracy. It is estimated that one third to one half of major fetal structural anomalies may be detected with routine ultrasound. Gross malformations such as anencephaly and hydrocephaly are detected most commonly. Anomalies more difficult to detect and overlooked more frequently include heart defects, facial clefts, diaphragmatic hernia, skeletal abnormalities and other neural tube defects. Some basic ultrasounds may suggest a need for a more comprehensive ultrasound.

An ultrasound may be indicated to determine an estimated fetal weight in the second trimester or third trimester. Formulas encompassing fetal measurements are used to estimate the fetal weight. The predictive accuracy of these formulas ranges from plus/minus 15% to 20%. These values give an idea of the estimated fetal weight; however, it should be noted that they may have a wide margin of error.

With ultrasound images, it is possible to determine gender if the fetus is in a position that permits visualization of the genital area. We do not routinely note fetal gender during an examination, as this is not an integral part of an ultrasound examination, nor do we offer this information to the mother and father unless they request it.

Addressing ultrasound and the impact of energy exposure on mother and baby, a safe level of ultrasound exposure to tissue is defined at less than 100 mW/cm2. The transducers used in obstetric ultrasound have a maximum energy output of 20 mW/ cm^2. In addition, the transducers use pulsed sound waves, which send sound 0.1% of the time. The remaining 99.9% of the time, the computer is generating the image you see on the screen. In thirty minutes of ultrasound scanning, a baby is exposed to less than two seconds of sound.

Ultrasound exposure at intensities produced by diagnostic ultrasound instruments has not been found to cause any harmful biologic effects on pregnant women, fetuses, sonographers, or other patients. Infants exposed in utero have shown no significant differences in birth weight or length, childhood growth, cognitive function, acoustic or visual ability, or rates of neurologic deficits compared with infants who have not been exposed.

Although the studies to date have not proven any adverse effects, we agree with the following statement published by the American Institute of Ultrasound in Medicine (AIUM): “Diagnostic ultrasound has been in use for over twenty-five years. No adverse biological effects on patients or instrument operators caused by exposures at intensities typical of present diagnostic instruments have been reported. Although the possibility exists that such biological effects may be identified in the future, current data indicate that the benefits to patients of the prudent use of diagnostic ultrasound far outweigh any potential risks.”