

August 09-Ultrasound in Pregnancy

Since the beginning of awareness that a fetus is growing inside the uterus, women have wondered what is going on “in there”. The modern use of ultrasound now empowers women to early bond with their children; to be knowledgeable about the health and status of their unborn child.

Medical ultrasound is roughly forty years old and uses technology similar to that in use of submarines. A transducer sends sound waves through the maternal abdomen for ten percent of the time and listens for ninety percent. Sound waves bounce back at different speeds depending upon the structure encountered and the strength of this signal is converted to a scale that gives a picture that can easily be read. Sound is louder in water (imagine hearing an approaching boat while your head is underwater) so the patient’s full bladder adds to the clarity of the image. The amniotic fluid of pregnancy is ideal for creating clear images. In these past forty years no adverse outcomes have been attributed to ultrasound and rumors that hearing problems in newborns are secondary to this technology have never been substantiated. Conversely, the ability to determine the exact date of delivery, number of fetuses, birth defects, position of placenta and fetal weight more than offset any real or imagined side effects. A quick note about “entertainment ultrasound”: while all scans provide some entertainment to the expectant couple and the joy of seeing their unborn child, the American College of Obstetrics and Gynecology proscribes against storefront and free standing clinics that do 3-D ultrasound solely for entertainment value. The information obtained by ultrasound is used to determine the health and structure of the developing fetus and when this technology is performed by a technician without a physician’s interpretation (as required by law) there is grave risk that potential problems can be missed. An ultrasound should be done only when ordered and reviewed by a physician trained to review and analyze the scan. That being said different information can be gained at different times during the pregnancy:

First Trimester (up to twelve weeks gestation):

When a pregnancy is confirmed positive, a fetal heart can be seen by six weeks by ultrasound. When seen within the uterus, the risk of miscarriage is reduced by 95%; tubal pregnancy is ruled out and the presence of more than one fetus is determined. Early diagnosis of multiple pregnancy (twins or more) can help to create a plan for the rest of the pregnancy to aid in a successful outcome. At this early stage it is difficult to determine the exact location of the placenta.

Second Trimester (12-28 weeks)

This is the most useful time for ultrasound. The fetus now has developed organs. The scan will help to determine neck fold thickness (a potential sign of Down’s syndrome); brain development and structure; fetal swallowing; correct development of heart, stomach, kidney’s and liver; correct structure of limbs, possible diagnosis of cleft palate. Defects at this time can sometimes be corrected before birth or at the very least prepare a mother for problems at birth that can be addressed by the pediatrician shortly after delivery. When a suspected defect is noted a “level two ultrasound” is frequently ordered at the medical center to be read by specially trained physicians so that specific judgments can be made about how to proceed with the pregnancy. At this time the size and location of the placenta can be determined.

A placenta that covers the cervical opening will come with precautions to avoid intercourse and heavy lifting that might cause bleeding. The amount of amniotic fluid can be determined—too much might be a sign of specific fetal defects and too little might indicate kidney or lung problems. In a multiple pregnancy the rate of growth of the fetuses can be monitored to be sure that they are growing uniformly.

Third Trimester (28 weeks-term)

Ultrasound is frequently not done during this time unless there is a specific need. They are never done just to determine the sex of the baby but most of the time this can be determined if the couple wants or needs to know. No guarantee of success of determination is made and the couple is cautioned about painting a room blue or pink based solely on a scan however, during this time the position of the fetus can be determined-important to decide upon the mode of delivery(head first-vaginal; breach by c-section); rate of growth can be determined and size can be cautiously estimated. In high risk pregnancies a biophysical profile is sometimes performed and the ultrasound will assess the fetus's muscle tone, breathing movements, body movements, and amniotic fluid. These factors can be used to assess fetal well being and to determine if delivery is necessary.

In summary ultrasound is a powerful tool that is indispensable to modern obstetrics. It has no known side effects and profoundly reduces the risks associated with pregnancy. In the future, when fetal defects are diagnosed fetal surgery will be undertaken to correct the defect before birth. This has already been done on a small scale with some success. As technology improves color will be added to the image to make organ delineation easier. Blood flow studies are being done now which aids in assessing placental function. That perinatal morbidity and mortality are so low is an attestation to advances in technology, especially that of ultrasound.