



Ultrasound Imaging & Fetal Doppler

Ultrasound - types, uses, and advantages:

Ultrasound imaging of an unborn baby is achieved by projecting intense sound waves through the tissue of the abdomen and bouncing them off of the baby. The sound waves that are reflected are interpreted by a computer and displayed as an image on a screen.

Routine ultrasound is an amazing tool for determining normal growth and development of larger systems in the baby's body (spine, heart, etc.), visualizing the physical symptoms of some birth defects, finding out where the placenta and cord attach to the uterus, and confirming the position of the baby. More in-depth ultrasound can be used for more detailed diagnostics when needed.

Other forms of ultrasound include the fetal doppler, which is very low-level in both intensity (megahertz frequency) and dose (strength of the signal) compared with imaging. A doppler only detects movement, such as a baby's heartbeat, and interprets the movements into sound through a speaker. A doppler with a waterproof probe can be used in a birth tub, and requires very little interruption to the laboring mother as it can be used quickly in almost any position.

You may be familiar with the ultrasound devices used during physical therapy to produce deep heat into an injured area. They work by disrupting the cells, literally shaking them with sound to produce heat. This creates a localized inflammation, which stimulates the body to increase blood flow to the area, which can result in faster healing. Small doses are considered to be very safe, but extended use could literally cook the tissue from the inside out, like a microwave oven; because of this potential, therapists strictly observe the recommended time limits on length of use at any one time.

Ultrasound was a very exciting advancement in technology for obstetrics. It makes the job of determining fetal heart rate and growth very easy and quick. It can also provide a printable record for the patient's chart. Doppler devices were adapted into monitors which could be strapped onto a woman in labor and left in place for hours, allowing the fetal heart rate of several women at once to be watched on remote monitors in hospital labor wards. Convenience is not the only benefit, however; when it is truly indicated, such as when a defect or complication is suspected that may require medical interventions, ultrasound can potentially be a lifesaver. Both imaging and dopplers can also provide great reassurance for parents that their baby is normal and doing well.

Disadvantages and risks:

While ultrasound is widely believed to be safe and benign, this theory was never scientifically tested prior to ultrasound being put into routine everyday use in obstetrics (similar to x-rays in the past). Now that this technology has become accepted as a standard of care, there would naturally be resistance to limiting its use if research does continue to bring up questions of safety.

So what do the studies show? Until recently, there were few studies done on the effects of ultrasound on fetuses. Most of the studies were of dubious design which reduced the value of the information obtained, and either selectively review other studies or check for limited effects to the baby, such as newborn death or decreased weight at birth. Recently many large studies were done on human pregnancies in China, which showed extensive damages.

One retrospective study was done in Sweden, where excellent records are kept of maternity care. Thousands of adult males were tracked who had ultrasound exposure in the womb, and they showed a significantly increased rate of antisocial behavior resulting in imprisonment. To find the physical cause which might explain this, a well-designed double-blind (with placebo) clinical trial study was done in the United States on pregnant mice, exposing them to a wide variety of levels of ultrasound similar to that being used during most human pregnancies. It was determined that the ultrasound waves caused delicate developing neurons in the brain to stop growing, and those brain cells failed to migrate to the outer cortex where they were supposed to be. The damage was directly related to dose, up to the point of causing fetal death with too much exposure. Short doses at doppler levels produced no detectable effect, and effects were minimal with very brief imaging levels. The China studies were more alarming.

What does this mean for your baby? The damage that was documented is very similar to the effect on the baby's brain that is the first result of fetal alcohol syndrome. It may be difficult to measure, but the end result is that the child can have a lowered ability to anticipate cause-and-effect, with increased tendency to engage in risky behavior without considering consequences. There may also be a lowered level of empathy for others when these higher brain functions are altered even slightly.

Other studies claim to link ultrasound exposure to the epidemic of autism we are experiencing. I have not yet examined those studies for quality of design, so cannot personally comment on the findings. However, it is plausible for ultrasound to be a contributing factor to autism, because the heating and cell disruption to neural tissue of a fetus by ultrasound could be very similar to that caused by maternal fever, and it is well known that many illnesses which include fever do cause permanent neurological damage to the baby. Before deciding to have ultrasound imaging, I recommend that you check out a copy of the recent China studies and read the summaries carefully.

Other Safety Considerations:

Levels of ultrasound emissions currently being used for imaging of developing fetuses exceed those deemed safe by the FCC for short-term exposure in adults, with power levels capable of heating tissues as much as a full ten degrees of temperature in less than one minute, the equivalent of a crippling fever to an unborn baby. (Stevens, E., July 15, 2014. *Ultrasound in Pregnancy*, published online.)

Recommendations:

I follow the doctrine of "first, do no harm". Because the safety of ultrasound is still in question, and it appears that there may be damage that is dose-related (the more exposure, the more potential harm), I recommend very limited use of ultrasound devices during pregnancy and labor. I actively advise imaging only if there may be a problem which should be diagnosed for the safety of you or your baby. One of these circumstances is VBAC, when imaging is required to know how well your previous c-section scar healed, and the location of the placenta. Another may be any unusual growth or size of your baby, or a decrease in the baby's heart rate or movements, which could be symptoms of a serious condition. I use the doppler for only a very short time while listening to your baby's heart rate and location of cord/placenta, and have a plain fetal stethoscope for listening manually if you feel that you do not want any doppler exposure (just ask for this if you prefer it).

I will happily write you a referral for an ultrasound if it is important for you to have one done, or if you feel strongly that you want imaging to rule out problems with the baby. When having an ultrasound done, I highly recommend asking for a very limited time of exposure to the baby's brain; the imaging tech can easily do this for you, thereby minimizing (or possibly eliminating) any potential for harm to your baby.

By selecting and initialing your options on the Informed Choice Checklist for this document you agree that:

I understand the information presented above, and have had adequate time to ask questions and do my own research on this procedure. I am choosing the following (please note your selections here for your own records to match those in your midwives' chart);

Ultrasound Imaging:

_____ I do not want any ultrasound imaging at all.

_____ I only want ultrasound if it is medically indicated.

_____ I want routine ultrasound done during:

1st 2nd (most common) 3rd trimester.

Doppler: _____ I do not want any doppler exposure at all.

_____ I am comfortable with minimal doppler use by my midwife.