

Yale Study Links Prenatal Ultrasound to Brain Damage

By Jan Hunt

Physicians should continue to be prudent about the use of ultrasound and perform the study only when medically necessary and when benefits outweigh risk, according to the American College of Radiology. The advice comes in the wake of recent findings by Yale researchers that link prenatal ultrasound exposure to brain damage.

During fetal development, neurons of the brain migrate to their correct positions. In a study of 335 mice, the researchers found that exposing pregnant mice to ultrasound waves at frequencies of 6.7 MHz for 30 minutes or more interfered with this normal migration in their fetuses. This interference could potentially result in brain abnormalities such as mental retardation and seizures.

Results were published in August in the Proceedings of the National Academy of Sciences. Further research is needed to determine whether the results could apply to humans.

The study has unveiled a risk previously not known, according to Dr. Carol Rumack, head of the American College of Radiology ultrasound commission. The study provides further proof that ultrasound keepsake videos should not be performed and that ultrasound equipment should be used only by qualified people, said Rumack, a professor of pediatrics and radiology at the University of Colorado School of Medicine.

The effects on neural migration were the result of direct prolonged exposure of the fetal mouse brain to ultrasound waves. Ultrasound examinations in pregnant women with abdominal pain are targeted to the evaluation of the mother's abdomen and not to the fetus. Typically, the fetal brain is not exposed or is exposed during very short periods of time during the examination.

In clinical practice, physicians often perform ultrasound for 30 minutes, but they typically move the probe around on the patient. In a quest to find the perfect 3D image of a developing child, however, others might hold the probe down in one spot for longer periods of time, increasing the risk of fetal damage.

The Yale study was performed in mice who were in the equivalent of the human third trimester of pregnancy. Traditionally, concern about performing imaging studies has centered on the first trimester, when basic organs are developing. The mouse study suggests concern in later stages might also be appropriate.

It's important for the public to remember that the imaging study involves putting ultrasound energy into the fetus, Rumack said.

"One should not use ultrasound as if it were a digital camera," she said.

In March, the FDA held a hearing to determine whether low-level ultrasound monitors should become available over the counter as an aid for tracking fetal heart rates. Currently, they are available for sale and rental with a doctor's referral.

As ACR representative, Rumack testified at the hearing against the proposal to expand access. If a woman used the monitor at home alone, a physician would not be available to offer a sound medical opinion about the baby's health, and if monitors were available to the public without a doctor's knowledge, many babies could be exposed to ultrasound with no oversight of potential effects, she said.

The Yale study raises new concerns not discussed at the meeting. A monitor left on all day could potentially cause damage to the brain of the developing fetus. Based on the new data, women with normal pregnancies should not take the risk of continuous ultrasound exposure for non-medical purposes, Rumack said.

(Here is the original research report: "Prenatal exposure to ultrasound waves impacts neuronal migration in mice." Read in full at: <http://www.pnas.org/content/103/34/12903.full>)

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