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NEWS

RSNA Press Release

New Test Provides Predictor of Severity of Perinatal Asphyxia

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Test may help identify newborns who will benefit from early intervention

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Media Advisory: To contact Tina Young Poussaint, M.D., call Bess Andrews at 617/355-6420. On the day of the briefing, call the AMA's Science News Department at 312/464-2410.

The following study was presented on November 14, 2002 at the American Medical Association's Medical Imaging Media Briefing in New York City. The press release was distributed by the AMA Science News Department.

NEW YORK—A new test using magnetic resonance (MR) technology can predict clinical outcomes for perinatal asphyxia, according to a study in the December 2002 issue of Radiology, the journal of the Radiological Society of North America. The results of the study show a strong correlation between the test results and clinical outcomes, according to Tina Young Poussaint, M.D., pediatric neuroradiologist, Children's Hospital Boston.

"The technique we used in the study appears to give us a clearer picture of the amount of injury in the newborn brain," Dr. Poussaint explained. "The correlation between the lactate-choline ratio and the outcome suggests that this should be used as a measure to identify those patients who should be followed more closely and may benefit from early therapeutic intervention to help the brain recover from the asphyxia. This non-invasive technique could also be used to determine those children who should be monitored more closely for early intervention of their developmental problems."

Dr. Poussaint spoke today at an AMA media briefing on medical imaging in New York City.

Dr. Poussaint and her colleagues reported on a study that measured lactate-choline ratios using MR spectroscopy. The researchers found a strong statistical association between higher lactate-choline ratio in the brain of these newborns and their risk of experiencing adverse clinical outcomes. The patients in the study were newborns who showed signs of asphyxia, which occurs when the oxygen level in the blood is reduced.

Asphyxia in newborns is usually caused by (but is not limited to) some problem with the baby breathing, a problem with the exchange of oxygen from the mother to the child through the placenta, cardiac disease or traumatic delivery. This reduction of oxygen levels in the blood causes a reduction of the oxygen supply to body tissues, which causes a change in the metabolic processes of the body. This lack of oxygen to the tissues, especially to the brain,

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can cause irreversible neurological damage.

When the newborn has trouble, there is a drop in oxygen and a build up of carbon dioxide, resulting in a change in the pathways used to create energy and thereby keep the body alive. One of the byproducts of this change from aerobic (oxygen-using) pathways to the anaerobic (non-oxygen) pathways is lactic acid.

MR spectroscopy was used to evaluate the lactate-choline ratio in certain brain structures (basal ganglia and thalami) of the newborns. The researchers also assessed how well another imaging technique called apparent diffusion coefficient (ADC) value in the same brain regions was related to clinical outcomes. They found no statistical correlation between the absolute ADC levels and outcomes.

Using statistical analysis, the researchers found that the probability of an adverse outcome (abnormal or fatal) was strongly associated with high lactate-choline ratio. The probability of an abnormal or fatal outcome was above 95 percent for a lactate-choline ratio of 1.0, while a lactate-choline ratio of zero was associated with a 25 percent probability of an adverse outcome. In addition, a 0.25 lactate-choline ratio was associated with 75 percent probability of adverse outcome and a 0.75 lactate-choline ratio was associated with a 90 percent probability of adverse outcome.

Some newborns have difficulty during the transition from having all of their oxygen needs met by their mother (in the womb) and breathing on their own after birth. Usually, as newborns take air into their lungs, the oxygen levels in their blood rise, causing a cascade of events that permit them to breathe. Some of the signs of asphyxia are that the baby does not breathe or cry at birth, or has seizures.

The infants in the study met the clinical criteria for the diagnosis of hypoxic-ischemic encephalopathy (damage caused by the reduction in the oxygen supply or perfusion of brain tissue) that was due to perinatal asphyxia. The infants in the study (14 girls and 12 boys) were born at full-term (aged 1 to 10 days old).

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Editor's Note: Dr. Poussaint has no financial interests, arrangements nor affiliations that could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation to disclose. She has received an honorarium from the American Medical Association to speak at this briefing.

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