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► **Other brain anomalies.** MRI can be advantageous for precisely visualizing deep structures of the brain, especially as gestational age advances and the skull becomes calcified. Sometimes, MRI enables visualization of deeper structures—such as the optic chiasma, pituitary stalk, and the pituitary—that are not visible on ultrasound.

Fetal MRI is also advantageous for visualizing subtle lesions of the brain, such as parenchymal infarcts and hemorrhage, and other abnormalities of cortical development. Such subtle anomalies can nevertheless be very consequential to long-term neurologic performance.

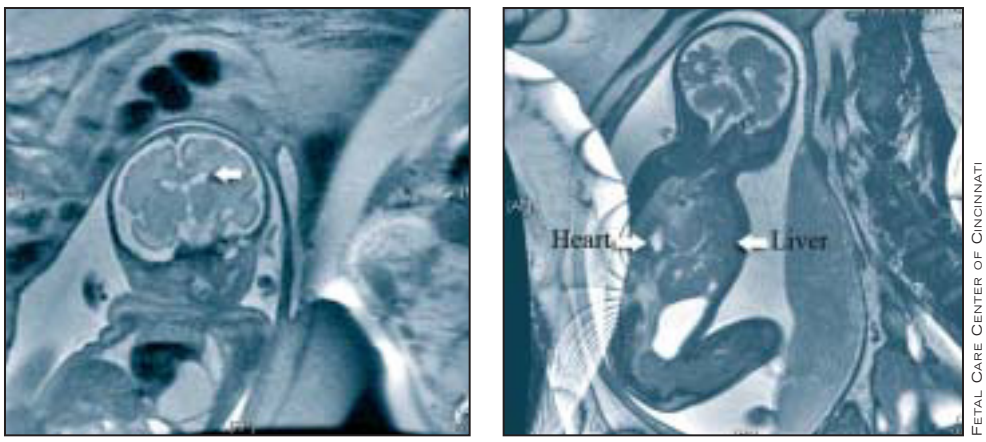
In our institution, we order an MRI whenever we see an anomaly of the brain. A persistently and significantly small fetal head with normal-appearing sonographic anatomy may, for example, reveal a lissencephaly syndrome on MRI exam. In patients with a significant family history of brain abnormalities, a confirmatory MRI of the fetal brain, despite a normal sonographic appearance, may be justifiable.

► **Masses in the neck.** MRI is thought to be particularly useful in assessing masses of the fetal neck and the potential for airway obstruction. Limitations of tissue differentiation on ultrasound may preclude a determination of the extent of infiltration of a neck mass. The panoramic view and tissue differentiation of the MRI may overcome this limitation.

These qualities are used to good advantage in determining whether a neck mass is infiltrating or obstructing the fetal airway, and whether it has the potential to prevent spontaneous breathing at delivery. Should such a situation be confirmed prenatally, an EXIT (ex utero intrapartum treatment) procedure can be planned. In this procedure, the fetus's head and shoulders are delivered and the placenta is left attached (maintaining umbilical circulation and fetal oxygenation) while a surgical intubation or tracheoscopy procedure is performed.

► **Diaphragmatic hernia.** Congenital diaphragmatic hernia is among the most common congenital thoracic lesions. Herniation of the abdominal viscus and organs into the chest can lead to compression of the lungs and lung hypoplasia at birth, precluding normal respiration. When the liver is also herniated into the chest, the chances of survival are sharply reduced.

Although possible, it can be difficult to determine herniation of the liver into the chest with ultrasound. MRI easily identifies thoracic displacement of the liver and therefore has prognostic value in congenital diaphragmatic hernia.



FETAL CARE CENTER OF CINCINNATI

The fetal MRI at left shows a subependymal tuber consistent with tuberosclerosis. At right is a congenital diaphragmatic hernia with liver herniation into the chest.

Limitations, Future Promise

Prenatal MRI does, however, have limitations. Because the technique is based on contrast between water and fat/lipids, it generally does not provide good quality images before about 24 weeks of gestation—a time period in which neurons, for instance, have not yet undergone significant myelination. Ultrasound, in contrast, tends to be quite effective earlier in pregnancy, which is a distinct advantage.

Availability of MRI technology and specific interest and expertise in fetal MRI also are significantly restricted, compared with ultrasound. Furthermore, MRI technology is significantly more costly than ultrasound at this time.

None of these limitations is immutable. All will likely be addressed or at least attenuated with the passage of time.

Just as important will be the development of a team approach to the use of MRI for fetal anomaly detection. Such an approach would involve embracing the expertise of the obstetrician in fetal anatomy and fetal anomalies in general. The interpretation of fetal MRI images should involve not only radiologists and pediatric subspecialists, such as pediatric neurologists, but also fetal medicine specialists working together.

The greatest promise of fetal MRI lies with further advances in so-called functional MRI. This has the potential to provide information not only about structural features of the anatomy, but about the function of various tissues as well. MRI studies could capitalize, for instance, on the fact that tissue that is injured or developmentally abnormal will have differences in metabolism, compared with normal tissue.

For example, animal studies have shown that the MRI signal of oxygenated hemoglobin is different from the MRI signal of deoxygenated hemoglobin. Utilizing such differences in fetal MRI imaging could enable us to identify oxygen deprivation in fetal and placental tissues.

Advances with MRI spectroscopy, moreover, could provide us with further detailed information on tissue metabolism. Collectively, such advances in MRI could revolutionize research and ultimately clinical assessment of the fetus. ■

DR. BAHADO-SINGH *stated he had no conflict of interest relevant to this article.*

Prepregnancy Obesity: Risk Factor for Postpartum Depression

BY DOUG BRUNK

SAN DIEGO — Prepregnancy obesity is an independent risk factor for postpartum depression, a large analysis demonstrates.

Common pregnancy stressors such as divorce or separation or being involved in a physical fight also were found to increase the risk.

"While I advocate that we should screen all women for depression, I think there are subsets of women whose risk is so high that we should either be identifying ways to prevent depression in this group or carry out early targeted surveillance and treatment," Dr. D. Yvette LaCoursiere said in an interview during a poster session at the annual meeting of the Society for Maternal-Fetal Medicine.

"So if a woman comes to pregnancy with a BMI of greater than 35 kg/m^2 who has psychosocial stressors, she may have a risk of postpartum depression of 40%-60%. Perhaps that population should be targeted, both for research and for clinical purposes," she said.

Previous research has shown that women with a history of depression are at increased risk of developing postpartum depression, but the possible association between prepregnancy obesity and subsequent postpartum depression has not been sufficiently studied, said Dr. LaCoursiere of the department of obstetrics and gynecology at the University of California at San Diego.

She and her associate, Dr. Michael W. Varner of the division of maternal-fetal medicine at the University of Utah, Salt Lake City, followed 1,053 women who were delivered of a term, singleton, liveborn infant at one of four hospitals in Utah between 2005 and 2007.

At intake, the researchers obtained demographic and anthropomorphic information and pregnancy stressors, in addition to a psychiatric, medical, obstetric, and family history. Participants were also asked to complete the Pregnancy Risk Assessment Monitoring System (PRAMS).

Self-reported prepregnancy body mass index was stratified by the World Health Organization classification system for underweight (less than 18.5 kg/m^2), normal weight (18.5-24.9 kg/m^2), preobese (25-29.9 kg/m^2), obese class I (30-34.9 kg/m^2), obese class II (35-39.9 kg/m^2), and obese class III (40 kg/m^2 or greater).

At 6-8 weeks after delivery, the women were asked to complete the Edinburgh Postnatal Depression Scale. Postpartum depression was defined as a score of 12 or more.

Dr. LaCoursiere reported that the rate of postpartum depression was directly related to the extremes of body mass index. For example, the rates of postpartum depression among those in the underweight, normal weight, and preobese groups were 18%, 14%, and 19%, respectively, while the rates among those in the obese class I, class II, and class III groups were 19%, 32%, and 40%, respectively.

The rate of postpartum depression was directly related to the extremes of body mass index: The rates in the underweight, normal weight, and preobese groups were 18%, 14%, and 19%.

After the researchers controlled for demographic, psychological, medical, and obstetrical risk factors, the overall adjusted odds ratio of postpartum depression was 2.87 for obese class II women and 3.94 for obese class III women.

In the PRAMS stressors component of the study, Dr. LaCoursiere and Dr. Varner found that common pregnancy stressors increase the risk of postpartum depression. For example, the adjusted odds ratio for postpartum depression among women who reported partner-associated stressors such as divorce or arguing more than usual was 2.61, while the adjusted odds ratio for those who reported traumatic stressors such as being homeless or being involved in a physical fight was 1.66.

The adjusted odds ratio for those who reported both types of stressors was 8.48.

Fewer than half of the study participants (44%) reported that their clinician asked about their mood during pregnancy, while 54% reported that they were asked about their mood during the postpartum period.

Dr. LaCoursiere acknowledged certain limitations of the study, including the self-reported height and weight data and the fact that while women who were being actively treated for depression were excluded, the questionnaire was not administered antepartum or immediately post partum. Therefore, she said, "this cohort may represent women who were depressed antenatally and continued to have antenatal depression into the postpartum period."

Dr. LaCoursiere reported that she had no conflicts to disclose. ■