Combined Tests Improve Delivery Timing in IUGR

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DALLAS — The combination of biophysical and venous Doppler ultrasound parameters provided better timing of deliveries than did either test alone in a study of 584 fetuses with fetal growth restriction.

The prospective, multicenter observational study evaluated umbilical artery, ductus venosus and umbilical vein Doppler flows, and biophysical parameters as predictors of stillbirth, acidemia (cord artery pH less than 7.0 and/or a base deficit of more than 12), neonatal morbidity (intraventricular hemorrhage above grade 2, bronchopulmonary dysplasia, and necrotizing colitis), and neonatal mortality.

All outcomes increased significantly with umbilical artery reversal, abnormal ductus venosus and umbilical vein Doppler, and abnormal biophysical parameters, Dr. Ahmet Baschat and associates reported at the annual meeting of the Society for Maternal-Fetal Medicine.

For all outcomes, combining the two testing modalities improved prediction. The sensitivity to predict stillbirth was 81% for an abnormal Doppler, 70% for abnormal biophysical parameters, and 89% when both tests were used.

Similar improvements in sensitivity were observed with combined testing for acidemia (71% for abnormal Doppler, 63% for abnormal biophysical parameters, 88% for both); neonatal morbidity (53% for abnormal Doppler, 42% for abnormal biophysical parameters, 73% for both); and neonatal death within the first 28 days of life (74% for abnormal Doppler, 55% for abnormal biophysical parameters, 94% for both).

A total of 1,722 exams were performed on 584 fetuses at six centers in the United States, United Kingdom, and Germany. Fetal growth restriction was defined by a combination of abdominal circumference below the 5th percentile and more than a 2-standard-deviation elevation of the umbilical artery pulsatility index. Biophysical risk factors included gestational age, fetal movement, tone, breathing activity, heart rate, and amniotic fluid volume.

The average gestational age at birth was 32 weeks (range 24-41 weeks), the average birth weight was 1,190 g (390-2,100 g), and 452 babies were delivered by cesarean section. There were 38 stillbirths, 48 cases of acidemia, 97 neonatal morbidities, and 32 deaths.

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DR. BASCHAT

The addition of Doppler correctly predicted 10 of 10 unexpected stillbirths that occurred within 1 week of being identified as normal by biophysical risk factors, and 23 of 97 neonatal morbidities after equivocal or abnormal biophysical findings, said Dr. Baschat of the University of Maryland, Baltimore. The addition of Doppler predicted 11 additional cases of acidemia, and 12 additional neonatal deaths.

Using abnormal biophysical parameters alone, 19 stillbirths and 18 cases of acidemia were prevented.

Absent ductus venosus atrial systole (a-wave), umbilical vein pulsations, loss of movement, and oligohydramnios were the strongest predictors of stillbirth and acidemia. When these biophysical variables were absent, Doppler changes had no further impact.

Doppler and biophysical parameters did not completely predict neonatal mortality and morbidity risks, as these depend on gestational age, said Dr. Baschat, who received no funding for the study and disclosed no conflicts of interest.

It is too early to say if integrated fetal testing should become the standard for determining delivery timing in intrauterine growth restriction (IUGR), although the University of Maryland Medical Center has been using the method for the past 7 years, Dr. Baschat said in an interview.

"These observational data lay the foundation for a randomized trial of delivery timing in IUGR," he said, adding that an IUGR research consortium, coordinated through the University of Maryland, is developing a protocol for a management trial. ■