Live 3-D Imaging Captures Fetal Heart Defects

VITALS

Major Finding: Live 3-D volume imaging provided the "face-on" view of the fetal interventricular septum in all but 1 of 153 singleton pregnancies.

Data Source: Exams were performed on an iU-22 ultrasound scanner, with images taken between 20 and 30 weeks' gestation.

Disclosures: None reported.

BY PATRICE WENDLING

HAMBURG, GERMANY — A novel technique that incorporates motion into 3-D ultrasonography allows clinicians to rapidly capture a view of the fetal heart that is difficult to obtain by standard sonography, according to Dr. Yi Xiong.

In a study of 153 singleton pregnancies, the en face, or "face-on," view of the fetal interventricular septum was visualized using live 3-D imaging in all but 1 case, Dr. Xiong reported at the World Congress on Ultrasound in Obstetrics and Gynecology.

There were seven abnormal cases including one isolated ventricular septal defect, one atrioventricular septal defect, three truncus arteriosus with ventricular septal defects, and one case of tetralogy of Fallot.

Only one case—a transposition of the great arteries without a ventricular septal defect—could not be displayed with live 3-D imaging. It was subsequently diagnosed by 2-D ultrasound and confirmed by postnatal echocardiography and surgery.

Although further studies are required to evaluate the sensitivity and reproducibility of this technique in a large population, live 3-D imaging may be a useful tool for the rapid assessment and diagnosis of fetal ventricular septal defects, said Dr. Xiong of the Prince of Wales Hospital at the Chinese University of Hong Kong.

Defects in the crest of the interventricular septum, the atrioventricular valves, and outflow tracts make up the majority of congenital heart defects observed in infants.

Although further studies are required to evaluate the reproducibility of this technique, live 3-D imaging may be useful for diagnosing fetal ventricular septal defects.

Ultrasound is the modality of choice to assess the fetal heart, but even with 3-D ultrasound, the rapid beating of the fetal heart can result in motion artifact. Several methods have been used in an attempt to reduce this limitation.

"The 3-D images can be acquired in real time; therefore, the motion artifacts are no longer a problem," coauthor Dr. Tze Kin Lau, also with the university, said in an interview.

In the current study, the exams were performed on an iU-22 ultrasound scanner (Philips Medical System) with a 7-2 MHz matrix-array transducer. All images were taken between 20 and 30 weeks' gestation, Dr. Xiong said.

With an apical four-chamber view as the starting point, the live 3-D imaging function is activated; the acquisition angle is adjusted to 72 degrees, and the volume is cropped along the *z*-axis to display the 3-D image of the four-chamber view.

When the fetus remains quiescent for 1-2 seconds, the "freeze" button is pressed, creating a cine sequence of real-time 3-D volumes, Dr. Xiong explained.

The best volume is chosen and then cropped along the *x*-axis by moving the red "render box" to the right side of the interventricular septum (IVS). The resultant volume is then turned 90 degrees along the *y*-axis to make the right side of the IVS face the operator. Finally, the green render box is scrolled back along the original *z*-axis for complete display of the en face view of the IVS.

Although live 3-D imaging was used in the study, Dr. Lau acknowledged that conventional 2-D ultrasound is usually used at their hospital to identify congenital heart defects. ■