Ultra early ultrasound for hearts

Cardiac defects can be seen by the 12th week of pregnancy. That helps ensure proper care after birth — and doctors are working on treating problems even sooner.

The specialist: Dr. Ira Parness on fetal cardiology

As chief of Mount Sinai’s Division of Pediatric Cardiology, Parness takes care of heart problems in patients from in utero to about age 20.

Who’s at risk

Thanks to advances in screening technologies, doctors can now examine the heart while it’s incredibly small. “We’re able to diagnose most abnormalities in the way the heart develops in the fetus,” says Parness. “So many pediatric cardiologists are becoming fetal cardiologists.”

Doctors use specialized ultrasounds, called fetal echocardiograms, to investigate the heart as early as the 12th week of pregnancy.

The heart develops at a furious pace between 4 and 9 weeks into pregnancy. “The heart is the first functioning organ of the embryo,” says Parness. “It starts as a coalescence of cells forming a heart tube that begins to beat as soon as it is formed.”

By week 10, the heart is fully developed and working at an average of 150 beats per minute. “So any defect in how the heart is formed is fully formed by the 10th week of pregnancy,” says Parness. “With ultrasound, we can examine how the blood flows in the chambers and make diagnoses in early fetal life.”

About 90% of children with heart problems were born with them; fetal echocardiograms allow doctors to diagnose these defects early and plan a response to them.

Congenital heart defects range from the mildest abnormalities of no import to critical abnormalities that require emergency surgery in the newborn period,” says Parness. “Parents are often surprised but reassured to hear that many of the problems are minor and unimportant in the long run.”

Not every pregnancy needs a fetal echocardiogram. “It’s a high-level screening for high-risk patients,” says Parness, “and there are many risk factors for having a child with a heart defect.” For instance, the fetus is at higher risk if genetic or other non-heart abnormalities have been identified or if one of the parents is older than 35 or has a sibling who was born with a heart defect. Poorly controlled diabetes, certain medications and certain maternal disorders can also have negative effects on the developing heart.

Signs and symptoms

Fetal cardiologists seek to identify heart defects long before any symptoms arise, and they use risk factors to determine which patients need screening. If you have any of the risk factors mentioned above, if you’re taking lithium or other drugs with the potential to affect the fetus, or if you get a viral infection during pregnancy, consult your doctor about getting additional screening.

What you can do

Consult a multidisciplinary team.

If screening identifies a defect, Dr. Parness’ rule of thumb is that it’s worth having a consultation in a center with a multidisciplinary fetal cardiology team.

Have a specialist do your echocardiogram.

“You want a careful and meticulous examination. There are many situations that can make getting a good look at the heart difficult,” says Parness.

Get informed.

Dr. Gregory DeVito, a well-known obstetrician, runs a patient-friendly Web site that explains fetal screening options with text, videos and drawings.

For the mother, a fetal echocardiogram is a lot like any other ultrasound. “What’s different is the doctor, not the machine or what the patient experiences,” says Parness. “You lie on a table, we rub gel on your belly, and we take images with an ultrasound machine.”

The ultrasound probe uses sound waves to examine the anatomy of the fetus, but focuses solely on the heart. The process usually lasts between 30 and 45 minutes. “We’re using very low-energy sound waves that are completely safe for the mother and the baby,” says Parness.

Traditional treatment

Right now, the main task of fetal cardiology is examining the heart in utero and informing parents of whether the heart is healthy or whether they need to prepare themselves for medical attention after the birth of their child.

“The most important thing we do is education and reassuring prospective parents,” says Parness. “Even in high-risk patients, the vast majority of the time we find out that things are normal.” This can be especially reassuring for parents who had an older child with a heart defect.

In cases where the echocardiogram does pick up a defect, doctors can start working in advance to take care of the fetus. “Then we mobilize our multidisciplinary team of expert subspecialists, using the opportunity to educate parents and other caretakers, plan the pregnancy accordingly and optimize the delivery and newborn care to improve outcomes,” says Parness.

“For instance, you wouldn’t want to deliver your child at a local hospital without additional pediatric cardiac services if your child has a complex heart defect,” he says. These critical defects are often discovered only after birth, and usually require the immediate transfer of the newborn to the closest university hospital.

“Often, the baby is whisked away and the mother can’t even leave the hospital yet,” says Parness. “The good news is that the vast majority of even complex abnormalities can be treated, so ultimately things work out — but it’s a terrifying time for parents.”

If that same abnormality is caught at 20 weeks of pregnancy, the doctor can answer all the parents’ questions, tell them what to expect and transfer the case to a tertiary-care hospital for the best possible neonatal attention and to make sure that the mother and baby don’t have to be separated after birth.

Research breakthroughs

Recent years have seen an explosion in the technologies that make it possible to diagnose heart defects in the fetus, but most of these problems are still treated after the baby is born.

“There are opportunities for treating things in utero, but they’re still fairly limited,” says Parness. “It’s an evolving area of research.” He points to a trial in Boston that seeks to use catheters and balloons to dilate obstructed heart valves when the fetus is only 18 to 20 weeks old.

“There are also research programs in animals trying to do open-heart surgery in utero,” says Parness. “People are working on doing surgery and then returning the fetus back to the womb, while helping the animal carry the fetus to term.” The use of such techniques in people is still years down the road.

Questions for your doctor

Patients who might have risk factors should ask, “Do I need a fetal echocardiogram? In some cases, an echocardiogram can be helpful for women who don’t want to get an amniocentesis. If screening does detect a defect, ask, “Can I deliver locally, or do I need to go to a tertiary center?” In the case of many defects, the baby can be born safely in a local hospital, but others would require transferring the baby right after birth, a potentially dangerous process for the infant and stressful for the parents.

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