Unlocking the genetic mysteries behind stillbirth

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Stillbirth is a tragedy that occurs in one of every 160 births in the United States. Compounding the sadness for many families, the standard medical test used to examine fetal chromosomes often can't pin down what caused their baby to die in utero. In most cases, the cause of the stillbirth is not immediately known. The traditional way to determine what happened is to examine the baby's chromosomes using a technique called karyotyping. This method leaves much to be desired because, in many cases, it fails to provide any result at all. Today, some 25 to 60 percent of stillbirths are still unexplained.

A new test for analyzing the chromosomes of stillborn babies, known as microarray analysis, has now proven 40 percent more effective in pinpointing potential genetic causes of death than the old karyotype testing procedure. Researchers at the University of Texas Medical Branch at Galveston, along with a team of other national leaders in maternal-fetal medicine, have published their findings in the Dec. 6 New England Journal of Medicine.

"Families have a much greater sense of closure if they understand what likely caused their baby to die," said Dr. George Saade, lead investigator of the UTMB arm of the study. "And for doctors to be able to see more genetic information about each stillborn baby can only be a good thing in terms of continuing the fight to reduce stillbirths worldwide."

Stillbirth, as defined separately from miscarriage, is when a baby dies in the womb prior to delivery at or after 20 weeks of gestation.

The study, part of the National Institutes of Health Stillbirth Collaborative Research Network's ongoing program, showed that microarray analysis genetic testing offers families strikingly more information than karyotyping about what potentially caused their baby to die before it was born. UTMB's Saade is the lead investigator for the study at UTMB, and chairman of the genetics committee for the Stillbirth Network.

The researchers compared the results of karyotypes from more than 500 stillbirths to results from microarray analysis, a method that detects small segments of missing parts of chromosomes (deletions) or additional sections of genetic material (duplications) that cannot be seen by karyotyping.

They analyzed samples from all stillbirths in a population-based study in five U.S. areas, covered by 59 hospitals over a period of two and a half years. Shortly after each stillbirth, parents gave research staff permission to collect blood from the umbilical cord and tissue from the fetus and the placenta.

The UTMB research team's goal was to reach the parents of 90 percent of all stillborn babies to residents of Galveston and Brazoria counties during the time period of the study. To achieve this, they formed partnerships with 11 hospitals in the region and developed a methodology whereby stillbirths were reported immediately to UTMB if the stillborn child's parents granted permission. Upon notification, UTMB sent staff members to the hospital to meet with the bereaved families.

If the families agreed to take part in the study, UTMB staff members then worked with the participating hospitals to transport the babies to Galveston for genetic testing and/or autopsy before arranging with funeral homes for the babies' final transport. About 100 stillbirths

occurred in the Galveston/Brazoria county region during the two and a half years the study took place.

"It's really something, that families in such a tough situation, with all the shock and sadness they must be feeling upon the loss of their baby, would be willing to work with us to conduct this important stillbirth research," said Saade.

The hospitals included in the UTMB arm of the study were Angleton Danbury Medical Center, Brazosport Memorial Hospital, Clear Lake Regional Medical Center, Memorial Hermann Hospital, Mainland Medical Center, Methodist Hospital, Memorial Hermann Southeast Hospital, Christus St. John Hospital, St. Joseph Medical Center, St. Luke's Episcopal Hospital, the Woman's Hospital of Texas and UTMB.

"We are so glad that the data from our region was included in this important national study," said Saade. "We are proud here at UTMB that our national reputation as a leader in maternal-fetal clinical research has enabled us to be part of this Network and study, and that we were able to work with such an outstanding group of participating hospitals."

Provided by University of Texas Medical Branch at Galveston