Umbilical cord protein analysis detects early onset infection

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Yale School of Medicine researchers have identified proteins associated with early onset neonatal sepsis (EONS), a stealthy bacterial infection linked to premature birth, illness and death. Using protein analysis, the researchers have found the biomarkers that can provide key information on how EONS develops.

"The biomarkers we identified have diagnostic value for infection and inflammation," said Yale assistant professor Catalin Buhimschi, M.D., senior investigator on the study who presented the findings in an abstract at the Society for Maternal Fetal Medicine (SMFM) conference in San Diego, Calif. "We have identified changes that occur in the physiology of the fetus that is exposed to infection and inflammation in the amniotic fluid."

Premature births accounts for 75 percent of infant mortality and 50 percent of long-term handicaps, including blindness, deafness, bronchopulmonary dysplasia, developmental delay and cerebral palsy. The poor outcome is not entirely dependent on their gestational age at birth but rather on other processes such as early onset neonatal sepsis. EONS is extremely difficult to diagnose. At-risk pregnant women are currently treated with a dose of antibiotics before delivery. At birth, the babies are treated with yet another round of antibiotics. These antibiotics can mask the presence of EONS, leading to false negative bacterial culture test results and development of antibiotic resistance.

Buhimschi said that the Yale team's work might lead to earlier

identification of EONS, so that only babies who need treatment receive antibiotics.

Buhimschi and his team analyzed protein in the cord blood of 155 preterm babies to identify which physiological pathways in the protein are activated in EONS. They used a technique called fluorescence 2-D differential gel electrophoresis (2D-DIGE) to create a map of the biomarkers in fetuses that have sepsis. They then observed how the proteins match in physiological pathways.

"We found that early onset neonatal sepsis is characterized by a variety of biomarkers that have different functions," said Buhimschi. "These biomarkers tell us how the fetus reacts to infection by giving a better map of a baby's physiology."

"We hope this research will lead to identifying babies who will develop EONS so that we can prevent its potentially devastating effects," Buhimschi added.

Source: Yale University