

Research at a Glance

The search for precise blood biomarkers of neonatal brain injury

What's known:

Hypoxic-ischemic encephalopathy (HIE) is characterized by reduced blood and oxygen flow to a baby's brain around birth and may cause neurologic disability or death. It occurs most commonly after intrauterine asphyxia brought on by such difficulties as circulatory problems, placental abruption, or inflammatory processes. Newborns with HIE may suffer seizures, difficulty feeding, and disturbed control of heart rate and breathing. Cooling therapy, which is the standard of care, offers some protection to the developing brain, but up to 50 percent of HIE-affected infants still have poor outcomes.

What's new:

Research scientists at Children's National Health System are involved in a multi-center clinical trial to determine if erythropoietin (EPO), a hormone naturally secreted by the kidneys and commonly used to treat anemia, helps to prevent brain injury in these infants. The trial is exploring whether EPO, given in addition to hypothermia, further lowers the risk of brain injury in HIE-affected babies. As a part of this study, researchers at Children's National are leading the investigation to identify biomarkers of brain injury. Biomarkers are telltale chemicals in the blood and are used in tests that evaluate whether patients have suffered a heart attack. While available biomarkers warn when the heart, kidney, or liver is in trouble, there is no blood biomarker that signals ongoing brain injury. Such blood biomarkers could help to determine which infants are responding to treatment as well as to precisely identify which HIE-affected infants are still struggling and require additional treatments, such as EPO, to protect the brain and improve outcomes.

Questions for future research:

- Q:** Does EPO, in tandem with hypothermia, improve long-term neurodevelopmental outcomes in newborns with HIE?
- Q:** Which biomarkers, or panel of biomarkers, best reflect the timing and severity of neonatal brain injury?
- Q:** Can biomarkers direct which types of treatments are best for specific patients and when they should be used?

Sources: "Plasma Biomarkers of Brain Injury in Neonatal HIE (Hypoxic-Ischemic Encephalopathy)." A.N. Massaro, Y. Wu, T.K. Bammler, A. Mathur, R.C. McKinstry, T. Chang, D.E. Mayock, S. Mulkey, K. Van Meurs, L. Dong, R. Ballard, and S. Juul.

"Erythropoietin and Hypothermia for Neonatal Neuroprotection: A Phase II Randomized Controlled Trial." Y. Wu, A. Mathur, T. Chang, D. Mayock, S. Mulkey, K. Van Meurs, R. McKinstry, F. Gonzalez, E. Rogers, A. Massaro, L. Dong, S. Bonifacio, H. Glass, R. Ballard, B. Comstock, P. Heagerty, and S. Juul.

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