Children's National Health System

Clinical Innovations at a Glance

A novel way to treat intractable epilepsy caused by hemimegalencephaly

What's known:

Hemimegalencephaly is an extremely rare birth defect in which one side of the brain grows larger than the other. This anomaly typically leads to severe, recurrent seizures that can be difficult to control solely with medications. While the seizures themselves are detrimental to the developing brain, the amount of medications used to reduce seizure frequency often come with significant side effects and have the potential to hamper brain growth.

Hemispherectomy, a radical surgery in which one half of the brain is removed, is often the most successful way to treat severe and intractable epilepsy. However, this surgery can be challenging to perform successfully in very young babies.

What's new:

The Children's National Health System Epilepsy Team led by Chima Oluigbo, M.D., F.R.C.S.C., a pediatric neurosurgeon; Tammy N. Tsuchida, M.D., Ph.D., a pediatric surgical epileptologist; Monica Pearl, M.D., a pediatric interventional neuroradiologist; Taeun Chang, M.D., a neonatal neurointensivist; and the neonatal intensive care team explored the possibility of using minimally invasive surgery to cut off the blood supply to the hemisphere responsible for generating seizures in newborns with hemimegalencephaly. This procedure, they reasoned, could buy time for babies to mature and become more resilient to withstand the future hemispherectomy while also lessening the damage caused by uncontrolled, recurrent seizures. Their case report focused on the first two patients with hemimegalencephaly who had sequential procedures to gradually restrict blood flow to the affected brain hemisphere within the first few weeks of life, followed by hemispherectomies at a few months of age. This novel approach significantly lessened their seizures until hemispherectomy, allowing these children to continue to grow and develop seizure-free.

Questions for future research:

Q: Which patients are best suited for this surgical procedure?

Q: How can surgeons reduce the risk of excessive blood loss during hemispherectomy caused by the growth of additional blood vessels after flow through the brain's major vessels has been blocked?

Q: What are the long-term outcomes for infants who undergo these procedures?

Source: " *'Endovascular embolic hemispherectomy': A strategy for the initial management of catastrophic holohemispheric epilepsy in the neonate." Oluigbo, C., M.S. Pearl, T.N. Tsuchida, T. Chang, C.-Y. Ho and W.D. Gaillard. Published by Child's Nervous System October 29, 2016.*