



Children's Hospital
Cleveland Clinic

Pediatric Stroke

Facts about Pediatric Stroke from Cleveland Clinic

OVERVIEW

Stroke is one of the top 10 causes of death in children, and the majority of pediatric stroke survivors will have lingering, persistent neurological and/or cognitive impairment. Epilepsy may develop in a significant number of stroke survivors. However, children tend to recover from stroke better than adults, due mostly to the plasticity of their brains (ability of brain networks to reorganize and recover following injury) and the fact that their brains are still developing.

The risk of stroke is highest during the first year of life, but stroke may occur any time throughout childhood or adolescence. Perinatal stroke – during the late stages of pregnancy and through the early newborn period – occurs in about 1 in every 3,000 live births. Boys and African-American children are at higher risk than other population groups for stroke. Recurrence risk, which depends on the underlying cause, occurs in about 20 percent of children. Unfortunately, delay and misdiagnosis of pediatric stroke are still common, despite increasing awareness of this condition among medical professionals and the public.

WHAT IS A STROKE?

A stroke, or “brain attack,” occurs when the blood supply to part of the brain is cut off, resulting in tissue injury and loss of brain function. When brain tissue is cut off from its supply of oxygen and nutrients for more than three minutes, it begins to die.

There are two types of stroke:

- In *ischemic strokes*, brain arteries become blocked by a clot and prevent blood and oxygen from nourishing a region of the brain. A clot may form inside an artery if the artery is injured or narrowed, or if a problem exists with blood clotting (a so-called hypercoagulable state). Or, a clot may travel from a distant site

(embolic clot). The most common distant sites include the heart and the neck vessels.

- In *hemorrhagic strokes*, brain arteries rupture from damage/trauma or malformation of the blood vessels. Blood accumulates inside the brain, causing pressure that leads to impaired flow of blood, oxygen and nutrients to the affected region, resulting in brain cell death. The risk of hemorrhage is higher with certain bleeding disorders, such as hemophilia.

CAUSES OF PEDIATRIC STROKE

The causes of stroke differ greatly in children and adults. Adult risk factors such as hardening of the arteries (atherosclerosis), high blood pressure, high cholesterol and diabetes do not commonly cause stroke in children. Rather, pediatric strokes may be caused by:

- Birth defects
- Infections (e.g., meningitis, encephalitis)
- Trauma
- Blood disorders, such as sickle cell disease or clotting problems
- Congenital or acquired heart disease
- Abnormalities of blood vessels (e.g. moyamoya, dissection, vasculitis)
- Metabolic disorders

PEDIATRIC STROKE SYMPTOMS

- Sudden onset of severe, progressive headache
- Eye movement problems or complete or partial loss of vision
- Sudden numbness or weakness in the face, arm or leg (especially on one side of the body)
- Difficulty speaking or understanding words or simple sentences

(Continued on back)

- Difficulty swallowing
- Dizziness, loss of balance or lack of coordination
- Brief loss of consciousness, seizures
- Sudden inability to move part of the body (paralysis)

Specific symptoms depend on the function of the part of the brain deprived of blood during the stroke. Some symptoms mimic those associated with adult stroke, while others such as seizure, nausea and vomiting are more common in children.

Every minute brain cells are deprived of oxygen during a stroke, brain damage increases. The chances of survival and recovery improve when treatment begins within the first few hours of stroke warning signs. Immediate treatment of a stroke may limit or even prevent brain damage. Hence, it is critical to get to the hospital quickly if you recognize stroke symptoms. **The fastest and safest way is to call 911.**

The long-term effects of stroke in a child are generally the same as in an adult. The most common effects are:

- Weakness or paralysis on one side of the body
- One-sided neglect, which causes the stroke survivor to ignore or forget his or her weaker side
- Difficulty with speech and language or trouble swallowing
- Decreased field of vision and trouble with visual perception
- Loss of emotional control and changes in mood
- Cognitive changes or problems with memory, judgment and problem solving
- Behavioral or personality changes, improper language or actions
- Development of epilepsy

PEDIATRIC STROKE TREATMENT

Every child with a suspected acute stroke should be evaluated by a pediatric neurologist familiar with managing pediatric stroke. This should be done in a facility with appropriate expertise and resources for the acute management of stroke in children.

Cleveland Clinic offers state-of-the-art neuroimaging and multidisciplinary, comprehensive care in the evaluation, management and treatment of pediatric stroke. Our team includes pediatric neurologists specializing in pediatric stroke, pediatric neuroradiologists and interventional neuroradiologists, and multiple pediatric subspecialists in hematology and vascular medicine; cardiology; rheumatology; psychiatry; and physical, occupational and speech therapy.

Pediatric stroke patients are managed in our Children's Hospital Pediatric Intensive Care Unit (PICU), which offers advanced neuroimaging capabilities and is staffed 24/7 by senior intensive care physicians.

Cleveland Clinic's Critical Care Transport (CCT) also offers emergency medical transportation for infants, children and adults. While in transport, CCT has the ability to obtain specialized consultations with Cleveland Clinic pediatric specialists. This communication and seamless transition of care continues throughout evaluation and treatment at Cleveland Clinic.

Cleveland Clinic is recognized as a leading congenital heart disease treatment center, with national and international referrals. Because approximately 25 percent of childhood strokes have a cardiovascular cause, we are able to apply our expertise in this important area, offering potential interventions and second opinions.

U.S. News & World Report ranks our pediatric neurology and neurosurgery program among the top four in the nation, and we are also ranked best in Ohio. Our pediatric neurology team works closely with pediatricians and pediatric specialists at Cleveland Clinic Children's Hospital, offering advanced medical care and rehabilitation services for acute illnesses and injuries as well as for chronic and disabling conditions.

The Center for Pediatric Neurology and Neurosurgery, a part of Cleveland Clinic's Neurological Institute, offers advanced and compassionate care to children with neurological disorders and their families. Each year, our world-renowned neurologists and neurosurgeons oversee more than 10,000 patient visits for an array of neurological disorders.

To schedule an appointment with a Cleveland Clinic pediatric stroke neurologist, please call **216.636.5860** or toll free, **866.588.2264**.

For more information on Cleveland Clinic's Center for Pediatric Neurology and Neurosurgery, call **216.444.5559** or visit clevelandclinic.org/pediatricneurology.