Stroke

A stroke occurs when the blood supply to part of the brain is suddenly blocked or when a blood vessel in the brain bursts, spilling blood into the spaces surrounding brain cells. In the same way that a person suffering a loss of blood flow to the heart is said to be having a heart attack, a person with a loss of blood flow to the brain or sudden bleeding in the brain can be said to be having a "brain attack."

Paralysis is a common feature of stroke, often on one side of the body (hemiplegia). The paralysis or weakness may affect only the face, an arm, or a leg or may affect one entire side of the body and face.

A person who suffers a stroke in the left hemisphere of the brain will show right-sided paralysis or paresis. Conversely, a person with a stroke in the right hemisphere of the brain will show deficits on the left side of the body.

There are two types of stroke: ischemic and hemorrhagic. An ischemic stroke is caused by a blood clot that blocks a blood vessel in the brain. Ischemic stroke is the more common of the two types. Hemorrhagic stroke is caused by a blood vessel that breaks and bleeds into the brain.

Ischemia is the term used to describe the loss of oxygen and nutrients for brain cells when there is inadequate blood flow. Ischemia ultimately leads to infarction, the death of brain cells, which are eventually replaced by a fluid-filled cavity (or infarct) in the injured brain.

When blood flow to the brain is interrupted, some brain cells die immediately; others remain at risk for death. The damaged cells can be saved by early intervention with drugs. Researchers have learned that restoring blood flow to these cells can be achieved by administrating the clot-dissolving agent tissue plasminogen activator (t-PA) within 3 hours of the start of the stroke. Many neuroprotective drugs are being tested to prevent the wave of damage after the initial attack.

Stroke has always been viewed as unpreventable and untreatable. Added to this fatalism was the wrong belief that stroke happens only to the elderly and is therefore not of concern.
As a result of these misconceptions, the average stroke patient waits more than 12 hours before arriving at the emergency room. Health care providers take an attitude of "watchful waiting" instead of treating stroke as a medical emergency.

With the use of the term "brain attack," stroke has a definitive, descriptive name. The appropriate response to a brain attack is emergency action, both by the person it strikes and the medical community. Educating the public to treat stroke as a brain attack and to seek emergency treatment is crucial because every minute lost, from the onset of symptoms to the time of emergency contact, cuts into the limited window of opportunity for intervention.

**Symptoms**

The symptoms of a stroke are easy to spot: sudden numbness or weakness, especially on one side of the body; sudden confusion or trouble speaking or understanding speech; sudden trouble seeing in one or both eyes; sudden trouble walking, dizziness, or loss of balance or coordination; or sudden severe headache with no known cause. Stroke can usually be distinguished from other causes of dizziness or headache. These symptoms may indicate that a stroke has occurred and that medical attention is needed immediately.

**Risk Factors**

The most important risk factors for stroke are hypertension, heart disease, diabetes, and cigarette smoking. Others include heavy alcohol consumption, high blood cholesterol levels, illicit drug use, and genetic or congenital conditions, particularly vascular abnormalities.

**Early Recovery**

In ways not clearly understood, the brain compensates for the damage caused by stroke or brain attack. Some brain cells may be only temporarily damaged, not killed, and may resume functioning. In some cases, the brain can reorganize its own functioning. Sometimes, a region of the brain takes over for a region damaged by the stroke. Stroke survivors sometimes experience remarkable and unanticipated recoveries that can't be explained.

General recovery guidelines show:

- 10 percent of stroke survivors recover almost completely
- 25 percent recover with minor impairments
- 40 percent experience moderate to severe impairments requiring special care
- 10 percent require care in a nursing home or other long-term care facility
- 15 percent die shortly after the stroke

**Rehabilitation**
Rehabilitation starts in the hospital as soon as possible after the stroke. In patients who are stable, rehabilitation may begin within two days after the stroke has occurred, and should be continued as necessary after release from the hospital. Rehabilitation options may include the rehab unit of a hospital, a subacute care unit, a rehab hospital, home therapy, outpatient care, or long term care in a nursing facility.

The goal in rehabilitation is to improve function so that the stroke survivor can become as independent as possible. This must be accomplished in a way that preserves dignity while motivating the survivor to relearn basic skills the stroke may have taken away – such as eating, dressing and walking.

Although stroke is a disease of the brain, it can affect the entire body. Some of the disabilities that can result from a stroke include paralysis, cognitive deficits, speech problems, emotional difficulties, daily living problems, and pain.

Stroke may cause problems with thinking, awareness, attention, learning, judgment, and memory. A stroke patient may be unaware of his or her surroundings, or may be unaware of the mental deficits that resulted from the stroke.

Stroke victims often have problems understanding or forming speech. Language problems usually result from damage to the left temporal and parietal lobes of the brain.

A stroke can lead to emotional problems. Stroke patients may have difficulty controlling their emotions or may express inappropriate emotions in certain situations. One common disability that occurs with many stroke patients is depression -- more than a general sadness resulting from the stroke incident.

Stroke patients may experience pain, uncomfortable numbness, or strange sensations after a stroke. These sensations may be due to many factors including damage to the sensory regions of the brain, stiff joints, or a disabled limb.

According to the National Stroke Association, the total cost of stroke to the United States is about $43 billion a year, with direct costs for medical care and therapy estimated at about $28 billion a year.

Sources: National Stroke Association, National Institute of Neurological Disorders and Stroke.

Graphics Credit: National Heart, Lung, and Blood Institute

The above excerpt is from the Christopher & Dana Reeve Foundation Paralysis Resource Center website.  https://www.christopherreeve.org/living-with-paralysis/health/causes-of-paralysis/stroke

Web Sites

American Stroke Association
American Heart Association: Heart Disease and Stroke Statistics
http://www.heart.org/HEARTORG/General/Heart-and-Stroke-Association-Statistics_UCM_319064_SubHomePage.jsp
Statistics on heart disease, stroke and other vascular diseases in the United States including data on disease morbidity, mortality and risks; quality of care; medical procedures and operations; and costs associated with the management of these diseases.

American Heart Association: Heart Disease and Stroke Statistics 2020
https://www.ahajournals.org/doi/epub/10.1161/CIR.0000000000000757

Brain Aneurysm Foundation
http://www.bafound.org
269 Hanover Street, Building 3
Hanover, MA 02339
Phone: 781-826-5556, 888-272-4602
E-mail: office@bafound.org
The Brain Aneurysm Foundation is dedicated to providing critical awareness, education, support and research funding to reduce the incidence of brain aneurysm ruptures. The website provides information on symptoms, diagnosis and treatment for stroke and has a patient resource directory and links to support groups.

Inspire: Stroke Support Group
http://www.inspire.com/groups/stroke/
Online support group for patients, families, friends and caregivers.

National Institute of Neurological Disorders and Stroke (NINDS)
http://www.ninds.nih.gov/
NIH Neurological Institute
PO Box 5801
Bethesda, MD 20824
Phone: 301-496-5751, 800-352-9424
This site offers information on the medical aspects of stroke, risk factors, biomedical research, therapies, and rehabilitation.

NINDS: Know Stroke
https://www.stroke.nih.gov/
This site offers a wide range of materials about stroke prevention, treatment, and rehabilitation.
National Institute of Neurological Disorders and Stroke (NINDS):

Post-Stroke Rehabilitation booklet

The Stroke Channel
www.TheStrokeChannel.TV
This website was created to help raise awareness about the signs of stroke as well as to provide support to those who have survived a stroke. It offers access to support groups, a radio podcast called “Life After Stroke” and videos from stroke survivors.

The Stroke Network
http://www.strokenetwork.org
The Stroke Network is an online stroke support organization created by stroke survivors that provides information and support to stroke survivors and caregivers through multiple web sites. Support services include daily chat sessions, instant messages, blogs and a message board. Information resources include a monthly newsletter, book shop, articles, links, webcasts and a Stroke Caregiver Handbook.

World Stroke Organization
http://www.world-stroke.org/
c/o Kenes International
7, rue Francois-Versonnex
P.O. Box 6053, CH-1211 Geneva 6
Switzerland
Tel: + 41 22 906 9166
E-mail: admin@world-stroke.org
The World Stroke Organization promotes stroke prevention, education, and clinical research, as well as care of persons with stroke and vascular dementia.

Pediatric Stroke

American Stroke Association: Stroke in Children
This site has information on strokes in infants and children, as well as links to support groups and other resources for parents and caregivers.

Children’s Hemiplegia and Stroke Association (CHASA)
http://www.chasa.org
4101 West Green Oaks
Suite 305, #149
Arlington, TX 76016
CHASA provides assistance, information and counseling to families of children who have hemiplegia, hemiparesis, or hemiplegic cerebral palsy. The site covers medical conditions, rehabilitation, daily living, finances and more.

Hemi-Kids
https://chasa.org/hemikids/
E-mail discussion group operated by CHASA for families of children who have hemiplegia due to pediatric stroke or other causes.

**Pediatric Stroke Awareness**
http://www.chasa.org/you-can-help/pediatric-stroke-awareness/
Informational site operated by CHASA.

**Pediatric Stroke Network**
http://www.pediatricstroke network.com
The Pediatric Stroke Network aims to bring together friends and families of infant or childhood stroke survivors from around the world. The website has information on childhood stroke, rehabilitation, and after effects. The network maintains a listserv for members.

**Stroke in Young Adults**

**American Heart Association: Early Strokes Leave Many Young Adults with Long-Lasting Disability**

**American Heart Association’s Heart Insight: Risk of Stroke on the Rise in the Young**

**Evidence-Based Review of Stroke Rehabilitation (EBRSR): The Rehabilitation of Younger Patients Post Stroke**

**National Orange Popsicle Week (NOPW)**
www.nopw.org
NOPW works to raise awareness of stroke in young people. It was founded by a woman who wanted an orange popsicle after her stroke. They dye a fountain in a park in Kansas City orange once a year to raise awareness. The website offers a place for young stroke survivors to share their stories.

**New York Times: Too Young to Have a Stroke? Think Again**
http://well.blogs.nytimes.com/2012/09/03/too-young-to-have-a-stroke-think-again/

**Stroke in Young Adults: A Resource for Patients and Families**
https://www.canadianstroke.ca/sites/default/files/resources/Stroke_Young_FINAL.pdf
A 2015 resource from the Heart and Stroke Foundation Canadian Partnership for Stroke Recovery.

**Strokes in Young Adults: Epidemiology and Prevention** Vascular Health Risk Management 2015; 11: 157–164.
http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4348138/
UpToDate: Ischemic Stroke in Children and Young Adults: Etiology and Clinical Features

WebMD: Stokes and the Toll They Take on Younger Adults

Constraint-Induced Movement Therapy

CHASA: Constraint Induced Movement Therapy and Hand-Arm Bimanual Intensive Therapy
https://chasa.org/treatment/constraint-induced-movement-therapy/

University of Alabama at Birmingham: CI Therapy Research Group
http://www.uab.edu/citherapy/
CI Therapy Research Group
University of Alabama at Birmingham
1720 2nd Ave South
CPM 712
Birmingham, AL 35294
Phone: 205-934-9768
E-mail: citherapy@uab.edu
This page has information on constraint-induced movement therapy, which was developed by Edward Taub, Ph.D. and other researchers at the University of Alabama at Birmingham. The site includes information on active research projects and a pediatric CI therapy clinic.

University of Alabama at Birmingham Pediatric Neuromotor Research Clinic: ACQUIREc Therapy
http://www.uab.edu/civitansparks/pediatric-neuromotor
UAB Civitan-Sparks
1720 2nd Avenue South
CH19 307
Birmingham, AL 35294-2041
Phone: 205-975-0466, 205-306-4479
Email: ksl@uab.edu
This page has information on ACQUIREc therapy (formerly called pediatric CI therapy).

Apps

Constant Therapy
www.ConstantTherapy.com
Constant Therapy is a customizable iPad application to support the rehabilitation efforts of stroke survivors. It offers 60+ tasks with up to 10 challenge levels, allowing for personalized activity programs for each individual. As performance scores change, tasks can change in the level of difficulty and new tasks can be introduced. Constant Therapy provides tools for stroke survivors who want to get back to everyday activities
like speaking, reading, writing, counting money, solving problems, reading maps and calendars, and more. Constant Therapy provides a science-based mobile solution for highly personalized, continuous therapy tools to patients with traumatic brain injury, stroke, aphasia, and learning disabilities.

Magazines

Stroke Connection e-news
Published by the American Stroke Association. Written for the consumer or patient. Free to individuals.

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