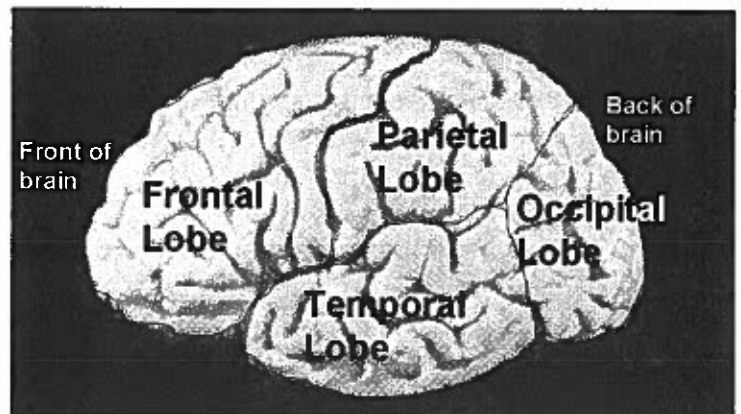
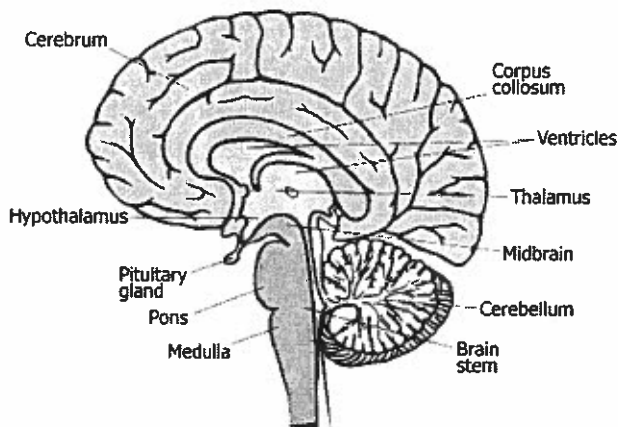


# Strokes and TIA's

## Anatomy of the Brain:

The brain is divided into 3 parts:

1. The *brain stem* is responsible for breathing, blood pressure, swallowing, and pupil constriction.
2. The *cerebellum* controls muscle and body coordination. This is what allows us to complete tasks such as walking, picking up objects and playing the piano.
3. The *cerebrum* is divided into the left and right hemisphere. Each hemisphere controls the opposite side of the body. The front part controls emotion and thought. The middle controls touch and movement. The back controls sight. Speech is thought to be controlled in the left hemisphere.



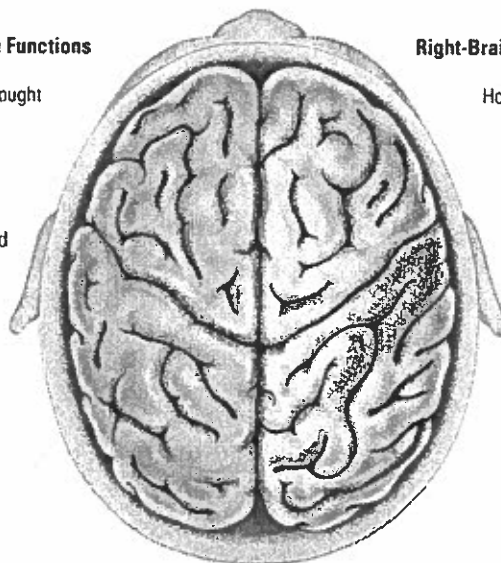
### Left and Right Brain Functions

#### Left-Brain Functions

Analytic thought  
Logic  
Language  
Science and math

#### Right-Brain Functions

Holistic thought  
Intuition  
Creativity  
Art and music



Poor blood flow or low oxygen levels may cause signs and symptoms such as dizziness, restlessness, anxiety, and confusion. Keep in mind patients that have COPD or emphysema, and those in cardiac arrest. The longer the patient is without adequate blood flow the worse the symptoms will be and the worse their outcome and recovery will be.

## **Pathophysiology:**

A *cerebrovascular accident (CVA)* is an event that interrupts blood flow to the brain that results in loss of function. A *stroke* is the brain damage and loss of function that results from a CVA.

When cells lose oxygen and die they are known as *infarcted* cells. If the brain develops *ischemia*, a lack of oxygen causing decreased function, there is a possibility that it can be reversed if corrected in a certain time frame. Normal function can be returned if blood flow is restored within a certain time frame.

## **Types of Strokes:**

1. A ***hemorrhagic stroke*** occurs when a blood vessel bursts and blood flows into the brain matter. The blood that leaves the vessel pushes on the surrounding tissue and forms clots. As the pressure builds on the rest of the tissue, certain functions are lost due to decreased oxygen supply. This accounts for about 10% of all strokes. Patients with hypertension (high blood pressure), and weaknesses of cerebral vessels known as aneurysms are at higher risk for developing this type of stroke. These are types of strokes are often fatal, however if caught early enough they can be surgically repaired.
  - a. Signs and Symptoms: the patient will tell you that they are having the “worst headache of my life.” This is a key phrase that should be taken very seriously. BP will often be low and heart rate will be high. The heart is trying to pump more blood around to compensate for a loss.
  
2. An ***ischemic stroke*** occurs when blood flow is impaired due to a blockage in the vessel. *Atherosclerosis* is a disorder in which plaque builds up and narrows the diameter of the blood vessel; this puts the patient at higher risk for having a blood clot get lodged in that vessel, resulting in a CVA.
  - a. Signs and Symptoms: depending on the location of the blockage, the patient can have no symptoms at all or can present with complete paralysis. Blood pressure will often be elevated; think of this as a kink in a hose- the pressure behind the kink will be high.
  
3. A ***transischemic attack (TIA)***, also called a “mini stroke” is an event in which a clot temporarily impairs or blocks blood flow to a certain part of the brain. The body naturally resolves the clot and blood flow is restored.
  - a. Signs and Symptoms: a TIA may present just like an ischemic stroke, however the signs and symptoms will resolve on their own without medical intervention within 24 hours of onset.

## **Signs and Symptoms:**

Left sided strokes often present with speech problems, aphasia (no speech), and grunting noises. Strokes that occur in the left side of the brain will affect the right side of the body.

Right sided strokes often present with slurred speech, and inability or severe difficulty in moving the extremities. Strokes that occur in the right side of the brain will present on the left side of the body.

\*Do not mistake signs and symptoms of altered mental status, hypoglycemia, or postictal state for a CVA\*

## **Assessment:**

First, assess the chief complain of the patient and determine their level of consciousness using the AVPU scale. Assess their ABC's; put the patient on high flow oxygen via a NRB as soon as possible. Make a transport decision; all symptomatic patients will be a rapid transport to a stroke center. Obtain SAMPLE history, and a full set of vital signs. Be sure to pay close attention to your blood pressure; it can change rapidly. It is not uncommon to have pressures as high as 200/100 for patients having an ischemic stroke.

## **Interventions:**

1. High flow oxygen via a NRB mask. Assist with ventilations if needed.
2. Determine how long the signs and symptoms have been going on. If the patient cannot give a time frame, ask the family "when was the last time they were seen acting normally?"
3. Obtain vital signs and recheck them frequently to note any changes.
4. Monitor respiratory status and intervene with assisted breathing as needed.
5. Monitor pupil reaction, often they will not be equal in a hemorrhagic stroke.
6. Keep the patient's head elevated (excluding spinal immobilization). Remember gravity. You do not want the patient laying flat or in the shock position; this will move more blood to the brain. You do not want to increase pressure more than necessary. Also, placing the patient in a semi-fowlers position will allow for full lung expansion and will improve their respirations.
7. Cincinnati Stroke Scale (see below)
8. Glasgow Coma Scale

**Cincinnati Stroke Scale** is a tool used to evaluate the severity of a patient having a stroke. This consists of three challenges for the patient:

1. **Facial Droop:** have the patient smile or stick out their tongue. Normally, the patient should present with bilateral rise and fall of the facial muscles or tongue. For a patient having a stroke, once side is usually weaker or not movable.
2. **Arm Drift:** have the patient close their eyes and hold their arms out straight in front of them (yes, like Frankenstein). Normally the patient would be able to keep their arms held out, however when they are having a stroke once side will be weak or will fall completely.
3. **Speech:** have the patient repeat one of the two phrases: "The sky is always blue in Cincinnati" or "you can't teach an old dog new tricks." Both of these phrases use every speech pattern. If the patient is having a stroke they will often not be able to speak these properly.

## **Prehospital Care and Time Frame:**

A patient having an ischemic stroke can be given medications called thrombolytics that are used to break up the clot. Thrombolytics can be administered within 3 hours of the onset of symptoms, once it is confirmed that they are having an ischemic stroke by the use of CAT Scan. Thrombolytics are powerful blood thinners that act to break up the clot. Generally speaking, this gives EMS a maximum of 2 hours to deliver the patient to the ER since the onset of symptoms. The hospital needs at least 1 hour to do an assessment on the patient, get blood work and an EKG, to get the patient to CAT Scan, and to push the medications. This is not a lot of time to play with, so the sooner the patient is delivered to the ER the better. This means that if a patient is symptomatic and is within the 3 hour time frame, the EMT must notify the receiving hospital that they are enroute with a "Code Stroke." This alerts the hospital to clear the CAT Scan table and focus on the care of this patient. In the Prehospital setting, no extra time should be taken. This patient is a rapid transport to the closest hospital that is a qualified stroke center.

## **Stroke Centers Near Us:**

Putnam Hospital Center: often our closest hospital, where most of our patients will go  
Northern Westchester Hospital Center  
Westchester Medical Center  
Hudson Valley Hospital Center  
Danbury Trauma Center

