

Cerebrovascular Accident

ACUTE CARE PART 1

Nervous System Anatomy and Physiology Review

- The nervous system acts as a coordinated unit both structurally and functionally
- Communication network responsible for coordinating and organizing the functions of all body parts
- The body's link to the environment
- Works with the endocrine system to maintain homeostasis
- Reacts in a split second

Functions

- 1. Regulates system
- 2. Controls communication
- 3. Coordinates Activities of body system

Divisions

- Central nervous system (CNS) : brain and spinal cord –interprets incoming sensory information and sends out instruction based on past experiences
- Peripheral nervous system (PNS) : Cranial and spinal nerves extending out from brain and spinal cord---carry impulses to and from brain and spinal cord

Neurological Terms

- Anesthesia- complete loss of sensation
- Aphasia-loss of ability to use language
- Auditory/receptive aphasia- loss of ability to understand
- Expressive aphasia- loss of ability to use spoken or written word
- Ataxia- uncoordinated movements
- Coma- state of profound unconsciousness
- Convulsion- involuntary contractions and relaxation of muscles

Neurological terms

- Delirium- mental state characterized by restlessness and disorientation
- Diplopia- double vision
- Dyskeinesia- difficulty in voluntary movement
- Flaccid- without tone- limp
- Neuralgia- intermittent, intense pain, along the course of a nerve

Neurological terms

- Neuritis- inflammation of a nerve or nerves
- Nystagmus- involuntary, rapid movements of the eyeball
- Paresthesia- abnormal sensation without obvious cause, with numbness and tingling
- Stupor- state of impaired consciousness with brief response only to vigorous and repeated stimulation

Pathology

- The pathology involving the CNS arises from injuries, vascular insufficiency, tumors, infections and disorders from other diseases. Neurological medical problems are due to interference with normal functioning of the affected cells

Patho

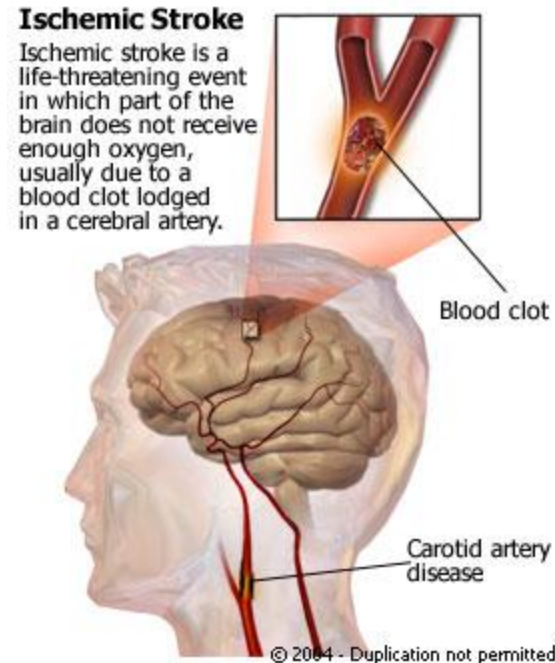
- Decreased blood supply to a part of the brain
- caused by rupture , occlusion, or stenosis of the blood vessels
- Onset may be sudden or gradual
- Symptoms and patient problems depend on location and size of area of brain with reduced or absent blood supply
- right CVA results in Left side involvement often associated with safety/ judgment
- Left CVA results in Right side involvement often associated with speech problems

Epidemiology

- Symptoms related to location and size of brain area affected
- Approximately 50% of survivors permanently disabled
- High proportion experiencing recurrence within weeks to years
- Chances for complete recovery depending on circulation returning to normal soon after the initial stroke
- Third most common cause of neurological disability

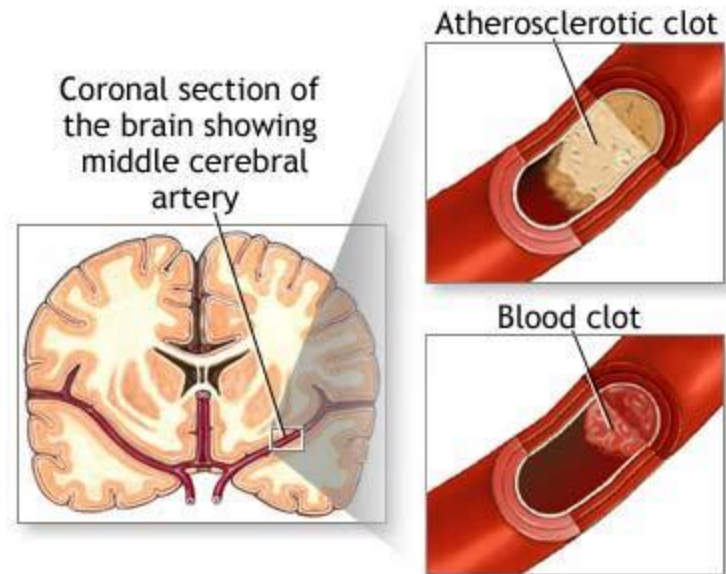
Cerebrovascular accident

- CVA
- Stroke
- Brain attack
- Incidence increased with aging
- Atherosclerosis
- Embolism
- Thrombosis
- Hemorrhage from ruptured cerebral aneurysm
- hypertension



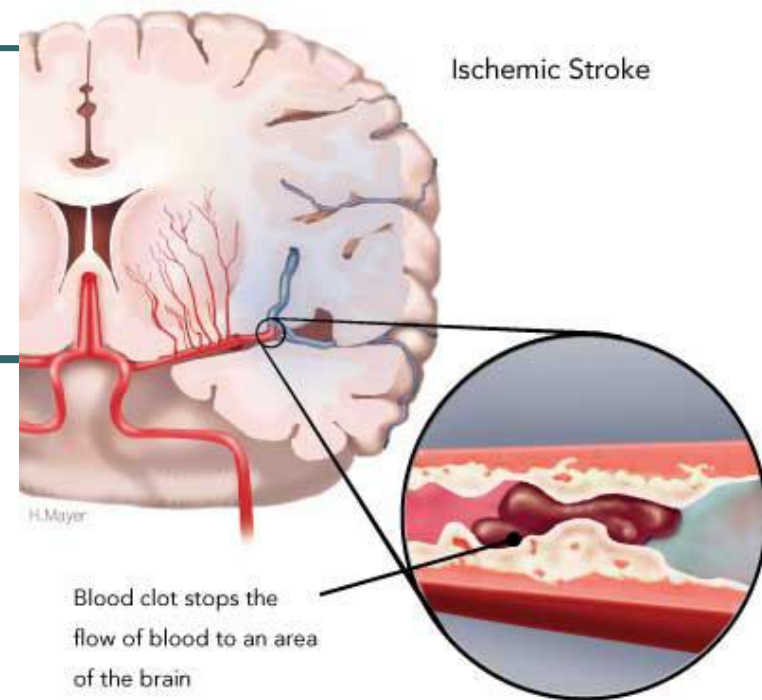
CVA: Pathophysiology

- Disruption of blood flow to part of the brain →
- Ischemia →
- Tissue Anoxia →
- \downarrow PaO₂ & \uparrow PaCO₂ →
- Acidosis →
- Infarction →
- Edema →
- \uparrow ICP



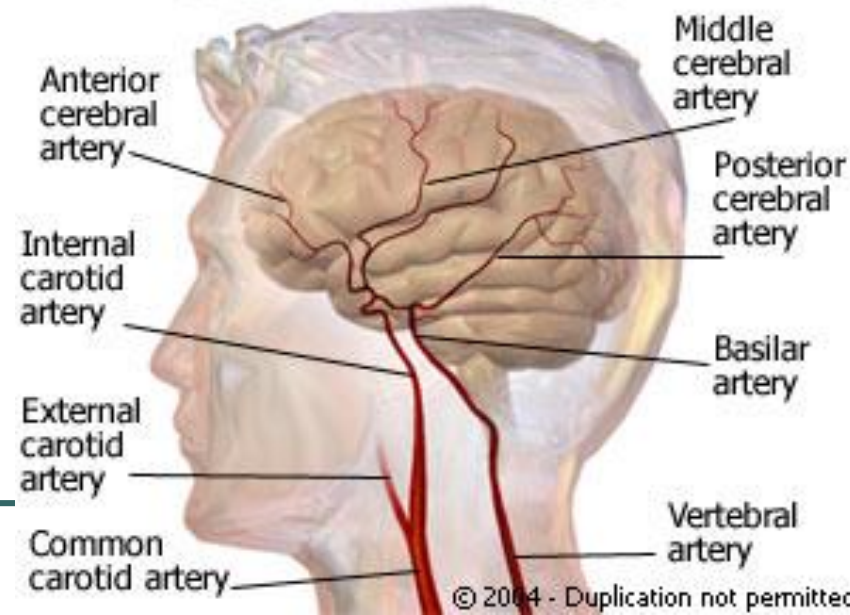
CVA: Etiology

- Ischemic (80%)
 - Thrombosis
 - ___?___ → thrombosis
 - Arteriosclerosis
 - Common site
 - Carotid artery
 - Embolism
 - Atrial fib or HTN →
 - Plaque breaking off and becoming an emboli
 - d/t Long standing cardiovascular disease
- Classification
 - Transient
 - Ischemic
 - Embolic



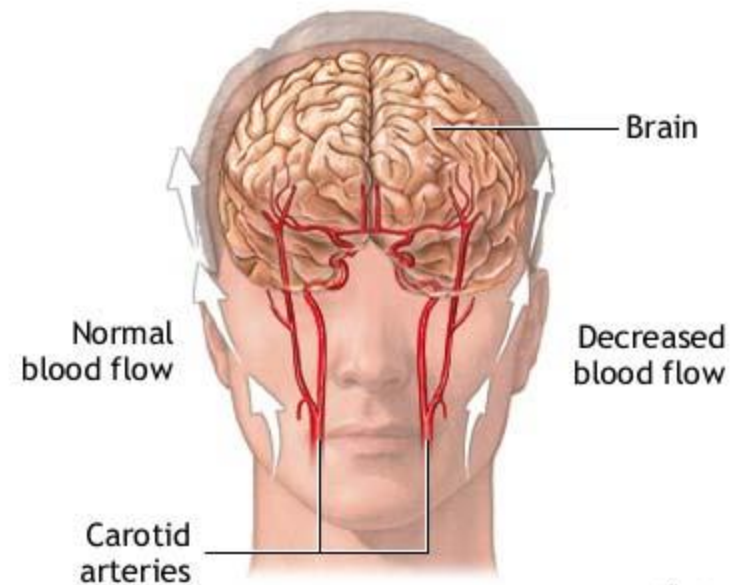
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Cerebrovascular System



TIA: Transient Ischemic Attack

- Short reversible ischemic event
- Duration
 - < 24 hrs
- No permanent neuro deficit/ Temporary Loss
- Warning!
- “Mini Stroke”



Transient Ischemic Attacks

TIA

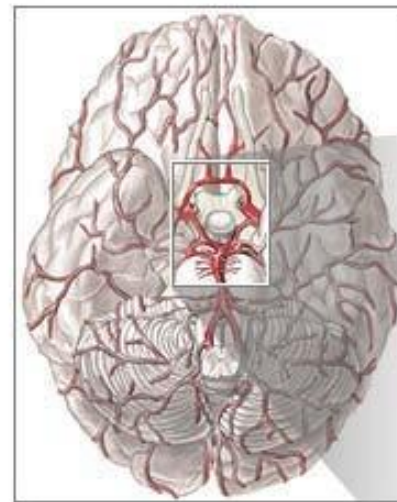
- Altered cerebral tissue perfusion related to a temporary neurologic disturbance
- Manifested by sudden loss of motor or sensory function
- Lasts for a few minutes to a few hours
- Caused by temporarily diminished blood supply to an area of the brain
- High risk for stroke

Hemorrhagic Stroke

- Usually more severe with a longer recovery period than ischemic stroke
- Caused by bleeding into:
 - Brain
 - Ventricles
 - Subarachnoid space

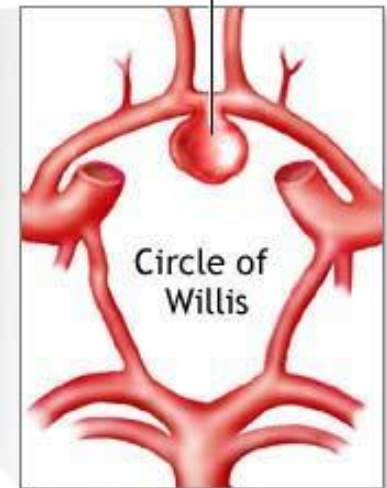
Hemorrhagic Stroke

- Cerebral aneurysm
 - Dilatation, bulging or ballooning out of part of the wall of a vein or artery in the brain
 - When they enlarge and press upon cranial nerves or tissue →
 - Symptoms



Bottom view of brain and major arteries of the brain

Berry aneurysm on the anterior communicating artery of the brain



Hemorrhagic Stroke

- Etiology
 - HTN
 - Arteriosclerosis
 - Meds

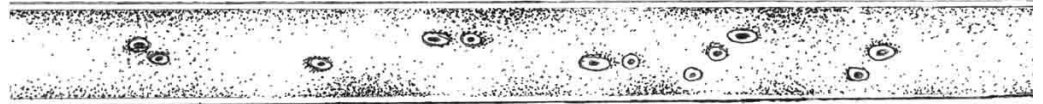


Hemorrhagic Stroke

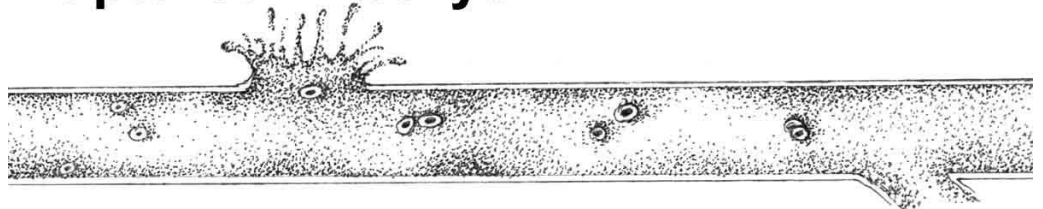
Clinical Manifestations

- Similar to ischemic
- Unique S&S
 - H/A
 - LOC
 - Nuchal rigidity

Normal Artery

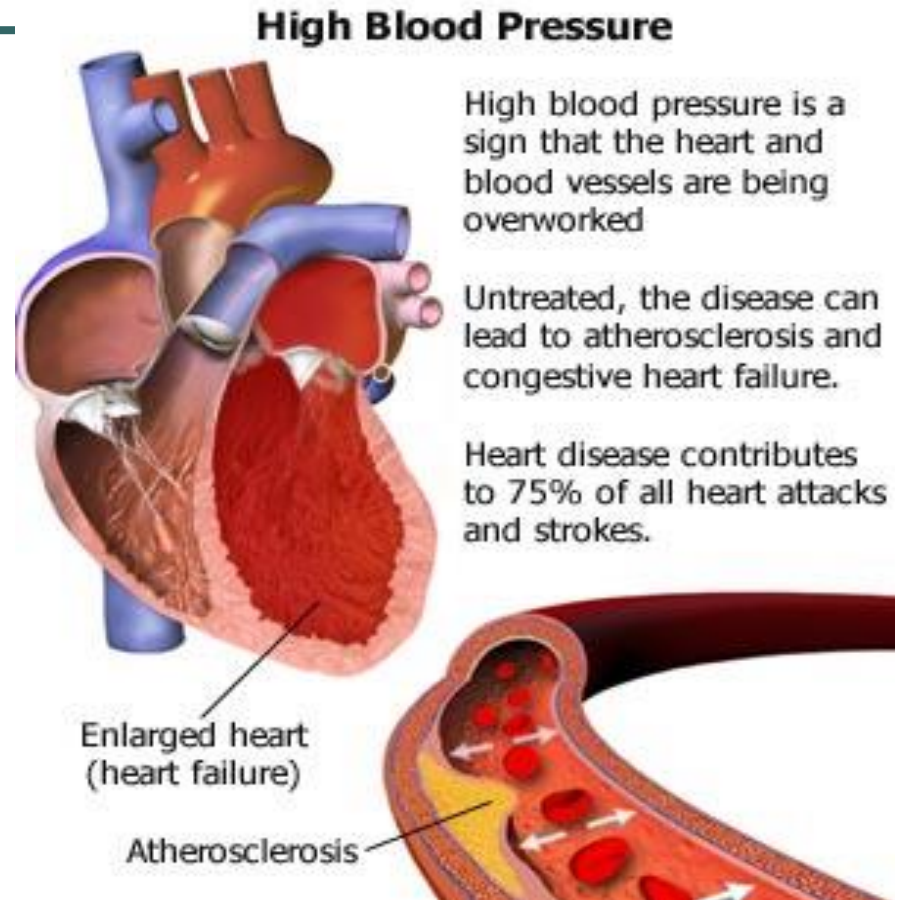


Ruptured Aneurysm



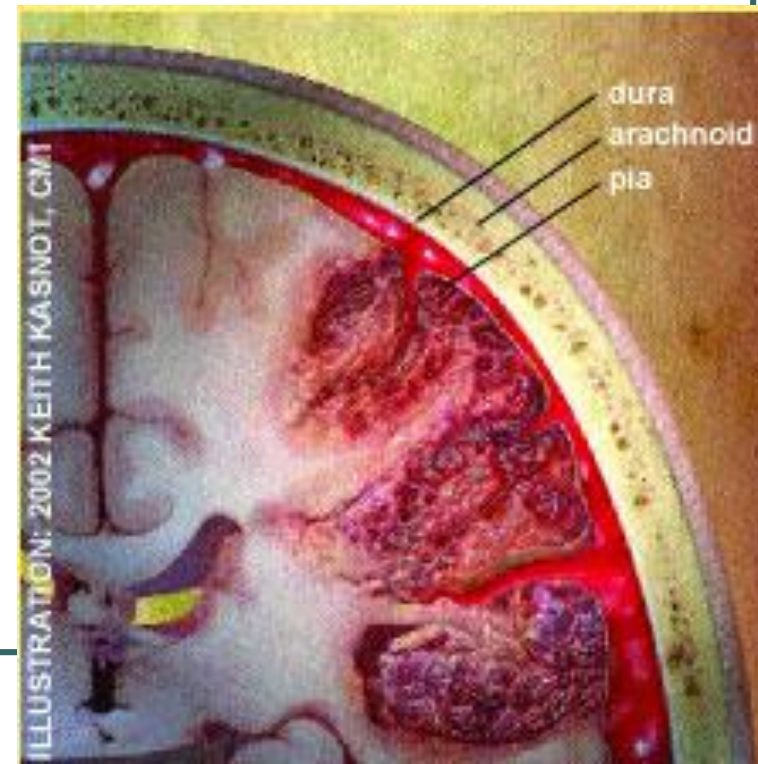
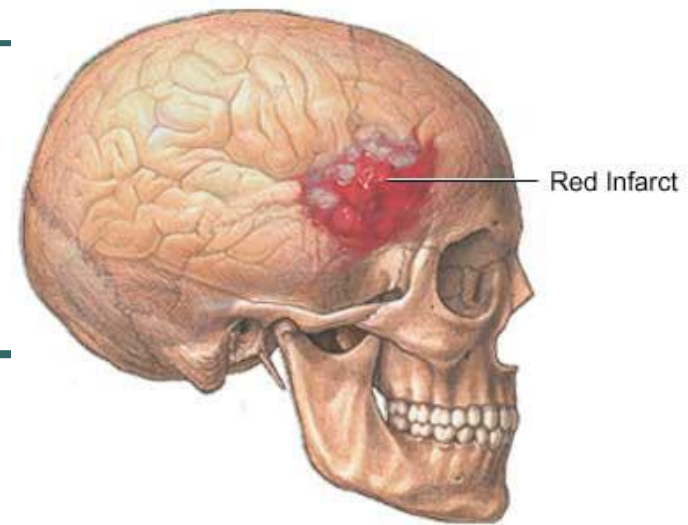
CVA: Etiology

- Hemorrhage
 - Rupture of the cerebral blood vessel
 - Commonly caused by poor control of HTN
- Most fatal
- Intracerebral, Subarachnoid (SAH)
 -

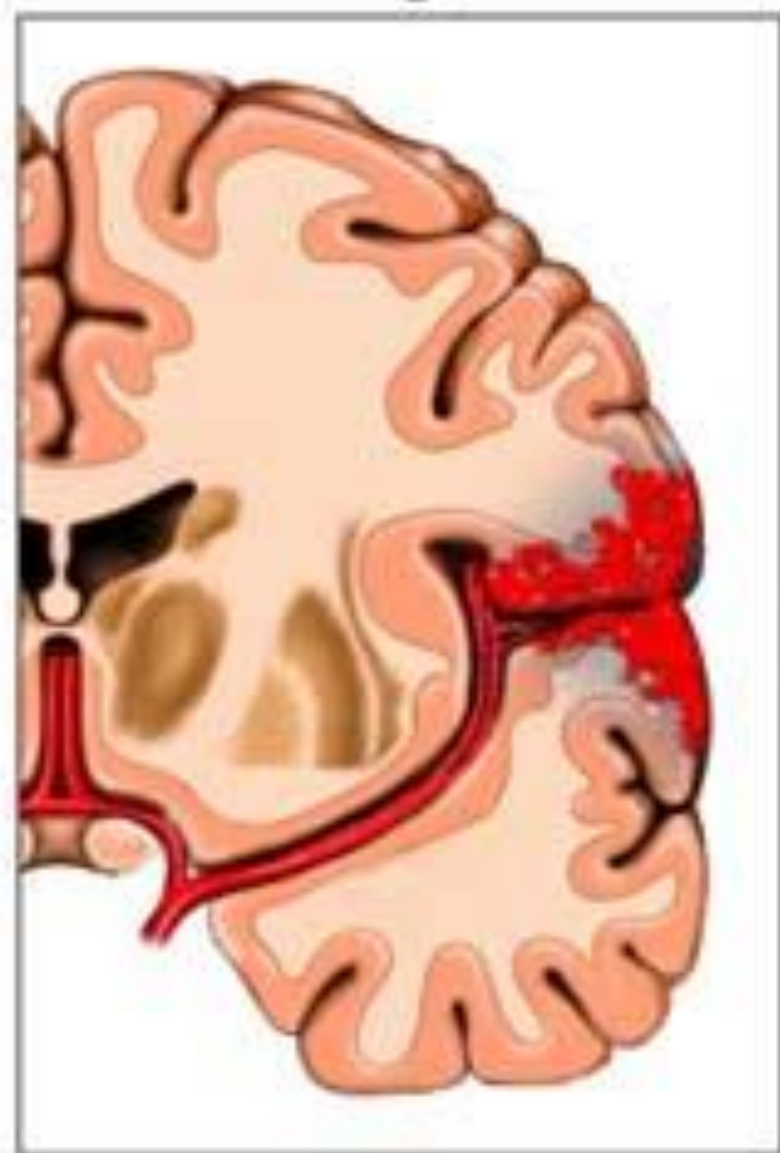


CVA: Etiology

- Hemorrhage
 - This type of CVA results in:
 - Slow recovery
 - ↑ probability of neurological deficits
 - No meds to reverse the effects

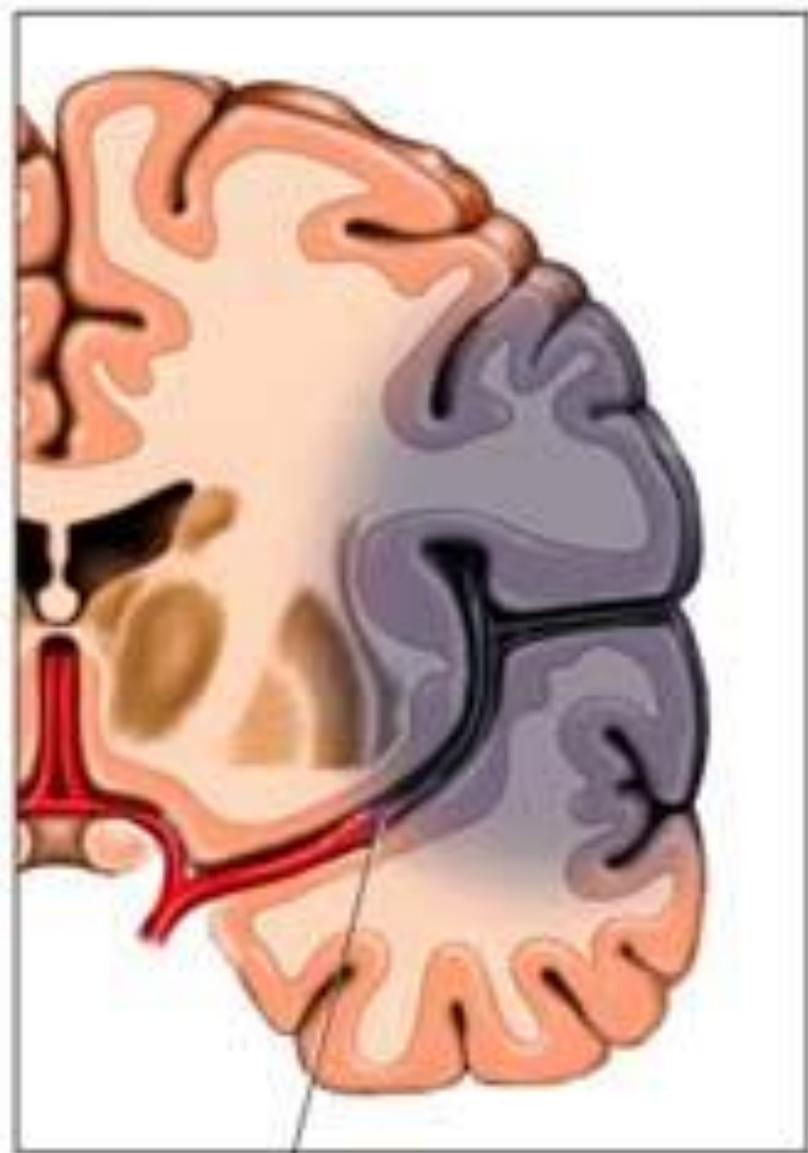


Hemorrhagic Stroke



Hemorrhage/blood leaks into brain tissue

Ischemic Stroke



Clot stops blood supply to an area of the brain

CVA: Etiology

- Other causes
 - Syphilis
 - Trauma
 - Hypertension
 - Hypoxia
 - ***Anything the ↓ blood flow
 - H/O TIAs
- Rheumatic Heart Disease
- Arrhythmias

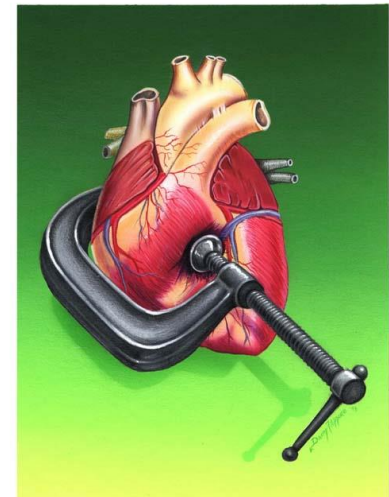
CVA: Risk Factors

Changeable

- Smoking
- Obesity
- High serum triglyceride levels
- Lack of exercise
- Hypertension
- Heart disease (MI)
- Sedentary life
- Stress
- ↑ fat diet
- ↑ Na diet
- Substance abuse
- Oral contraceptives
- Diabetes mellitus
- Atherosclerosis

Non-changeable

- Age
- Gender
- Family history
- Race



CVA: Risk Factors

Which is the most important risk factor for a stroke?

A. Smoking

B. Weight

C. Diet

D. HTN

E. Stress

F. Substance Abuse

CVA: Risk Factors

What is the number one cause of CVA in a younger patient?

A. Smoking

B. Weight

C. Diet

D. HTN

E. Stress

F. Substance Abuse

CVA: Pathophysiology substance abuse

- Substance (PCP, crack) →
- ↑ Blood pressure →
- ↑ ICP →
- Subarachnoid & intracerebral hemorrhage →
- Interrupt blood flow →
- ↓ O₂ & ↓ glucose →
- Depressed neurons →

CVA: Pathophysiology

- ** Vessels involved determine the area of the brain involved
- *** Area affected determines the S&S

CVA: Clinical manifestations

S&S depend on:

1. Location
2. Size
3. Amount

Stroke

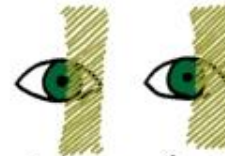
BRAIN ACCIDENT - CVA

- Headache
- Mental Changes
 - Confusion
 - Disorientation
 - Memory Impairment
- Aphasia (CVA Left Hemisphere)
- Resp Problems (↓ Neuromuscular Control)
- ↓ Cough / Swallow Reflex
- Agnosia (↓ Sensory Interpretation)
- Incontinence
- Seizures



- Hemiparesis or Hemiplegia
- Emotional Lability

- Visual Changes (Homonymous Hemianopsia)



- Horner's Syndrome - Ptosis of Upper Lid
 - Vomiting
- Perceptual Defects (CVA Right Hemisphere)
- Hypertension
 - Apraxia (↓ Learned Movements)

TIA:

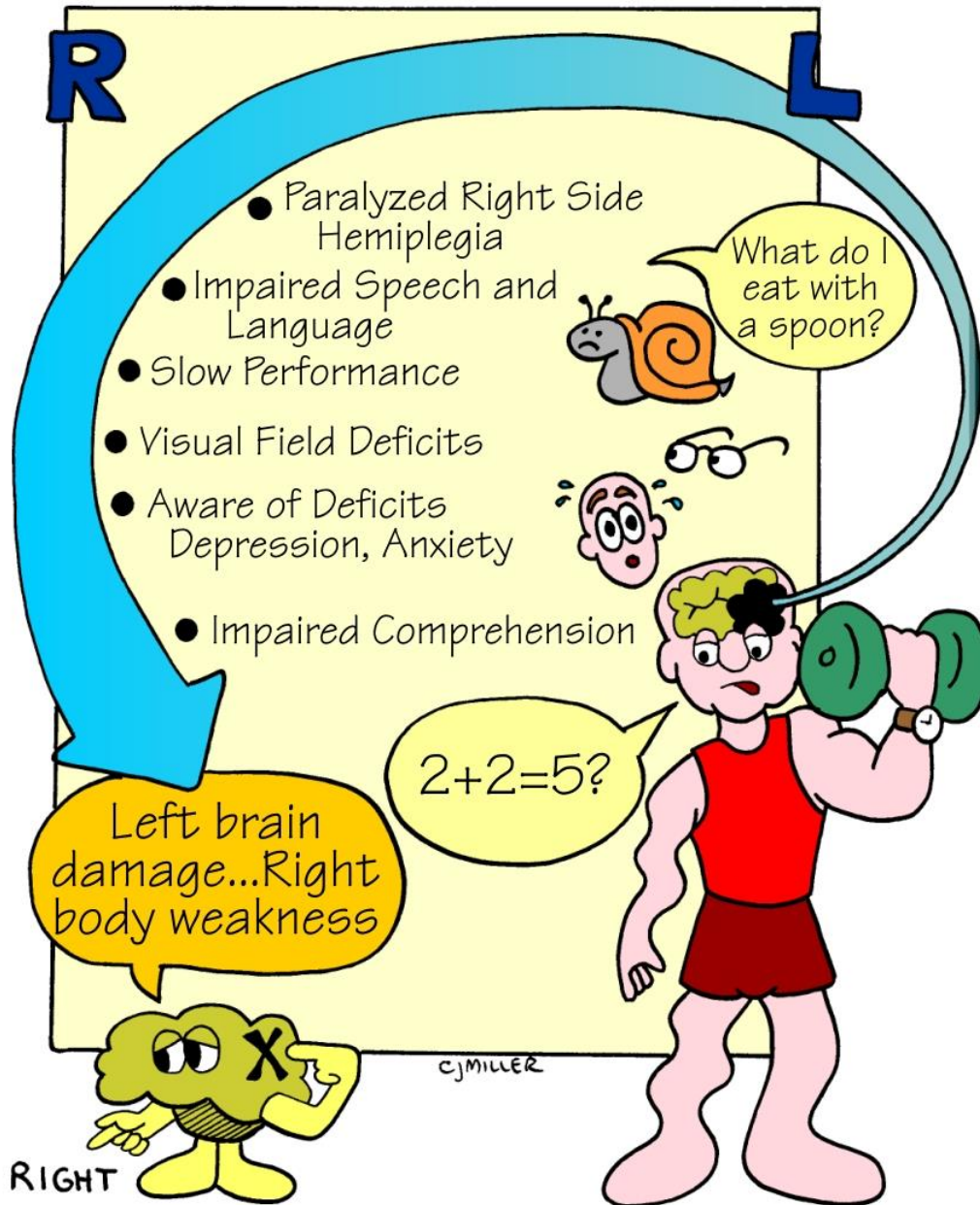
- Confusion
- Vertigo
- Dysarthria
- Transient Hemiparesis
- Temporary Vision Changes
- Lasts a Few Minutes → 24 hrs.

Focal Neurological S & S:

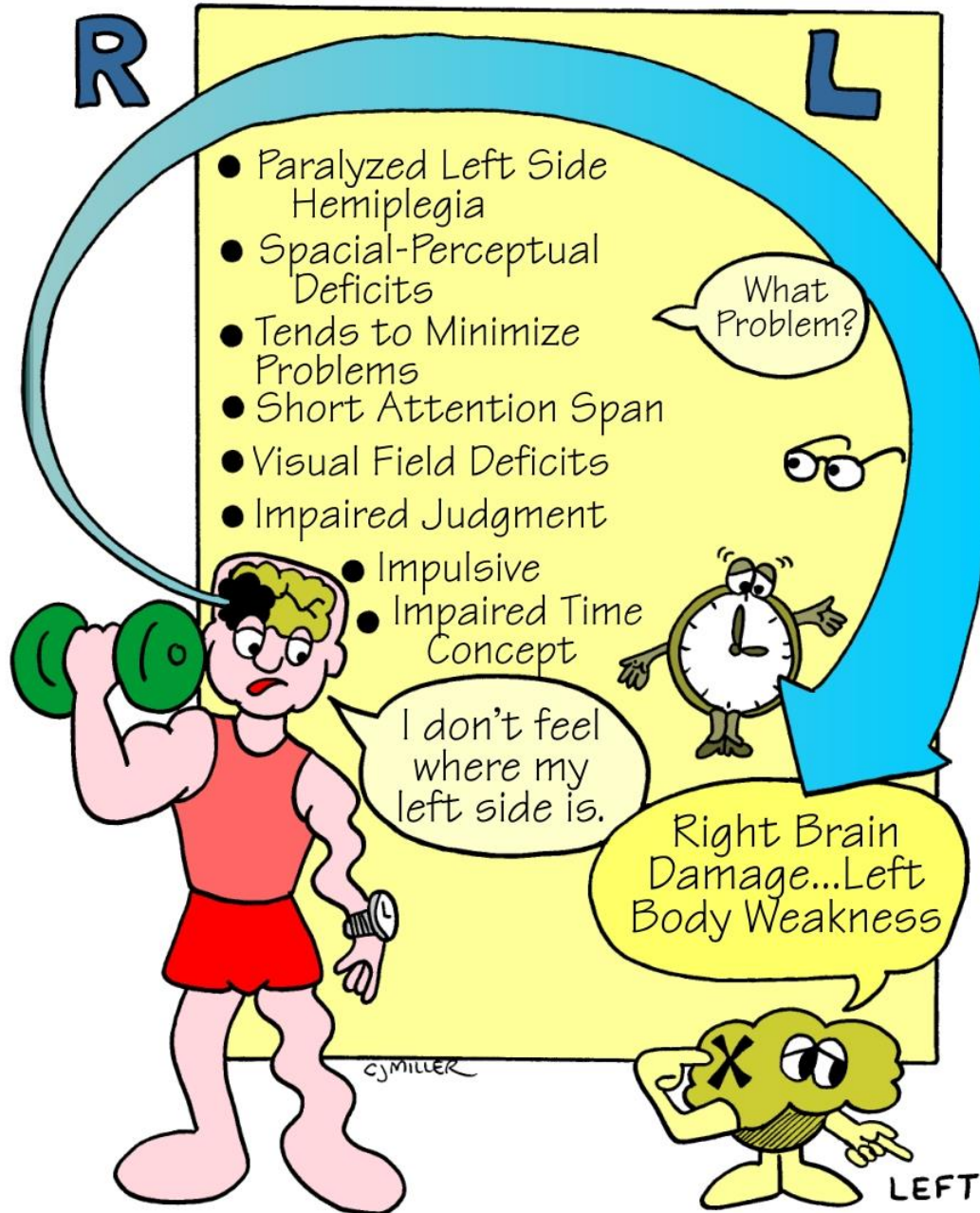
- Paralysis
- Sensory Loss
- Language Disorder
- Reflex Changes

Syncope
Paraesthesia
Diff walking

LEFT CVA



RIGHT CVA



Left vs. Right Hemispheric CVA

Left CVA		Right CVA
Aphasia	Language	
	Speech	
	Sensation	
	Perception	
	Movement	

Left vs. Right Hemispheric CVA

Left CVA		Right CVA
Aphasia	Language	
Dysarthria	Speech	
	Sensation	
	Perception	
	Movement	

Left vs. Right Hemispheric CVA

Left CVA		Right CVA
Aphasia	Language	
Dysarthria	Speech	
Right Homonymous hemianopsia	Sensation	
	Perception	
	Movement	

Left vs. Right Hemispheric CVA

Left CVA		Right CVA
Aphasia	Language	
Dysarthria	Speech	
Right Homonymous hemianopsia	Sensation	
Normal awareness	Perception	
	Movement	

Left vs. Right Hemispheric CVA

Left CVA		Right CVA
Aphasia	Language	
Dysarthria	Speech	
Right Homonymous hemianopsia	Sensation	
Normal awareness	Perception	
Right side paresis	Movement	

Left vs. Right Hemispheric CVA

Judgment intact Depression Slow & cautious	Behavior	
	Cognition	
	Memory	

Left vs. Right Hemispheric CVA

Judgment intact Depression Slow & cautious	Behavior	
Impaired analytical	Cognition	
	Memory	

Left vs. Right Hemispheric CVA

Judgment intact Depression Slow & cautious	Behavior	
Impaired analytical	Cognition	
Deficit new language info	Memory	

Left vs. Right Hemispheric CVA

Left CVA		Right CVA
Aphasia	Language	Intact
Dysarthria	Speech	
Right Homonymous hemianopsia	Sensation	
Normal awareness	Perception	
Right side paresis	Movement	

Left vs. Right Hemispheric CVA

Left CVA		Right CVA
Aphasia	Language	Intact
Dysarthria	Speech	Dysarthria
Right Homonymous hemianopsia	Sensation	
Normal awareness	Perception	
Right side paresis	Movement	

Left vs. Right Hemispheric CVA

Left CVA		Right CVA
Aphasia	Language	Intact
Dysarthria	Speech	Dysarthria
Right Homonymous hemianopsia	Sensation	Left Homonymous hemianopsia
Normal awareness	Perception	
Right side paresis	Movement	

Left vs. Right Hemispheric CVA

Left CVA		Right CVA
Aphasia	Language	Intact
Dysarthria	Speech	Dysarthria
Right Homonymous hemianopsia	Sensation	Left Homonymous hemianopsia
Normal awareness	Perception	Unilateral neglect
Right side paresis	Movement	

Left vs. Right Hemispheric CVA

Left CVA		Right CVA
Aphasia	Language	Intact
Dysarthria	Speech	Dysarthria
Right Homonymous hemianopsia	Sensation	Left Homonymous hemianopsia
Normal awareness	Perception	Unilateral neglect
Right side paresis	Movement	Left side paresis

Left vs. Right Hemispheric CVA

Judgment intact Depression Slow & cautious	Behavior	Judgment impaired Denial Impulsive behavior
Impaired analytical	Cognition	
Deficit new language info	Memory	

Left vs. Right Hemispheric CVA

Judgment intact Depression Slow & cautious	Behavior	Judgment impaired Denial Impulsive behavior
Impaired analytical	Cognition	
Deficit new language info	Memory	Deficit new spatial info

CVA

Signs and Symptoms

- Altered LOC
- Change in mental status
- Decreased attention span
- Decreased ability to think and reason
- Difficulty following simple directions
- Communication; motor and sensory aphasia
difficulty with reading ,writing, speaking, or
understanding
- Bowel and bladder dysfunction retention
impaction or incontinence

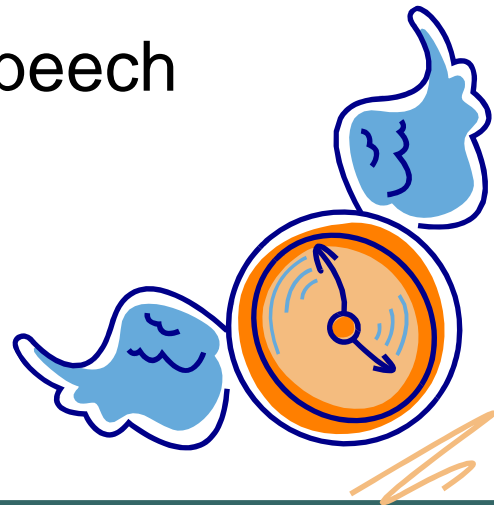
CVA

Signs and Symptoms

- Seizures
- Limited motor function; paralysis, dysphagia, weakness , hemiplegia, loss of function
- Loss of sensation/ perception
- Headaches and syncope
- Loss of temp regulation elevated TPR and BP
- Absent of gag reflex (aspiration)
- Unusual emotional responses; depression, anxiety, anger, verbal outburst, and crying: emotional lability
- Problems related with immobility

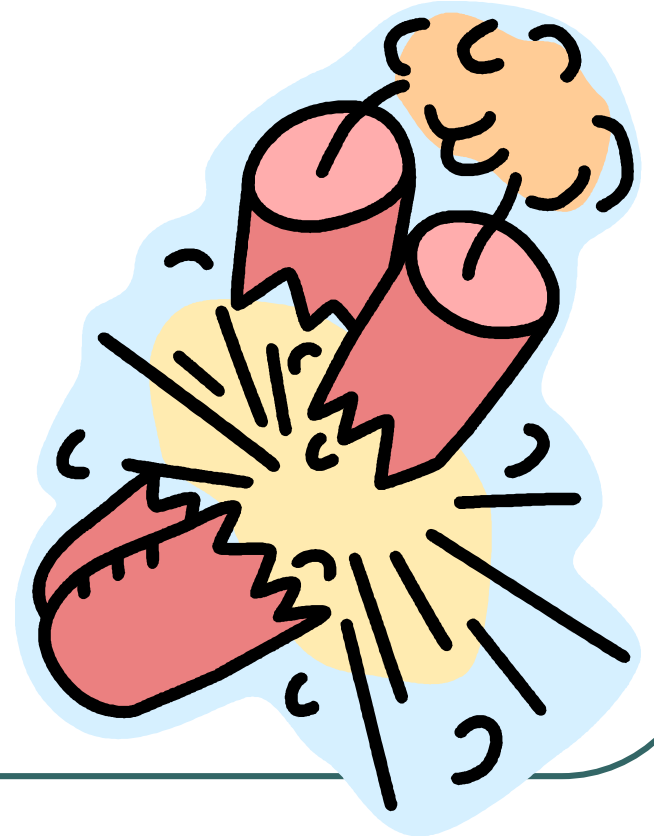
Warning! Time of the Essence!

- Sudden Numbness or Weakness
 - Face, arm or leg
 - Especially on one side of the body
- Sudden Confusion
 - Difficulty speaking
 - Difficulty comprehending speech
- Sudden Difficulty Seeing
 - One or both eyes



Warning! Time of the Essence!

- Sudden Difficulty
 - Walking
 - Dizziness
 - Loss of balance/coordination
- Sudden Severe HA
 - No known cause



Stroke Recognition:

3 Steps to Stroke Recognition



Ask the person to smile
and stick out tongue



Ask the person to make
a complete sentence



I can't fall
tell side
which one.



ejmiller

Ask the person to
raise both arms.



Contact someone if the person cannot
perform these 3 steps!

Breaking down in tears

- 'I'm a student who's never seen a person die. When the time comes, I'm afraid I'll lose it and upset the patient or family. How do you do this work all the time and not break down in tears?'

