



# Cerebrovascular Disease: Behavioral Presentations

Sarah West, PhD

Neuropsychologist, #5330

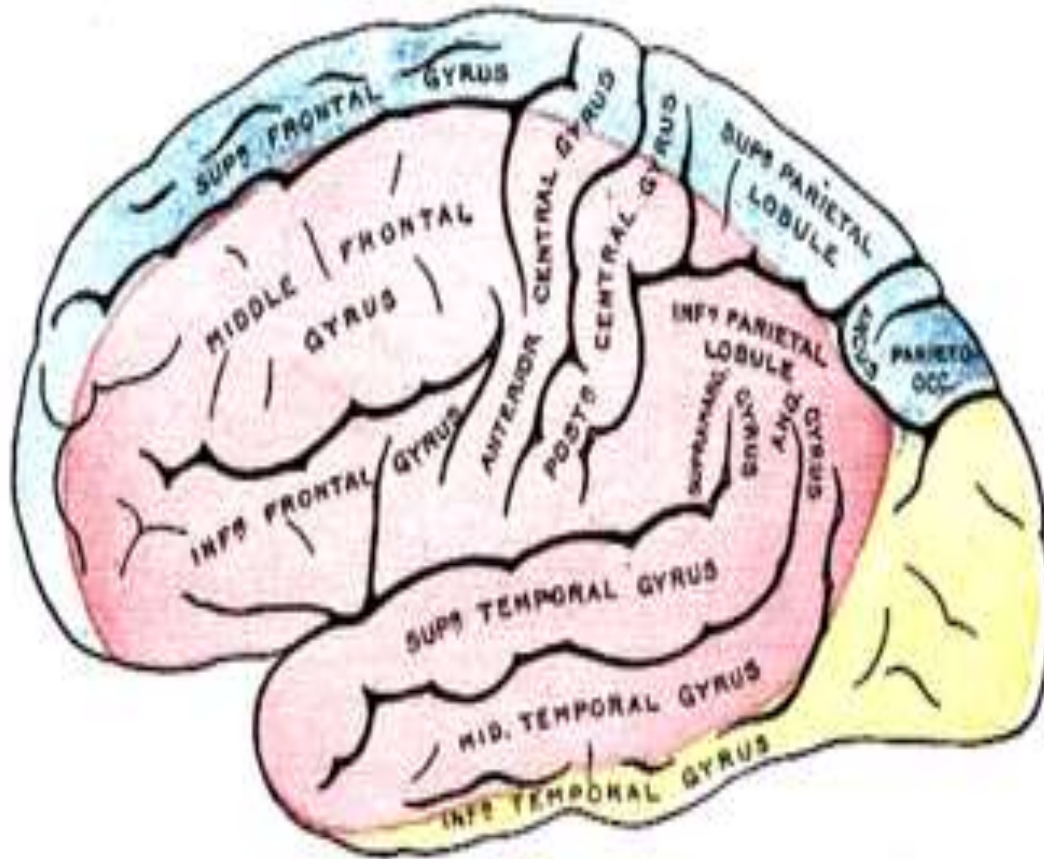
Presented by:

Claire McGrath, PhD, ABPP

Neuropsychologist, #5574



# CEREBRO-NEUROANATOMY



\*Please note all images were acquired online and citations are at the end of this slide deck



# MIDDLE CEREBRAL ARTERY

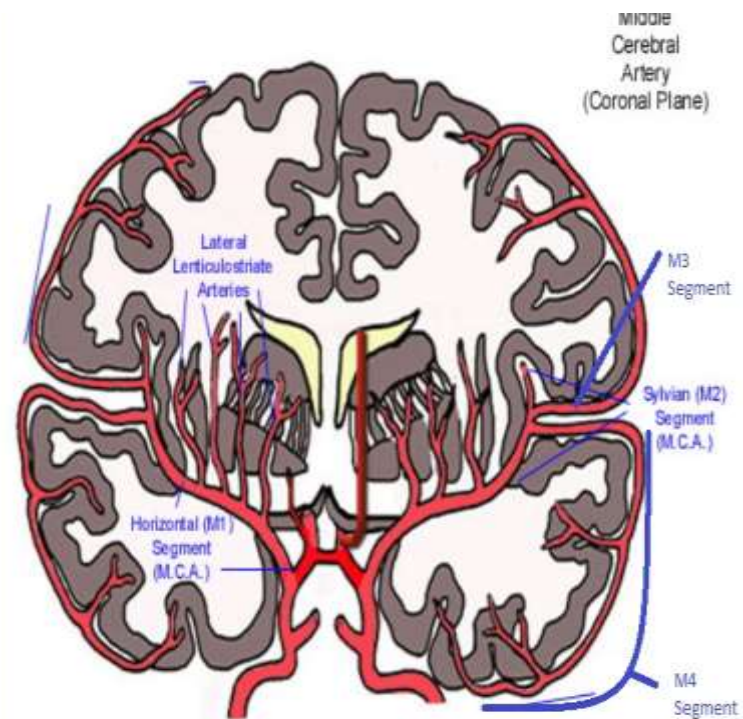
MCA stroke facts:

- 2/3 of all strokes, most common area affected by CVAs
- Usually stroke by embolism, carotids flow into MCAs
- MCA supplies: frontal, parietal, lateral temporal lobes, centrum ovale

# MCA – THE SEGMENTS

4 Segments of MCA:

- M1 (spheroidal segment)- frontal and temporal lobes
- M2 (insular segment)- insula, most cortical arteries
- M3 (opercular)- ends at Sylvian fissure
- M4 (cortical)- blood to cortical surface





# DEFICITS DUE TO MCA STROKE

- Hemiplegia, sensory deficits (usually more arms and face), apraxia
- Frontal involvement- inappropriate behavior, uncontrollable laughter, perseveration, apathy/abulia/akinetic mutism
- Neglect (typically more right hemisphere), visual field cuts (posterior), angular artery infarct- visual and optic problems, left/right confusion, trouble with reading and writing

# DEFICITS DUE TO MCA STROKES

- Dom. Hem.: aphasia- global, Broca's, and Wernicke's; apraxia, alexia, agraphia, trouble naming objects, L/R confusion
- NDom. Hem.: confusion, denial of deficits, neglect, dysarthria, visuospatial problems, hallucinations/delusions, restless/agitation, sensory aprosody (trouble understand emotional speech), construction apraxia, asomatognosia (loss of awareness of part of the body), visuospatial problems
- Bilateral lesions in the temporal area can cause cortical deafness





# ANTERIOR CEREBRAL ARTERY STROKE

- Arises from the internal carotid artery
- Supplies the medial surface of the frontal and parietal lobes, anterior corpus callosum, and other deep structures
- Five main branches, A1-A5
- Often have MCA infarct as well; can have vasospasm following rupture of ACoA (anterior communicating artery) aneurysm
- Ischemic stroke- cardiac emboli or thrombus from ICA





# DEFICITS FROM AN ACA STROKE

## DEFICITS:

- Motor: paresis in legs more than upper body, rare in face
- Sensory: less common, may have trouble with proprioception in foot/leg
- Amotivation: ranging from apathy to mutism and severe lack of movement/talking, etc.
- Emotional lability, euphoria, restlessness, hyperactive, agitated, verbose, depressed (left-sided)
- Urinary incontinence





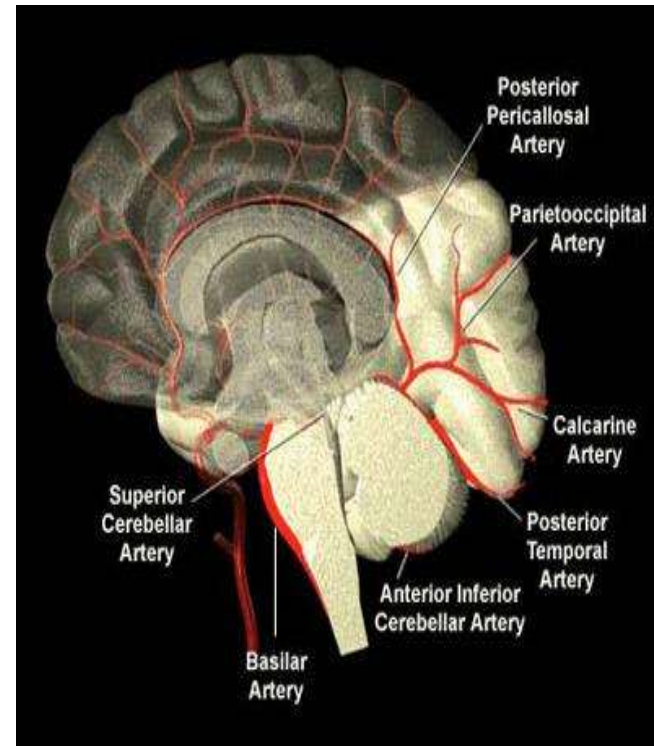
# DEFICITS FROM AN ACA STROKE

Deficits continued:

- Language: transcortical aphasia (motor/sensory, initiation), mutism, whispering (not aphasia like MCA)
- Trouble with short-term memory, confabulation
- Pathological grasp phenomenon: closing one or more digits when touch palm of hand
- Alien-hand sign: feeling that the left hand does not belong to the person, motor perseveration (repeat motor movement because can't stop), compulsive manipulation of tools, voluntary behavior in one hand can cause involuntary behavior in the other

# POSTERIOR CEREBRAL ARTERY

- PCA: supplies midbrain, thalamus, occipital lobes, temporal lobes, posterior parietal
  - Not going to see frontal signs (such as lack of insight)
- Difference from other strokes: no hemiparesis, can be clumsy or ataxia though



# POSTERIOR CEREBRAL ARTERY STROKE

- DEFICITS: visual field cuts, higher order processing of visual info, gaze palsy, neglect (with right-sided stroke), sensory sx. (tingling/burning/etc), lethargy/coma, memory impairment, alexia without agraphia, impaired color naming, visual agnosia
- Cortical blindness: bilateral infarct to striate cortex, don't always admit what they can't see, can avoid bumping into objects/blink to visual threat
- Balint's syndrome: bilateral upper-bank posterior infarcts, poster PCA-MCA region; symptoms; disoriented to place, difficulty revisualizing locations, asimultagnosia (can't direct eyes for panoramic view), optic ataxia (can look at an object asked to look at), gaze apraxia
- Difficulty identifying what objects are and where they are in space



# WHITE MATTER STROKE

- Cause: hypertension, diabetes, or embolism (cardiac)
  - Hypertension & diabetes affect capillaries (smaller blood systems) → white matter, basal ganglia
- Deficits: sensory and motor problems, executive functioning problems, slowed processing speed

# THALAMIC STROKE

Sensory relay station

Deficits: sensory, ataxia, jerky motor movements, can have impaired executive functioning and transient motor aphasia (especially left-sided lesions), amotivation/apathy, slight clumsiness, facial asymmetry, may have short-term memory loss, disorientation, aphasia, neglect, visual problems, visual hallucinations



# BASAL GANGLIA STROKE

Most common site for spontaneous intracranial hemorrhage

Risk factors: hypertension, chronic alcoholism, MoyaMoya, cocaine use

Symptoms: impaired consciousness, aphasia, hemiparesis, conjugate gaze deviation, sensory deficits, neglect, motor deficits





# CAUDATE NUCLEUS STROKE

Part of basal ganglia, learning, movement

Major risk factors: hypertension, high cholesterol, diabetes, previous heart attack, cigarette smoking

Deficits: inattention, memory impairment, impaired executive functioning, restless/hyperactive or slowness, neglect, speech: dysarthria, motor weakness, disinhibited/impulsive, affective symptoms with psychotic features

Good prognosis for recovery of function





# MIDBRAIN STROKE

Deficits: oculomotor palsies, motor involvement, akinetic mutism, disorientation, memory disturbance, sensory symptoms, visual hallucinations (rare), hearing/taste change

Can have midbrain Locked-in Syndrome

# PONTINE STROKE

Deficits: altered consciousness, respiratory problems, hemiplegia or quadriplegia, cranial nerve palsy,, ataxic hemiparesis, dysarthria/facial paresis, transient dizziness, diplopia, gaze abnormalities, nystagmus, dysphagia, can have deficits in smooth pursuit of visual saccades, tonic limb spasms, cranial nerve palsies, autonomic dysfunction, gaze paresis

Dysarthria/clumsy hand syndrome: ( presentation in pontine stroke)

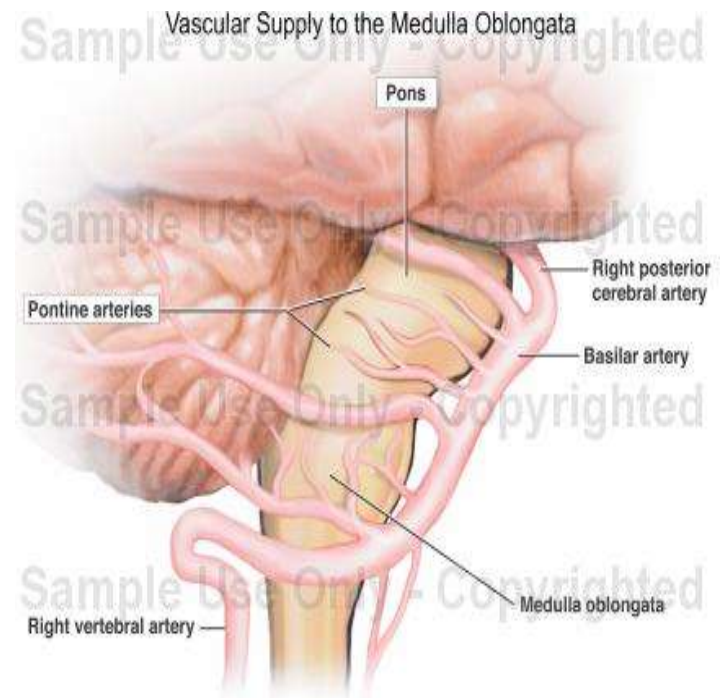
dysarthria, clumsiness characterized by dysmetria (lack of coordinated movement), dysdiadochokinesia (inability to perform rapid alternating movements), ataxia



# CEREBELLAR STROKE

Deficits/Sx.: vertigo/dizziness, vomiting, limb/gait ataxia, headache, dysarthria, trouble sensing pain and temperature, eye movement abnormalities/nystagmus

Cerebellar Cognitive Affective Syndrome (CCAS): impairment in executive functioning, visuospatial, visual memory, language, personality change, affect-depression, anxiety, apathy, dysregulation of affect





# FOLLOW-UP CARE

- Bancroft:
- PT, OT, ST, cognitive therapy
- Neuropsychologists/Psychologists
- Nurses
- Dietician/Nutritionist
- Housing and support





# REFERENCES

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Images:

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