The Neuropsychology of Stroke

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Outline

- What is the Role of Neuropsychology
- Purpose of Neuropsychological Assessments
- Common Neuropsychological Disorders
- Assessment
- Mood Disorders
- Case Study

Role of Neuropsychology

Inpatient and outpatient services

Focus of intervention tends to be in 3 areas

- Cognition
- Emotion
- Behavior

What are we assessing and treating?

- Measure cognitive functioning in order to identify neuroanatomical structures and functions that have been affect by insults to the brain.

- Use known pathology of neurological disorders as a framework to identify which cognitive, affective and behavioral domains have been affected.

Why do we assess?

- Obtain a broader picture of the person's cognitive, behavioral and emotional **strengths** and weaknesses

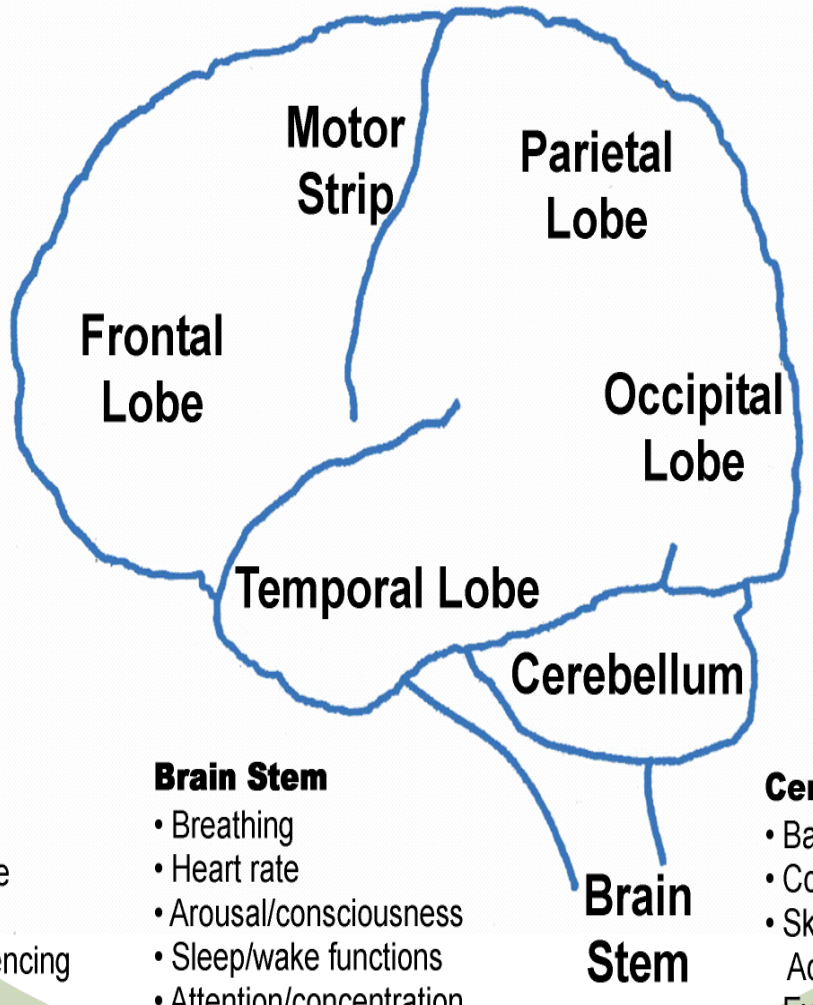
- Which deficits are caused by the CVA
  - premorbid factors
  - psychological issues

  - Address issues related to return to premorbid functioning

Simplified Brain Behavior Relationships

Frontal Lobe
- Initiation
- Problem solving
- Judgment
- Eye movement
- Planning
- Inhibition of behavior
- Planning/anticipation
- Self-monitoring
- Motor planning
- Personality/emotions
- Awareness of abilities/limitations
- Organization
- Attention/concentration
- Mental flexibility
- Speaking (expressive language)

Temporal Lobe
- Memory
- Hearing
- Understanding language (receptive language)
- Organization and sequencing
- Object perception
- Motion perception



Brain Stem
- Breathing
- Heart rate
- Arousal/consciousness
- Sleep/wake functions
- Attention/concentration

Parietal Lobe
- Sense of touch
- Differentiation: size, shape, color
- Spatial perception
- Visual perception
- Sense of taste and Smell
- Visiospatial map
- Visual attention

Occipital Lobe
- Vision
- Visual Perception
- Recognition of
- Printed Word
- Shape
- Contrast

Cerebellum
- Balance
- Coordination
- Skilled motor Activity
- Eye movement

Common Disorders

- Speech Disorders
  - Aphasia's – common consequence of left hemispheric lesions
  - 1/3 of CVA patients experience some type of aphasia
- Cognitive Dysfunction
- Unilateral Neglect
  - Inattention to half the universe
- Delirium
  - Acute confusional state
  - Abrupt onset/short duration
- Post Stroke Depression/Anxiety

Assessment

- Reading the chart

1. Obtain and clarify if needed, the referral question

2. Read the H&P, specialist's consultation reports

3. CT/MRI/EEG

4. Most recent progress notes looking for any recent changes in mental status, improvement or decline in functional status

Neuropsychological Assessment

- Orientation
- Intellectual Functioning
- Attention & Concentration
- Language (receptive and expressive)
- Comprehension
- New Learning
- Memory
- Spatial Abilities
- Processing Speed/Reaction Time

Potential Issues to be addressed

Next Steps

- Inpatient Rehabilitation
- Outpatient Services

Safety

- Can this person be left alone
- Can this person drive

Beyond the basics….

- **Independence**
  - Can this person live alone?
  - Can this person manage their medications?
  - Can they manage their finances?
  - What supports need to be provided to maximize independent living/provide the least restrictive environment?
- **Employment**
  - Can this person work in their previous capacity?
  - Can this person work at all?
  - In what type of job would this person be most successful?
  - What accommodations can be made to maximize success?

Estimated Premorbid Level of Intellectual Functioning

- Is current level of intellectual functioning consistent with estimated premorbid level or is there evidence of decline?

- For individuals with CVA's, tend to see focal deficits rather than global decline

Verbal Abilities

- Aphasia assessments
- Comprehension or speech production difficulties
- Verbal abilities/verbal reasoning
- Assesses general left-hemisphere functioning

Nonverbal Abilities

- Assess visual-constructional abilities
- Nonverbal reasoning
- Visual sequencing
- General right-hemisphere functioning

Processing Speed

- How quickly individuals can process visual information
- Usually affected by any brain damage

Executive Functions

- Planning
- Problem-solving
- Inhibition
- Initiation/generation
- Self-monitoring
- Cognitive flexibility

Executive Functions

- Primarily in the prefrontal cortex but also influenced by connections in other areas
  - Association cortex of parietal, occipital & temporal lobes
  - Limbic cortex
  - Subcortical structures such as amygdala, basal ganglia, thalamus and cerebellum

Attention/Working Memory

- Attention span, divided attention (efficiency) & sustain attention
- Dorsolateral prefrontal cortex
- Basal ganglia
- Frontal and parietal lobe lesions

Learning & Memory

- Verbal and visual semantic memory
- Learning new information
- Immediate and delayed recall of information
- Recognition of information

Post CVA Psychiatric Disorders

- Depression 35%
- Anxiety 25%
- Apathy 20%
- Pathologic Affect (PBA) 28%
- Catastrophic Reaction 20%
- Psychosis is rare
- Mania is rare
- New onset Bipolar D/O is rare

- Behavioral Impact
  - Behavioral Excess

    Too Much
  - Behavioral Deficit

    Too Little

Multifactorial Etiology

- Localizable lesions
- Transmitter system
- Cognitive dysfunction
- Medications
- Primary Psychiatric
- Other medical issues/delirium
- Psychosocial Factors

PSD and PSA

- Impact on acute recovery
  - A depressed individual may lack motivation to push himself/herself during therapy sessions
  - An anxious person may be too fearful of ailing to attempt to walk with out assistance despite assurance that he/she is ready to do so.
- Treatment
  - Combinations of approaches typically has better outcome
    - Counseling
    - Pharmacology
    - Family Intervention

Case Study

- 59 Year old female with CVA in 2016
- Recovery was complicated by obstructive hydrocephalus
- Followed during inpatient rehab
- Seen for initial and repeat NP assessment
- Followed for psychotherapy for adjustment to CVA and lifestyle changes
- Worked full-time as a coordinator at the

I U.

Case Study

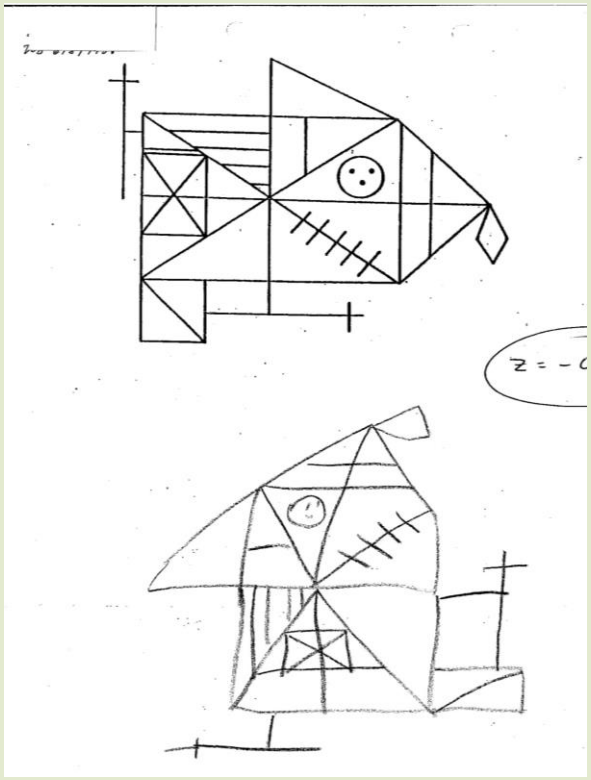
- Intellectual Resources
  - Largely intact
- Language
  - Conversational speech notable for occasional word-finding deficits
  - Confrontational naming is now in the low average range
- Executive Functioning
  - Initially moderately impaired but on repeat testing she improved to the low average range

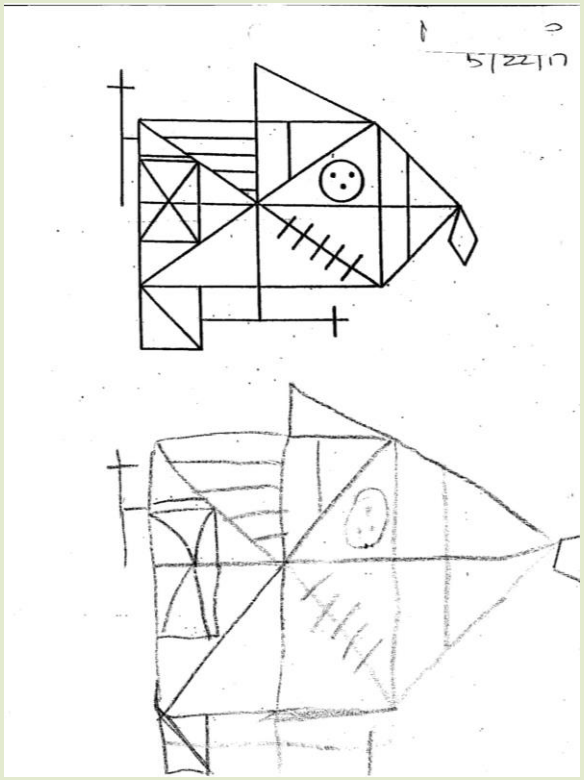
Case Study

- Memory
  - Performance on logical memory measures reveal immediate recall at the 5th percentile with delayed recall at the 2nd percentile
  - Logical Memory-I is at the 5th percentile, Logical Memory-II is below the 1st percentile
  - Verbal List learning is at the 4th percentile following a 20 minute delay
  - Visual Reproduction-I was at the 63rd percentile and drops to the 9th percentile after a 20 minute delay

Case Study Visuospatial skills

- Visual perception of spatial relationships





Start by doing what is necessary;

Then do what is possible;

and suddenly you are doing the impossible

St Francis of Assisi