Neuroanatomy for the Clinical Psychologist: Adult Neuropsychological Syndromes That Mimic Psychological Disorder

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My First Dilemma
- Virtually all of my patients need psychotherapy, but...
  - I don't do therapy, and...
  - those who do therapy, often don't seem to understand my patients.

Scenario 1: Will This Work?
A year ago, my patient was in a two-vehicle car accident that killed the driver of the other vehicle and resulted in my patient suffering a loss of consciousness for several hours. He now has executive and memory deficits, and has been diagnosed with PTSD. His symptoms include panic attacks when in traffic, avoidance of driving, refusal to look at photos of his car crash or drive by the scene of the accident, and frequent nightmares involving car crashes. Although he does not actually remember his crash (or any events for several days before and after the accident), he is intensely guilty about the death of the other driver and believes the accident must have been his fault. His psychiatrist is working with him to recover his memory of the accident, believing this will both relieve his guilt and lessen his PTSD symptoms.

My Second Dilemma: Doing This in 20 Minutes
- Anatomy and Pathophysiology of TBI and Stroke
- Two Adult Neuropsychological Syndromes That Mimic Psychological Disorder
  - The Medial Frontal Syndrome
  - The Orbital Frontal Syndrome
- What To Do About Mimicking Syndromes

Anatomy and Pathophysiology of TBI

Rapid Deceleration Injury
If the head hits a hard surface or if the person is severely shaken or jerked, the brain can strike the skull and become damaged.
Blunt Head Trauma

Linear, Depressed, and Penetrating Skull Fractures

Penetrating Head Injury

Epidural Hematoma

Intracerebral Hemorrhage
Cerebral Contusion

Inner View of Skull

Focal Effects: Frontal and Temporal
- Parietal lobe
- Occipital lobe
- Frontal lobe
- Temporal lobe

Cerebral edema, thickening, and narrowing of gyri

Diffuse Axonal Injury
- Twisted Axon
- Torn Axon
- Broken Axon
  - Pulled away at synapse

Pressure Wave/Shaken Brain
**Anatomy and Pathophysiology of Stroke**

**Types of Stroke**

- **Ischemic Stroke**
  - **Areas deprived of blood**
  - Illustration of brain tissue deprived of blood
d- **Hemorrhagic Stroke**
  - Illustration of blood vessel rupture

**Arterial Territory**

- **A**
  - Illustration of brain territories
- **B**
  - Illustration of brain territories
- **C**
  - Illustration of brain territories
- **D**
  - Illustration of brain territories

**Two Paths to Cell Death**

- **NORMAL**
  - Illustration of normal cell death mechanisms
- **NECROSIS**
  - Illustration of necrosis
- **APOPTOSIS**
  - Illustration of apoptosis
- **Phagocyte**
  - Illustration of phagocyte involvement

**Hemorrhagic Stroke**
- Hemorrhage/blood leaks into brain tissue

**Ischemic Stroke**
- Clot stops blood supply to an area of the brain
Two Adult Neuropsychological Syndromes That Mimic Psychological Disorders

Scenario 2: The Two Faces of “Evan”
Evan was a 52 year old, right-handed, white male, with 2 years of college, who suffered a right anterior cerebral artery stroke (6 months ago) initially affecting his gait and speech. He had a history of hypertension and had undergone CABG several years in the past. Evan had no complaints when seen for evaluation, but his wife used the word “schizophrenic” to describe him. He had no prior history of mental disorder, but admitted to binge drinking in college.

Some Days...
- Sits around doing nothing but watching television or napping
- Won’t even get up to eat unless prompted, but then eats full meal
- No attention to hygiene or dressing, unless told what to do
- No interest in sex
- No desire to leave the house
- But denies feeling sad, upset, anxious, hopeless, and has no tearfulness and no suicidal ideation

Other Days...
- Is excited and almost euphoric
- Goes from one activity to the next, but without finishing anything
- Talks constantly, flitting from one topic to another
- Still sleeps the full night, but doesn’t nap during the day
- Wants to go out and visit friends at all hours, and gets angry when requests are refused
- Generally more easily irritated
- But evidences no grandiosity, no impulse buying, no increased interest in sex

Evan 1
- Apathetic, almost inert
- Slow to respond
- No spontaneous vocalization
- Deferred all questions to wife, unless prodded
- Slow performance on all timed tests, even when exhorted to work fast
- Long latency to respond

Evan 2
- Talkative, joking
- Asks inappropriate personal questions and wants to tell tangential stories
- No flight of ideas or grandiosity
- Quick to respond, and often impulsive in answers
- Wandered away when technician stepped out and was brought back by staff from another office
- Returned early from lunch, found testing office empty, so started answering the secretary’s phone
**Anterior Cerebral Artery Stroke**

- Weakness and sensory loss in the contralateral leg
- Motor neglect in the arm is more likely than true weakness
- Reduced speech initiation or even muteness

**Medial Frontal Lobe**

- Akinetic
- Mute
- Loss of drive and initiative
- Abulia
- Moria

**Abulia Alternating with Moria**

**Abulia**

- Loss of initiative
- Inertia
- Lack of spontaneity
- Absence of effort
- Placidly
- Decline in interest in previous activities
- Neurologic onset without pre-morbid history

**Moria**

- Excited or euphoric mood despite illness or disability
- Increased activity and speech
- Neurologic onset without pre-morbid history

**Medial Frontal – Limbic Connection**

**Scenario 3:**

"Bubba Gage"
**Bubba’s Disinhibited Behavior**

- Concreteness
- Loss of Insight
- Excessive Jocularity
- Inappropriateness
- Restlessness

- Disorganization
- Irritability
- Poor Judgment
- Impulsivity
- Utilization

**Orbital Frontal Lobe**

- Disinhibition
- Impulsivity
- Aggressiveness
- Poor judgment
- Jocularity
- Norm violation
- Lability

**Prefrontal – Limbic Connections**

**Phineas Gage’s Brain**

**Bubba’s Brain**

**Dorsolateral Frontal**

- Poor concentration
- Poor strategy for memorizing
- Poor source memory and event tagging
- Poor organization
- Poor generativity
- Poor hypothesis testing and use of feedback
- Poor decision-making
- Loss of insight
- Anosognosia
What To Do

TECHNICAL DIFFICULTIES

REPAIRS UNDERWAY

When Neuro Mimics Psycho

- Prognosis for change may differ
- Interventions WILL need to be tailored
- Emergent problems may reflect a change in the brain rather than a change in psychology

Prognoses Differ

- Change is still possible, but may require a continuum of support:

Intervention Modification

- Goals based on reasonable expectation for change
- Intervention based on understanding of the brain’s role in the problem
- Take into account neuropsychological limitations
  - Attention, memory, reasoning, ability to delay gratification

Scenario 4: Fall Last Night

Patient had a severe TBI 2 months ago with hydrocephalus that required placement of a shunt. He is now medically stable with daily outpatient rehab. He has cognitive deficits and significant depression, for which he is seeing you. His wife calls and says he fell last night in the bathtub. He didn’t hit his head or injure himself, but he still seems different. He seems “out of it” despite sleeping all night and his memory is worse. He won’t say what’s wrong, but the wife wonders if he views the fall as a setback, and is consequently more depressed. All his rehab therapists agree he is more depressed today. What should you do?

Emergent Problems

- Suicide isn’t the only potential killer when dealing with neurological patients
- Must also watch for reoccurrence of the original pathology
Summary

- Anatomy and Pathophysiology of TBI and Stroke
- Two Adult Neuropsychological Syndromes That Mimic Psychological Disorder
  - The Medial Frontal Lobe Syndrome
  - The Orbital Frontal Lobe Syndrome
- What To Do About Mimicking Syndromes
- Resources
  - Slides - virginia.hallone@emory.org
  - Handout to come

Final Thought:

Knowledge of brain anatomy is arguably important in understanding certain patients, but, without question, it is critical in understanding certain members of the D.C. community. Will leave you with these final tools....