

Right vs Left Hemisphere Impairment

November 2, 2018

Brad Steinle, M.D.

Medical Director, Rehabilitation Services

Saint Luke's Health System



I have no conflicts of interests and financial support to disclose.

Right Vs Left Hemisphere Impairment

- Stroke occurs when blood supply to part the brain is disrupted, causing brain cells to die.
- While most are familiar with the motor, sensory and visual impairments, there are specific deficits that may occur depending on which hemisphere was affected.
- We will review and discuss right versus left hemispheric injury.

Right hemispheric Injury

- The right hemisphere controls visual-spatial functions:
 - Judging distance
 - Position sense
 - Size of objects
 - Speed of objects
- This can make it difficult to locate objects, walk up or down stairs, bring food to their mouth or get dressed.

Right hemispheric Injury

- Hemispatial neglect – ignoring people or objects on their left side. Extreme example is denying ownership of their left arm or leg (alien hand syndrome).

Right hemispheric Injury

- Anosognosia – lack of insight of physical or mental deficits. Show poor judgement of abilities or deny changed condition. Often are less willing to participate in therapy due to this lack of insight.

Right hemispheric Injury

- Anosodiaphoria – exhibit an indifference or display a lack of concern following stroke. Often are poorly motivated to change.

Right hemispheric Injury

- Visual spatial dysfunction – loss of the ability to associate the parts that make up a whole, will misperceive situations. Reduced visual memory less to inability to recall location or shape of objects.

Right hemispheric Injury

- Social misperception – difficulty with social nuance, body language or nonverbal clues. Will have trouble with social rules and recognizing others' perceptions. Will not pick up on subtleties such as sarcasm or humor.

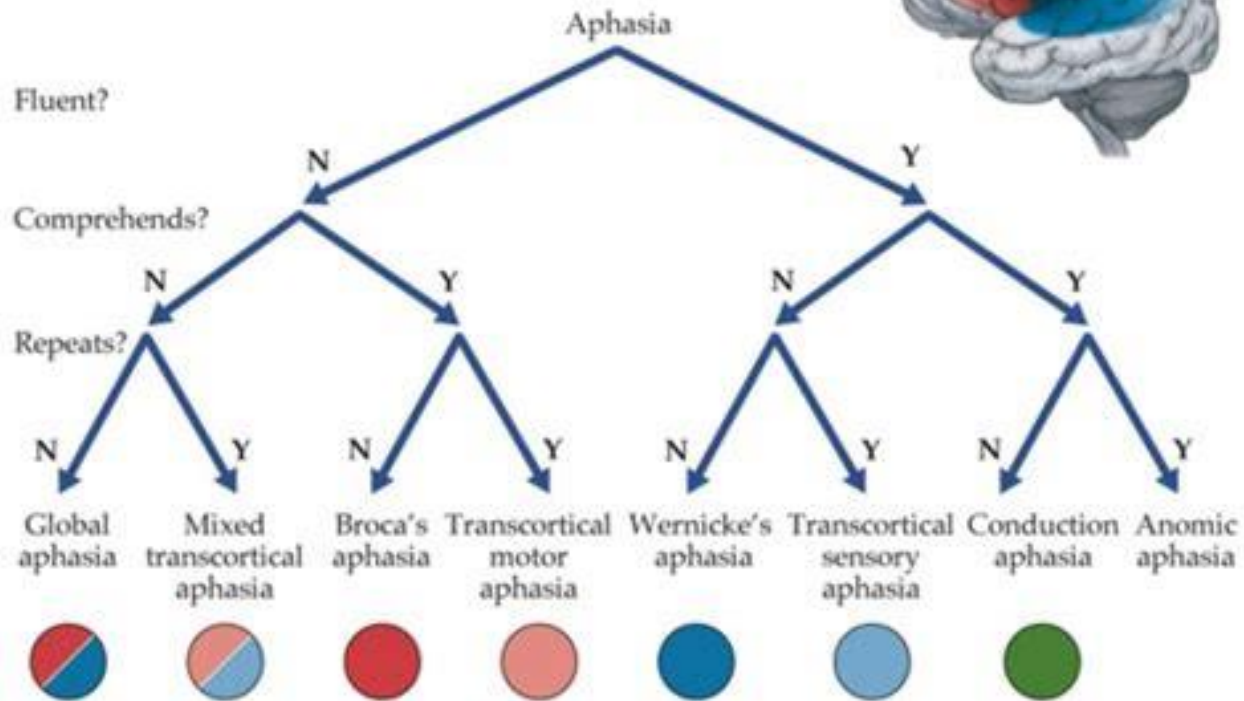
Left hemispheric Injury

- The left hemisphere is related to language and calculation.

Left hemispheric Injury

- Aphasia – ability to expression or understand verbal or written language.
 - Decreased or non-fluent
 - Neologism – made up words
 - Semantic paraphrasia – forget or substitute words

Left hemispheric Injury



Left hemispheric Injury

- Apraxia – loss of the ability to carry out purposeful movements or tasks.

Left hemispheric Injury

- **Ideomotor apraxia:** These patients have deficits in their ability to plan or complete motor actions that rely on semantic memory. They are able to explain how to perform an action, but unable to "imagine" or act out a movement such as "pretend to brush your teeth" or "pucker as though you bit into a sour lemon." However, when the ability to perform an action automatically when cued remains intact, this is known as automatic-voluntary dissociation. For example, they may not be able to pick up a phone when asked to do so, but can perform the action without thinking when the phone rings.
- **Ideational/conceptual apraxia:** Patients have an inability to conceptualize a task and impaired ability to complete multistep actions. Consists of an inability to select and carry out an appropriate motor program. For example, the patient may complete actions in incorrect orders, such as buttering bread before putting it in the toaster, or putting on shoes before putting on socks. There is also a loss of ability to voluntarily perform a learned task when given the necessary objects or tools. For instance, if given a screwdriver, the patient may try to write with it as if it were a pen, or try to comb their hair with a toothbrush.
- **Buccofacial or orofacial apraxia:** Non-verbal oral or buccofacial ideomotor apraxia describes difficulty carrying out movements of the face on demand. For example, an inability to lick one's lips or whistle when requested suggests an inability to carry out volitional movements of the tongue, cheeks, lips, pharynx, or larynx on command.
- **Constructional apraxia:** The inability to draw or construct simple configurations, such as intersecting shapes.
- **Gait apraxia:** The loss of ability to have normal function of the lower limbs such as walking. This is not due to loss of motor or sensory functions.
- **Limb-kinetic apraxia:** voluntary movements of extremities are impaired. For example, a person affected by limb apraxia may have difficulty waving hello.
- **Oculomotor apraxia:** Difficulty moving the eye, especially with saccade movements that direct the gaze to targets. This is one of the 3 major components of Balint's syndrome.
- **Apraxia of speech:** Difficulty planning and coordinating the movements necessary for speech (e.g. Potato=Topato, Topato.) AOS can independently occur without issues in areas such as verbal comprehension, reading comprehension, writing, articulation or prosody.

Left hemispheric Injury

- Dyscalculia – reduced ability to calculate or comprehend mathematics.

Left hemispheric Injury

- Emotionality – may become or cautious or slower to participate or make decision. Emotional lability.

Left hemispheric Injury

- Amnesia – may loss of ability to store/recall short term information.

- Case #1
- JM is a 34 yo RH male who developed right arm and leg weakness while at work as a highway patrolman.
- He was life flighted to SLH and underwent successful clot retrieval.
- Unfortunately over the next 24 hours developed brain swelling and required rescue craniectomy.
- He had prolonged ICU care – trach, PEG.

- Case #1
- Was able to be weaned from vent.
- When medically ready, he was sent to acute rehab.
- At that time, he had expressive aphasia, R HP (arm 1-2/5; leg 2-3/5).
- He had a 5 week stay on the rehab unit.
- He had 2 interruptions during stay:
 - Bone flap replacement.
 - Appendectomy.

- Case #1
- The 4 days he was off DVT prophylaxis he developed PE.
- Despite this, he was able to discharge to home (3 days after his wife delivered twin boys). At that time, communication had improved, right arm was 3-4/5; right leg 4/5.
- He traveled to SLH outpatient therapy for 6 weeks.

- Case #1
- He has developed spasticity in the right arm and has undergone botulinum injection.
- He was eventually transitioned to therapy in his home town.
- He underwent driving evaluation at R!KC and successfully passed.
- He is working with Missouri Vocational Rehabilitation for return to work opportunities.

- Case #2
- BT is a 62 yo RH male who was admitted SLH with left arm and leg weakness. Unfortunately, he woke up with the weakness and outside the window for intervention.
- He had left visual inattention, left hemiparesis (arm 1-2/5; left leg 2-3/5); left hemisensory neglect.
- After 4 days, he was admitted to acute rehab.
- He made some progress with therapy and was discharged to home after 4 weeks using a wheelchair.

- Case #2
- He did several weeks of home health therapy and was then discharged to R!KC day rehab program.
- He spent approximately 8 weeks in their program. He did not gain much function in the left arm; he was walking with cane and left AFO.
- He was referred to the R!KC driving program and failed their program.
- He started the American Stroke Foundation program – a wellness program for stroke.

- Case #2
- He participated in the stroke walk – was their biggest fund raiser one year.
- He took the driving program at Shawnee Mission Medical Center and failed their program.
- He “conned” a physiatrist” in his neighborhood to work with him on driving a golf cart in subdivision.
- Approximately one year later, he was sent back to R!KC for “pre-driving” work.

- Case #2
- Somehow he passed the driving test the third time he took it.
- He has volunteers at SLH.
- He travels to Florida every winter.





 Saint Luke's
REHABILITATION INSTITUTE



Questions?