Right Hemisphere Stroke:
Beyond left hemiparesis

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Objectives:

• To review right brain neuroanatomy.
• To review the typical deficits encountered by people with right hemisphere strokes as related to brain function and neuroanatomical areas.
• To describe an integrated rehabilitative approach to a patient with right hemisphere stroke.
Review of Right Brain Neuroanatomy
Structure and function
Objectives:

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Neuroanatomy Review

Cerebral Cortex

- Divided into 4 lobes
Figure 15-3. Homunculi of the primary somatosensory area (left) and primary motor area (right).
Neuroanatomy Review

Blood Supply to the Brain

Many arteries and their branches carry blood to the brain. Each artery supplies specific areas of the brain, but some brain areas are supplied by more than one artery.
Typical Deficits

With right hemisphere stroke
Objectives:

- To review right brain neuroanatomy
- To review the *typical deficits* encountered by people with right hemisphere strokes as related to brain function and neuroanatomical areas
- To describe an *integrated rehabilitative approach* to a patient with right hemisphere stroke
Right Anterior Cerebral Artery Stroke

- Paralysis of left leg and foot
- Impaired gait
- Sensory loss to left leg and foot
- Flat affect
- Lack of spontaneity, apathy
- Memory impairment
- Incontinence

Blood supply to **frontal** and **parietal** lobes
Right Middle Cerebral Artery Stroke

- Hemiplegia (left face, arm and leg)
- Left sensory deficits
- Homonymous hemianopsia
- Confusion
- Neglect
- Decrease auditory attention
- Short term memory loss
- Difficulty organizing Verbal information

Blood supply to frontal, parietal, temporal, and occipital lobes
Right Posterior Cerebral Artery Stroke

- Left sensory loss
- Pain & dysesthesia
- Dyskinesias
- Decreased visual attention
- Mild left hemiparesis
- Left visual field cut

Blood supply to parietal, temporal, and occipital lobes
Unique to Right CVA

• **Left sensory extinction**
  – Failure to respond to contralateral stimulation when simultaneous ipsilateral stimulation is present

• **Body scheme impairment / reduced body awareness**
  – Impaired knowledge of the position of body parts and the spatial relations between them

• **Impaired proprioception**

• **Agnosia**
  – Inability to recognize common objects in the absence of sensory impairment

• **Acalculia**
Unique to Right CVA

- Visual perception changes – difficulty processing visual information into something meaningful

  - Example: inability to find things in cluttered environment (figure-ground)
  - Example: inability to learn from observing

Patient Drawer
Visual Neglect

• Reduced awareness of contralateral stimulation
  – Present in more than 40% of patients with right hemisphere stroke acutely.
  – Majority of patients experience spontaneous recovery.

• Unilateral neglect and impaired constructional skills are most common in patients with right hemisphere strokes.
  – Paolucci, McKenna & Cooke (Australian Occupational Therapy Journal, 2009)

• Visual neglect, difficulty with visual reasoning and visuoconstructive defects are independent predictors of poor functional outcomes after right hemisphere stroke.
  – Losoi, Kuttunen, Laihosal, Ruuskanen, Dastidar, Koivisto & Jehkonen (Neurocase, 2012)
Language Impairments

“Active” type
• Insensitivity towards others, preoccupied with self
• Oblivious to social conventions
• Unaware of or inattentive to their physical and mental limitations
• Verbose, tangential, and rambling in speech
• Insensitive to the meaning of abstract or implied material
• Unable to grasp the overall significance or meaning of complex events

“Passive” type
• Unresponsive to social or environmental stimuli
• Use short utterances that lack emotional inflection
• Have difficulty maintaining attention for more than a few seconds

Cognitive Impairments

- Anosognosia
  - reduced self awareness of stroke-related impairments
- Apraxia
  - Inability to execute learned purposeful movements unexplained by sensorimotor deficits
- Impulsive, unorganized
- Impaired judgment
- Impaired insight
- Difficulty with follow-through
- Does not learn from mistakes
- Overall reduced attention

Vossel, Weiss, Eschenbeck & Fink (Cortex, 2013)
With RIGHT brain strokes…

Objectives:

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- To review the **typical deficits** encountered by people with right hemisphere strokes as related to **brain function and neuroanatomical areas**
- To describe an **integrated rehabilitative approach** to a patient with right hemisphere stroke
Case Study
Patient arrives at rehab with goal of driving and roller-skating and driving this week.
Case history

• 60 year old female
• Right Middle Cerebral Artery CVA in 2016

• Team Goals:
  1. Achieve functional use of left upper extremity
  2. Increase independence in ADLs and IADLs;
  3. Increase independence in ambulation;
  4. Return to driving;
  5. Return to volunteer work
  6. Improve midline orientation and balance
  7. Improve neuromuscular control of L LE
  8. Increase independence on stairs
H.H. – Observations

- Minimal eye contact – right gaze
- When speaking, shifts topics without warning
- Talks without letting partner have a turn
- Weight on right › left
- Head tilted to the left
- Lack of insight
- Impaired awareness and judgment
Assessment Materials

SLP:
• Scales of Cognitive Ability for Traumatic Brain Injury (SCATBI)
• Cognitive Linguistic Quick Test (CLQT)

OT:
• Daily living questionairre (Joan Toglia, 2006)
• Brief visual screen / Encourage client to get formalized eye assessment
• Bell’s Test

PT:
Non specific to right-brain stroke
Early Example of Assessment Findings

Clock Drawing (various tests)  Copying Tasks  Line Bisection
Later Example of Assessment Findings

Bell’s Test
Integrative Treatment Approach
Treatment approach

• Provide the “just right challenge”
  – More compensation → Less compensation
  – Less cluttered → More cluttered tasks
  – Small field → Larger field to scan
  – Stationary → Dynamic tasks
  – Less distractions → More distractions

(Berryman et al., 2010; Warren, 1998; Warren, 2008)
Treatment approach

• Incorporation of *kinesthetic/motor* input

  (Berryman et al., 2010; Luukkainen-Markkula et al., 2009; Profitis, et al., 2013; Spaccavento et al., 2016; Warren, 2008)
Treatment approach

• Lighthouse adaptation
  (Niemeier, 1998; Pereira Ferreira, 2011)
Treatment approach

• **SLP / OT specific**
  – Self-rating systems for almost all activities
  – Role play

• **Team approach**
  – Informal rating of activities ("how did you think that transfer went?" “Did you finish your entire tray – cue to look down at tray”?)
Example of self-ax questionnaire

**Executive skills questionnaire**

This questionnaire assesses your executive skills. Read each of the statements and mark the box that best describes your behaviour at present. It might be helpful to ask someone who knows you well to complete the questionnaire and fill in the independent scorer column.

**Scoring**
- Agree = 2
- Partially agree = 1
- Disagree = 0

<table>
<thead>
<tr>
<th>Question</th>
<th>Self-score</th>
<th>Independent score</th>
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<tbody>
<tr>
<td>3. I have difficulty planning and organising.</td>
<td></td>
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<td>2. I have difficulty doing more than one thing at a time.</td>
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<td>3. I have difficulty weighing up the pros and cons, deciding on what is important and making decisions.</td>
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<td>4. I sometimes misinterpret the actions of others and 'get the wrong end of the stick'.</td>
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<td>5. I am more impulsive, acting without thinking of the consequences.</td>
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<td>6. I often 'go off at tangents', or move too quickly from one idea to the other in conversation.</td>
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<tr>
<td>7. I have difficulty summarising information, 'getting to the point', or 'sawing the wood from the trees'.</td>
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<td>8. I tend to hold firm, 'black and white' or rigid views.</td>
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<tr>
<td>9. I have problems planning realistic goals, and working out the steps to achieve those goals.</td>
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<tr>
<td>10. I sometimes have difficulty switching attention quickly in a fast-flowing conversation.</td>
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</tbody>
</table>

**TOTAL SCORE**

**INTERPRETATION**
- Self-score: 10-20: This suggests that your executive skills could be improved.
- Discrepancy between self-score and independent score
- 5-20: This suggests that you may not be fully aware of your executive skills problems, or are denying them.

How relevant did you find this sheet? Very □ Slightly □ Not very □ What was the most important point for you?
Treatment approach

• Encourage clients to “STOP, THINK then DO”

• Help to break the task down
  – Would you do this or that first...
  – What would you do first, second....

• Reflect on the performance with the client

(Vossel et al., 2013)
Treatment approach

- Use visual cues to...
  - Slow patient down
  - To problem solve
- How...
  - Reading / Scanning
  - Walking
  - Within home environment
Treatment approach

• **SLP specific**
  
  – Use **post-it notes** for interruption and/or every **minute of speaking without break**
  
  – Use **timer**
  
  – **Presentation and summarizing** tasks within time limit (“say XXX information in 3 minutes”)

• **Team approach**
  
  – Physical cue (pre-determined by SLP/staff) for partner’s turn
  
  – Other cue (such as **saying patient’s name**; hand up to indicate it’s partner’s turn)

Sheila Macdonald, Cognitive communication course 1 & 2
Treatment approach

• SLP Specific
  – “Liners” activity. Excellent for summarizing speech, attention to detail, turn taking, verifying information, and auditory comprehension.

• Team approach
  – Incorporate verifying with patient
  – Watch out for “head nodders”!
Treatment approach

- **Unilateral neglect**—associated with **falls**, increased **rehab stay** and increased assistance required on D/C.

- **Impaired sensation and position sense** increases risk for **injury** to L LE/UE during **transfers** and ambulation/wheelchair **mobility**.
Treatment approach

- **Consider:**
  - Aircast for support to L ankle
  - theraband wrapping of L knee and ankle
  - development of stroke teams (OT, PT, Nurse) to **improve** consistency with transfers and mobility.

[Link to Fairview Health Library article](https://www.fairview.org/HealthLibrary/Article/40382)
Treatment approach

- Ensure attention is paid to proprioceptive, sensory impairment, positioning and feedback during treatment.

- Proprioceptive and sensory impairment linked to Complex Regional Pain Syndrome (or RSD) – negatively impacts recovery, and is associated with increased rehab stay, and increased assistance required upon D/C.
Treatment approach

- **PT specific interventions:** use L LE/UE with standing with R knee on ball/ R foot on slider, stepping activities.

- **Team approach:**
  - Incorporating affected UE in **weight bearing** or **active use** for ADLs
  - **use** of L LE and UE (if possible) for wheelchair propulsion
  - **use** of L arm for gait retraining (walker splint)
  - **consistent message** for incorporating UE/LE during bed mobility, transfers and sitting and standing tasks
Treatment approach

• Frequently associated with proprioceptive disorder and hemineglect.

• Syndrome referred to as a positive/productive manifestation of neglect.

• Abnormalities in body geometry have a clear link to R brain damage.

• Close connection noted between neglect and pusher syndrome after R hemisphere CVA.

http://pushersyndromeassist.weebly.com/
**Treatment approach**

- **PT/OT specific strategies** such as side-saddle, ambulation with arm vs wall/holding handrail.

- **Team Approach**: to provide consistent cues to encourage midline orientation for bed mobility, sitting balance, transfers
  - assist on unaffected side to decrease push
  - transfer to L side where possible
  - leaning on theraball

Most importantly...

• Collaborate with the **team** and **FAMILY / FRIENDS** of patient
• What is functional?
• What is motivational? (client’s interests!)
Team Tips

• Clear, specific, and **simple** verbal instructions
• Gain **eye contact** first before speaking
• Use **gestures** to help
• **Verify** the person has understood (eg. “Ronny, can you tell me what I just explained?”)
• If appropriate, use **physical or verbal signal** (eg. light touch on shoulder, using person’s name when starting to talk) to indicate it’s **your turn to talk**
Team Tips

• Bed selection which encourages patient to look to the left
• Encourage scanning left to right
• Red tape on left side of tray
• Wash/shave/touch left side of body
• Hand in active support or use of left upper extremity to assist with functional tasks
• Ask specific questions/encourage problem solving
Team Tips

• Falls prevention for those with motor deficits
• Environmental protection for those who are ambulatory
• **Family education re:** safety risks associated with cognitive/perceptual impairment as not always obvious given verbal abilities
Questions?

Thank you!

June 8, 2017