Management of TBI and mTBI

Amanda Hereford, MA, CCC-SLP

Management of TBI from SLP Perspective

- Receive orders on every patient with +head CT findings and patients with +LOC plus cognitive symptoms (education given to those not seen for speech-language/cognitive evaluation)
- Missing orders corrected with use of huddle
- Establish level of cognitive functioning with use of Rancho Los Amigos Scale
- Frequently see patients for swallowing and passy muir valve placement simultaneously
- Education re: role of medical SLP, TBI, cognitive functioning after TBI
- Education to nursing and family re: agitation and higher level cognitive deficits

Evaluation

- Galveston Orientation and Amnesia Test (GOAT)
- Working Memory from Numbers Reversed from Woodcock-Johnson: Test of Cognitive Ability
- Three word recall
- Episodic recall
- Trail Making A & B
- Verbal Problem-Solving
- Optional: Behavioral Assessment of Dysexecutive Syndrome (BADS) subtest Zoo Map
- Language sample
- Generative Naming (Animals, FAS)
### Rancho Los Amigos - Level of Cognitive Functioning Scale

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
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<tbody>
<tr>
<td>Level I</td>
<td>No Response. Patient does not respond to external stimuli and appears asleep.</td>
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<tr>
<td>Level II</td>
<td>Generalized Response. Patient reacts to external stimuli in nonspecific, inconsistent, and nonpurposeful manner.</td>
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<tr>
<td>Level III</td>
<td>Localized Response. Patient responds specifically and inconsistently with delays to stimuli, but may follow simple commands.</td>
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<tr>
<td>Level IV</td>
<td>Confused, Agitated Response. Patient exhibits bizarre, nonpurposeful, incoherent or inappropriate behaviors, has no short-term recall, orientation to self and surroundings.</td>
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<tr>
<td>Level V</td>
<td>Confused, Inappropriate, Nonagitated Response. Patient gives random, fragmented, and nonpurposeful responses to complex or unstructured stimuli - Simple commands are followed consistently, memory and selective attention are impaired, and new information is not acquired.</td>
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<tr>
<td>Level VI</td>
<td>Confused, Appropriate Response. Patient gives context appropriate, goal-directed responses, dependent upon external input for direction. There is carry-over for relearned, but not for new tasks, and recent memory problems persist.</td>
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<td>Level VII</td>
<td>Automatic, Appropriate Response. Patient behaves appropriately in familiar settings, performs daily routines automatically, and shows carry-over for new learning at lower than normal rates. Patient includes social interactions, but judgment remains impaired.</td>
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<tr>
<td>Level VIII</td>
<td>Purposeful, Appropriate Response. Patient is oriented and responds to the environment but abstract reasoning abilities are decreased relative to premorbid levels.</td>
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### How are mTBIs different?
- Usually lethargic, repetitive questioning, unusual patterns of deficits initially
- Deficits resolve fairly quickly
- Absence of findings on head CT
- Brief LOC or altered LOC (can have a concussion without losing consciousness)
- Continued deficits are usually: processing speed, attention, cognitive fatigue, working memory, new learning, and very high level executive functioning deficits

### Diagnostic criteria for mild traumatic brain injury from the American Congress of Rehabilitation Medicine

A patient with mild traumatic brain injury has had a traumatically induced physiologic disruption of brain function, as manifested by 1 or more of:
- any loss of consciousness up to 30 min,
- any loss of memory for events immediately before or after the accident for as much as 24 h,
- any alteration of mental state at the time of the accident (eg, feeling dazed, disoriented, or confused), or
- focal neurologic deficits that might or might not be transient, but where the severity of the injury does not exceed
  - loss of consciousness exceeding 30 min,
  - posttraumatic amnesia longer than 24 h, or
  - a Glasgow Coma Scale score falling below 13 after 30 min.

Adapted from the Mild Traumatic Brain Injury Committee of the American Congress of Rehabilitation Medicine.
Common symptoms of mild traumatic brain injury

**Physical**
- Headache
- Nausea
- Vomiting
- Blurred or double vision
- Seeing stars or lights
- Balance problems
- Dizziness
- Sensitivity to light or noise

**Behavioral or emotional**
- Drowsiness
- Fatigue or lethargy
- Irritability
- Depression
- Anxiety
- Sleeping more than usual
- Difficulty falling asleep

**Cognitive**
- Feeling "slowed down"
- Feeling "in a fog" or "dazed"
- Difficulty concentrating
- Difficulty remembering

International Classification of Diseases (ICD-10) diagnostic criteria for postconcussion syndrome

A. History of head trauma with loss of consciousness preceding symptom onset by a maximum of 4 wk.
B. Symptoms in 3 or more of the following symptom categories:
- headache, dizziness, malaise, fatigue, noise intolerance;
- irritability, depression, anxiety, emotional lability;
- subjective concentration, memory, or intellectual difficulties without neuropsychological evidence of marked impairment;
- insomnia;
- reduced alcohol tolerance; and
- preoccupation with above symptoms and fear of brain damage with hypochondriacal concern and adoption of sick role.

Level 1 Trauma Centers

- Survey of 35 trauma centers
- 18 indicated SLPs completed evaluations for MTBI
- Evaluations tools used: GOAT, SCATBI, RIPA, Bedside test of Head Injury, Woodcock Johnson Test of Cognitive Ability, BNT, Brain Injury Test Battery, Weschler Memory Test, The Word Test, Sharp Cabrillo Test, Mini Inventory of Right Brain Injury, Ross Test of Higher Cognition, Mini Mental Status Examination, DTLA, CELF
- Referral post-discharge: 16 Neuropsychologist, 15 SLP/OT

- Routine testing of mTBI patients show that 20-60% of patients will have deficits if tested within one month of injury.
- The majority of these deficits will resolve within 3 months, but some will persist.
- However, faster identification will allow for adjustments to daily activities, return to work/school, sports, until cognitive function has significantly recovered.

- The best predictor of cognitive outcome at discharge from acute care was the duration of post-traumatic amnesia.
- Level of education was predictive of early functional cognitive outcome.
- Age (in research studies) is not a consistent predictor of outcome.

**Difficulty with Predicting PCS**

- Who gets it? Conflicting research
  - Those likely to have PCS at 1 week: being diagnosed, female, psychiatric history, anxiety on screening tool, pain severity
  - Unlikely at 1 week: acute cognitive measures during acute stage, PTA duration, age, previous head injury, education level, pre-injury health, narcotic use
  - Those likely at 3 months: psychiatric history, poor pre-injury health, anxiety on screening tool, pain severity, and stressful life events
  - Unlikely at 3 months: cognitive memory measures at any stage, PTA duration, age, previous TBI, educational level

Ponsford et al, 2012
A study of 130 patients indicated: 85% had at least one PCS at one week f/u (dizziness was highest in frequency); 55% at 2 weeks; 23% at 3 weeks; 13% at 4 weeks; and 94% of patients had no symptoms at 8 week f/u.


There is some relatively new research that suggests Oculomotor and Visuomotor measures may successfully predict PCS (even more so than neuropsychological evaluations)

Heitger et al, 2008

So, what should a SLP do in the Acute Phase???

Role of Education in mTBI
- Those that receive education re: recovery from mTBI and what to expect are less likely to report symptoms at 3 months
- Education re: work/school re-entry and accommodations

Ponsford et al, 2002 and Bell et al, 2008
Treatment of TBI in Acute Care

- Education
- Environmental modifications
- Environmental supports
- Addressing attention
- Errorless Learning and spaced retrieval
- Re-orientation
- Memory books

Education

- Use education from the Model Systems Knowledge Translation Center (msktc.org)
  - Good information re: understanding TBI, cognitive deficits after TBI, driving, headaches, etc.
  - Even has home based cognitive activities for families.

Environmental Modifications

- Reducing noise, visitors, visual clutter
- Having RN introduce themselves every time they enter room
Environmental Supports
- Posted orientation information (month, year, place) in large print
- Selected pictures

Addressing Attention
- Items from the APT
- Sorting tasks: cards, checkers, coins
- Timed tasks
- Reading passages/auditory clips

Errorless Learning
- Providing correct information instead of asking patient
- For use in acute care, orientation information with use of environmental supports. Cue patient to use written information.
- Use of daily memory logs to refer to in recalling episodic information
- Use multiple modalities: have family frequently verbally review information with them, have patient write information, have patient read information
Next Directions

- Continue to update and streamline patient education based on latest research
- Advocate for patients with TBI to receive the services they need post-discharge
- Follow up in the Multi-disciplinary TBI Clinic