Health Care Decision Making after High Spinal Cord & Traumatic Brain Injury: A Team Approach

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Prognosis and Severe Neurologic Injury

Cervical Spinal Cord Injury (SCI) and Traumatic Brain Injury (TBI)
Spinal Cord: Intro

- Major conduit through which motor and sensory information travels between brain and body
- 33 vertebrae
- Coverings of the spinal cord: dura, arachnoid, pia
- Grossly, spinal cord is continuous with the medulla and ends in the lumbar spine
  - Typically ends around L2
SCI: Epidemiology Facts

- Background Epi
  - The incidence of SCI is approximately 54 per one million people per year, or 17,000/year
  - Current prevalence in the US is somewhere between approximately 243,000-347,000
  - Men account for approximately 80% of injuries
    - Approximately 64% Caucasian but general race demographics are changing
  - 3 most common causes of SCI are MVC, falls and acts of violence
SCI Vocabulary

• Tetraplegia
  – Impairment or loss of motor or sensory function in the cervical segments of the spinal cord due to damage of neural elements within the spinal canal
  – “Tetraplegia” versus “quadriplegia”

• Paraplegia
  – Impairment of motor and/or sensory function in the thoracic, lumbar or sacral segments of the spinal cord secondary to damage of neural elements within the spinal cord
    • Upper extremities spared
Neurological level and extent of lesion

- 45% incomplete tetraplegia
- 21.3% incomplete paraplegia
- 20% complete paraplegia
- 13.3% complete tetraplegia
The ISNCSCI Exam: what is that?

- Also known as the ASIA exam
- Systematic Classification
- Means of prognosis and communication between providers
  - Standardized exam, performed supine
  - Testing 28 dermatomes bilaterally, 10 myotomes
  - Total of 112 sensory points and 20 muscle groups, PLUS…
Prognosis and SCI

- The Neuro exam, ISNCSCI exam aka the “ASIA” exam helps to give an idea to prognosis
  - Neurologic level of injury
  - Complete versus incomplete
- Based on clinical findings
- NOT based on imaging
- Consider other injuries or comorbidities
- Respiratory
  - Vital Capacity or NIF
  - Need for prolonged wean from ventilator
- Functional prognosis
Spinal Cord Injury...and other injuries

- If you are experiencing a force hard enough to disrupt your spine and cause spinal cord injury there is a high likelihood of other injuries at the time as well
  - Fractures
  - Peripheral Nerve Injury
  - Traumatic Brain Injury
    - Dual Diagnosis of SCI/TBI may reach up to 74%
    - Cognitive issues may affect treatment plan
SCI and Respiratory issues

Why?
• Weakness of inspiratory and expiratory musculature
  • Diaphragm: C3-5
  • T1-T5: intercostal innervation
  • T5-T12: progressive loss of abdominal motor function, impairing expiration/cough
• Difficulty to take a deep breath, ineffective cough, inability to clear secretions

• Common Disorders
  • PNA
  • Ventilatory failure or insufficiency
  • Sleep-disordered Breathing
    • Sleep apnea
  • VTE disease
Spirometry, SCI and vent weaning

- Vital Capacity and NIF the best indicators for weaning
- Tidal volumes for pts with SCI on the vent:
  - Often patients have more “healthy” lungs so can consider volumes higher than those with acute pulmonary disease
  - Range but typically up to 12 mL/kg for TV. Some centers 15-20
  - Work to decrease atelectasis
    - Improve surfactant production, prevent collapse, promote recruitment
- When can you initiate weaning
  - NIF <20
  - VC > 10cc/kg
Traumatic Brain Injury

- Incident and prevalence higher than that of SCI
  - Approximately 1.7 million/year in the US
  - 52,000 result in death, 1.3mil considered “mild”
  - Approximately 275,00 with mod to severe TBI with associated complications and medical costs

- TBI severity: Based on Glasgow Coma Scale (GCS) and imaging findings
  - Mild (GCS 13-15)
  - Mild Complicated (GCS 13-15 + imaging findings)
  - Moderate (9-12)
  - Severe (GCS ≤8)
### Glasgow Coma Scale (GCS)

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<th>Open spontaneously</th>
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<td>Open to verbal command</td>
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</tr>
<tr>
<td></td>
<td>Open to painful stimuli</td>
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<tr>
<td></td>
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<tr>
<td></td>
<td>Inappropriate words</td>
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</tr>
<tr>
<td></td>
<td>Incomprehensible sounds</td>
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<td>Responds to painful stimuli by:</td>
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<td></td>
<td>purposeful localization</td>
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</tr>
<tr>
<td></td>
<td>withdrawal</td>
<td>4</td>
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<tr>
<td></td>
<td>flexor posturing</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>extensor, posturing</td>
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<tr>
<td></td>
<td>no response</td>
<td>1</td>
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| GCS Score         | 3 to 15               |   |
TBI: Disorders of Consciousness

- Coma
- Vegetative State
- Minimally Conscious State
TBI: Prognosis

- How someone will do depends on how they are doing
  - NOT always imaging-related
- Consider co-morbidities
- Time in Post-Traumatic Amnesia (PTA)
  - GOAT or O-Log
- Long-term prognosis: Glasgow Outcome Scale
  - Dead
  - Vegetative State
  - Severe disability
  - Moderate Disability
  - “Good recovery”
TBI: Functional Impact

- Centers for Disease Control and Prevention estimates that at least 5.3 million Americans currently need long-term or lifelong assistance with activities of daily living (ADLs) as a result of TBI.

- Loss comes in many forms: medical care, loss of productivity, societal or indirect loss, financial cost.

- In the acute phase, sometimes challenging to know how much impact a TBI will have.
Cognitive-Communication Evaluation

The Role of the Speech-Language-Pathologist in this Process
Identify unmet communication needs & current barriers to participation

Monitor progress & evaluate outcomes; Create or procure communication tools

Document current patterns of communication & participation

Provide partner training & identify practice opportunities

Select/set up/design/create communication support technologies to try
Questions the SLP Will Consider in their Assessment:

- How is the patient able to communicate?
- Is the patient alert?
- How quickly do they fatigue?
- Is there a “best” time of day to assess?
- What mode of communication can we trial?
  - Eye Gaze
  - Partner Assisted Communication
  - Yes/No (using eyes)
- Which methods work best for the patient?
Evaluation

Unreliable

- Egocentric & Nonegocentric Yes/No Question responses not accurate
- Comprehension is poor
- Pt’s responses and ability to follow commands is not consistent and cannot be replicated
- Pt is unable to sustain adequate LOA

Reliable

- Yes/No response has been established and person is consistently responding accurately
- Other members of the team can replicate and responses don’t change
- Pt can consistently follow commands.
- Pt can maintain LOA
Types of Augmentative Alternative Communication (AAC)
Reminders

- Leave out your bias
- Do not lead patient’s response
  - How you formulate a question can lead the patient’s response
- Do not ask the patient to do things that are reflexive responses, i.e. hand squeeze
- Make sure the patient has a way to answer both “Yes” and “No”
- Demonstrate use of communication systems, provide instruction and consider the energy it takes for the patient to use a communication system
  - The cognitive demand to respond to use an alternative communication system is high and can be tiring
If patient is reliable with his/her answers and we establish a functional, consistently reliable mode of communication without bias then we demonstrate function, teach it to other members in the assessment team so that we can utilize the “same” system.
Psychiatry

The Role of Psychiatry in this Process
Decisional Capacity

1. Exhibit understanding of the medical condition, treatments and alternatives offered
2. Understand the significance of the consequences of the decisions and the possible outcomes
3. Consistently express wishes
4. Demonstrate rational thought processes leading to decision.

<table>
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<tr>
<th>Table 1. Legally Relevant Criteria for Decision-Making Capacity and Approaches to Assessment of the Patient.</th>
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<tbody>
<tr>
<td><strong>Criterion</strong></td>
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<tr>
<td>Communicate a choice</td>
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<tr>
<td>Understand the relevant information</td>
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<tr>
<td>Appreciate the situation and its consequences</td>
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<tr>
<td>Reason about treatment options</td>
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\(^a\) Questions are adapted from Grisso and Appelbaum. Patients’ responses to these questions need not be verbal.
Psychiatric Diagnostic Considerations
Major Depressive Disorder

- Symptoms/dx prior to injury
- Recent course
- Focus on mood/cognitive symptom criteria
  (depressed mood, loss of interest/pleasure, worthlessness/guilt, decreased concentration, recurrent thoughts of death/suicidal ideation)
Depressive Disorder Due to Another Medical Condition

- Persistently depressed or irritable mood
  or
- Diminished interest or pleasure in most activities
- Work up indicates medical condition is causal
- Significant distress/impairment of psychosocial functioning
- Onset usually 1st month of illness
- Consider substance induced mood changes (SIMD)
Adjustment Disorder with Depressed Mood

- Trauma and stressor-related disorders
- Residual Dx: not diagnosed if meets criteria for another specific disorder/bereavement
- Occurs in response to an identifiable stressor
- Low mood/tearfulness/hopelessness
- Significant distress that exceeds what would be expected and/or impairs functional status
- Occurs within 3 months of stressor onset/resolves within 6 months after stressor/consequences have ended
Palliative Medicine

The Role of Palliative Care in this Process
Palliative Care

- Values Triad: Longevity, Independence, Comfort
- Anticipatory Guidance:
  - Physical Exam
  - Projected Injury Recovery
  - Complications/Setbacks
  - Role of the Surrogate
  - Outline time limited trial
FRAMEWORK FOR DECISION MAKING IN HIGH SPINAL CORD & TRAUMATIC BRAIN INJURY

PROGNOSIS DEVASTATING?

UNCERTAIN

NO

TEAM CONSENSUS

YES

Pt values

Surrogate consensus

YES

comfort

longevity

Withdrawal of LST***

Organ Donation Coordination (if applicable)

TEAM CONSENSUS

YES

Pt values

Surrogate consensus (if needed)

YES

Continued Full Medical Care
-- Early rehab medicine
-- Early rehab psych
-- Early SLP, PT, OT
-- Palliative care

*see page 2 for details re: assessments

***LST: Life Sustaining Treatment

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**Detailed Capacity Assessments**

1. **Cognitive-Communication evaluation (SLP)**
   - UNRELIABLE
   - RELIABLE
     - Reassess in ~24-48 hours
     - Evaluate decisional capacity for LST

2. **Decisional capacity (palliative, psych, primary MD)**
   - YES
     - Assess mood, depression (Psychiatry)
     - Tend to emotion
     - Assess retention of information; Prognostic awareness
     - Fill in knowledge gaps (rehab medicine)
     - Reassess over several days for consistency
   - NO
     - Reassess in ~24h-48h AND

3. **Expected to regain capacity?**
   - NO
     - Patient values
     - Surrogate consensus
       - YES
         - comfort
         - Withdrawal of LST Organ Donation Coordination (if applicable)
         - Continue Full Medical Care
           --Early rehab medicine
           --Palliative care
           --Early SLP, PT, OT
       - NO
         - longevity
         - Educate family Re: framework
     - YES
Case study #1

ADMISSION NOTE:

- 47yo woman transferred from OSH while intoxicated in her hotel room & sustained a C5-6 fracture-dislocation w/complete SCI. She had immediate pain in her neck & loss of sensation of everything from her costal margin down as well as in her RUE. She was stuck waiting for 6 hours until EMS found her and took her to OSH.

- She arrived at HMC w/VSS & [paraplegia] of BLEs & RUEs & minimal movement of her LUE. She was place in C-Spine traction & underwent an anterior left sided C5-6 ACDF w/JP drain placement with ortho spine. She is in stable condition w/pain well-controlled and plan to return to the OR tomorrow for PSIF.

- She is in an emotional state & states, “I want to die.”

Physical Exam:

- AAOx3, conversing appropriately, in emotional distress
- Neuro: CN II-XII intact, complete [paraplegia] of BLEs, minimal movement of LUE, 3/5 strength in LUE.
- Sensation: Left: 5/5 @C5, 3/5 @ C6, 0/5 @ C7
  Right: 1/5 @ C5, 0/6 @ C6
Case Study #2

- 37yo woman presents with weeks of significant back and neck pain, fevers and chills, some leg symptoms and multiple trips to multiple emergency rooms
- Presented to our hospital, still ambulatory at the time
- MRI performed, found cervical epidural fluid collection suggestive of abscess
- Prepared by ortho team for emergent surgical intervention
- Subsequently suffered cardiac arrest with prolonged ROSC
- Surgery delayed secondary to medical issues
Case study #2 (continued)

- Still intubated without tracheostomy or feeding tube
- Physiatry involved post-op to perform clinical exam
- Patient still quite delirious, source control of infection difficult with significant involvement/direction from ID team
- Spouse is at bedside stating that patient would not want to live “like this”
- Challenges in getting reliable source of communication
Pitfalls

- Anyone asking “do you want to live, do you want a breathing machine...”

- Different teams/family/nurses asking at times outside of formal evaluation

- Indicating that family has surrogate decision making from beginning

- Not being explicit about timelines
PEARLS

- Consistency in providers

- Assess over days to a week or two

- Refrain staff/family from engaging in assessment questions when not in formal evaluation to avoid confusion

- Ensure colleagues are observing with you; use your IDT team

- Invite family to observe assessments: Set ground rules!