Traumatic Brain Injury

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Traumatic Brain Injury

- TBI – A blow to the head or penetrating head injury that disrupts the function of the brain
Non-Traumatic Brain Injury

- Non-Traumatic
  - Internal
    - Stroke
    - Brain Tumor
    - Infection
  - External
    - Poisoning
    - Hypoxia
    - Substance Abuse
Traumatic Brain Injury Statistics

- Approximately 1.5 million people sustain TBI each year in the United States
  - 50,000 die
  - 85,000 suffer long-term disabilities
  - 5.3 million people in the U.S live with disabilities caused by TBI
- Direct & Indirect medical costs totaled an estimated $60 billion dollars in the U.S. in 1995

*Statistics by Center for Disease Control and Prevention*
Traumatic Brain Injury Statistics

- What causes TBI?
  - Falls (35.2%)
  - Motor Vehicle Accidents (17.3%)
  - Firearms (16.5%)
  - Assaults (10%)

- Who is at highest risk for TBI?
  - Males are 1.5 times as likely to sustain TBI
  - Highest risk ages (0-4) years and (15-19) years and elderly
  - African Americans have the highest death rate from TBI
    - Statistics by Center of Disease Control and Prevention and Colorado Brain Injury Alliance
Presentation of TBI

Physical
• Headache
• Neck pain/pressure
• Blurred vision
• Dizziness
• Poor Balance
• Tinnitus
• Nausea and Vomiting
• Parathesias
• Sensitivity to light/noise
• Disorientation

Cognitive
• Difficulty remembering
• Difficulty concentrating
• Slowed speech
• Easily confused
• Feeling “slowed down”
## Presentation of TBI

<table>
<thead>
<tr>
<th>Emotional</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inappropriate feelings</td>
<td>Fatigue</td>
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<tr>
<td>Personality changes</td>
<td>Drowsiness</td>
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<tr>
<td>Nervousness/Anxiety</td>
<td>Excess sleep</td>
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<tr>
<td>Irritability</td>
<td>Insomnia</td>
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<tr>
<td>Sadness</td>
<td></td>
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<tr>
<td>Lack of Motivation</td>
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</tbody>
</table>
Recognizing a TBI

- Blow to Head
- Whiplash
- Car Accident
- Assault/Violence
- Sustained High Fever
- Brain Tumor
- Anoxia
- Meningitis
- Encephalitis
- Seizures
- Overdose
Mild Brain Injury

- Any period of observed or self-reported
  - Transient confusion, disorientation, or impaired consciousness
  - Dysfunction of memory around the time of injury
  - Loss of consciousness lasting less than 30 minutes
Mild Brain Injury

- Observed signs of neurological or neuropsychological dysfunction, such as:
  - Seizures acutely following injury to the head
  - Among infants and very young children: irritability, lethargy, or vomiting following head injury
  - Symptoms among older children and adults such as headache, dizziness, irritability, fatigue or poor concentration
Post-Traumatic Amnesia (PTA)

- The time between injury and recovery of continuous memory
  - PTA – less than 10 minutes – very mild injury
  - PTA – less than 10 – 60 minutes – mild injury
  - PTA – 1-24 hours – moderate injury
  - PTA – 1-7 days – severe injury
  - PTA – greater than 7 days – very severe injury
Ranchos Los Amigos

I. No response: Unresponsive to stimuli
II. Generalized Response: Limited, inconsistent, often only to pain
III. Localized Response: Purposeful, may follow simple commands
IV. Confused, agitated: Confusion, disorientation, unable to care for self
V. Confused, Inappropriate, non-agitated: Agitated to external stimuli, verbally inappropriate, does not learn new information
VI. Confused, appropriate: Good directed behavior, can relearn, ADL’s
VII. Automatic appropriate: Robot-like appropriate behavior, needs structure
VIII. Purposeful appropriate: Alert, oriented, independent in home living skills
Glasgow Coma Scale

- Based on a 15 point scale for estimating and categorizing the outcomes of brain injury on the basis of overall social capability or dependence on others
- 90% less than or equal to 8 are in a coma
- Less than or equal to 8 at 6 hours – 50% will die
- Greater than or equal to 12 is a minor injury
Glasgow Coma Scale

- Eye Opening
  - 1. Spontaneous.................................4
  - 2. To Speech......................................3
  - 3. To Pain........................................2
  - 4. Not open......................................1
Glasgow Coma Scale

- Verbal Response
  - 1. Alert and Oriented.............5
  - 2. Confused..................................4
  - 3. Inappropriate words.........3
  - 4. Sounds only .........................2
  - 5. Silence..................................1
Glasgow Coma Scale

- Motor Response
  - 1. Obeys commands........................................6
  - 2. Localizes to noxious stimuli.........................5
  - 3. Withdraws from noxious stimuli......................4
  - 4. Abnormal flexion, i.e. decorticate...............3
  - 5. Extensor response, i.e. decerebrate............2
  - 6. No response...........................................1
Brain Injury Management

- Post Surgical Issues
  - Incision Care
  - Infection
  - Dehiscence
- Bone Flaps
  - Protection
  - Monitor for Swelling
  - Schedule Replacement
Brain Injury Management

- Nose
  - CSF Rhinorrhea
  - Feeding Tubes
  - Sense of Smell
Brain Injury Management

- Ears
  - Tympanic Membrane Integrity
  - Otorrhea
  - Cerumen
Brain Injury Management

- Oral
  - Dental Injury
  - Thrush
  - TMJ
  - Swallowing
  - Speech
  - Jaw Wiring
Brain Injury Management

• Neck
  • Trachioestomy Care
  • Carotid Dissection
  • Thyroid/Parathyroid Function
• Clavicular Injury
• Cervical Spine Injury
Brain Injury Management

- Lungs
  - Trauma
    - Pneumothorax
  - Infection
    - Aspiration
    - Abcess
  - Bacterial

- Lungs
  - Mechanical
    - Atelectasis
  - Restrictive
  - COPD/RAD
Brain Injury Management

• Heart
  • Post Traumatic Aortic Dissection
  • Endocarditis
  • Pericarditis
  • Arrhythmias
  • CHF
Brain Injury Management

- Abdomen
  - Peg Tubes
  - GI Bleeding
  - Obstruction
  - Hemorrhoids
- Liver Function and Injury
  - Elevated LFT’s
- Splenic Function and Injury
Brain Injury Management

- Renal
  - Function
  - Injury
- Bladder
  - Injury
  - Decatheter
Brain Injury Management

- Vascular
  - DVT/PE Prophylaxis
  - Arterial Injury
Brain Injury Management

- Skin
  - Traumatic Wounds
  - Pressure Ulcer Prevention
  - Rashes/Drug Reactions
  - Gangrene
  - Burns
Brain Injury Management

- Musculo-Skeletal
  - Fractures
  - External Fixation
  - Heterotopic Ossification
  - Joint Contractures
  - Spasticity Management
Brain Injury Management

- Pain
- Sleep Disturbances
- Nutritional Support
- Fall Prevention
Brain Injury Management

- Pre-existing Medical Issues
  - Hypertension
  - Diabetes Mellitus
  - Hyperlipidemia
  - Gastrointestinal
  - Osteoarthritis
  - Chronic Renal Insufficiency
  - Thyroid Dysfunction
Controlled Stimulation Unit
Brain Injury Management
TBI Prevention

- Always wear a seat belt in a motor vehicle
- Use an appropriate child safety seat or a booster
- Never drive under the influence of alcohol or drugs
- Always wear a helmet
Fall Prevention Methods

- Use the rails on stairs
- Provide adequate lighting
- Place bars on windows to prevent children from falling
- Sit on safe stools
- Do not place obstacles in walking pathways
Gun Safety

- Keep guns locked in cabinet
- Store guns unloaded
- Store ammunition apart from guns
Controlled Stimulation Unit
TEAM APPROACH
Why Controlled Stimulation?

- A third to a half of patients with TBI exhibit confusion and agitation during posttraumatic amnesia and during the subacute rehabilitation period.
- A prolonged confusion and agitation period can result in a longer hospitalization, reduced ability to participate in rehabilitation, and create increased burden and stress on caretakers.
Sleep and Arousal

- Sleep is necessary for the brain to “recharge.”
- Sleep is critical following a brain injury to allow the brain and body to heal.
- Insomnia, hypersomnia, and sleep apnea.
- Anxiety and agitated behaviors can be a consequence of sleep disturbance.
- Sleep can become a chronic problem if not identified and treated shortly following a brain injury.
Behaviors following a TBI

- Confabulation
- Delusion
- Hallucination/Illusion
- Restlessness
- Aggression
- Disinhibition
- Depression/Dysphoria
- Agitation
- Apathy/Indifference
- Irritability/Lability
- Anxiety
- Pain
- Abnormal Vitals
Managing Behaviors after a TBI

- Managing the environment can actually be the most effective way to treat behavioral problems and to decrease problems with agitation and restlessness in persons with brain injuries.
- It is often difficult for individuals with a brain injury to remain calm in an active environment. A lot of stimulation, such as loud televisions, loud conversations, and crowds, can increase irritability, agitation, anxiety, and restlessness.
- Controlling stimulation includes managing noise, lighting, social interactions, and other sensory input.
- Staff’s awareness of one’s own behaviors.
Outcome

- Length of stay
  - 2016: 15.7 compared to national mean of 13.3
- Level of functioning at discharge
  - Functional Independence Measure (FIM): 74.2 compared to national mean of 65.5.
- Discharge back to community
  - 2016: 81.3% compared to national mean of 78.8%