Acquired Traumatic Brain Injury
Behavior Management: A Holistic and Integrated Approach to Care

Objectives
- Focus: Moderate to Severe Acquired Traumatic Brain Injury (aTBI)
- Review of Prognosis and Outcomes
- Neuropathology and Neurological Recovery following aTBI
- Behavioral Conditions and Neurobehavioral Outcome
- Emotional and Behavioral Conditions of aTBI
- Conceptualizing Behavior Care
- Practical Interventions for Behavioral Difficulties

Structured Flexibility and Context Sensitive Behavioral Support for the Chronically Cranky
(Feeney, 2014)
Prognosis and Outcome (Kothari, 2013)

- Realism and Hope!
- As important as evaluation & treatment
  - Demystifies care
  - Gives a map
- The problem of prognosis
  - Delivery of poor prognosis
  - Fear of extinguishing hope
  - Limits purpose of professional help
  - Professional arrogance
  - Lack of clinical guidelines (subjective v research)

Establishing Prognosis

- Path coefficient v probability

- Diaschisis (Temporary/Fluctuating v Permanent)

Factors Influencing Outcomes

- MRI and CT Findings:
  - MRI
    - Depth of lesion
    - DAI
  - Cranial CT
    - Traumatic subarachnoid hemorrhage
    - Midline shift
    - Cerebellar compression
    - Subdural hemorrhage
    - Epidural hematoma

- Neuronal Changes
  - Focal Damage
  - Local Ischemia
  - Necrotic & Apoptotic Neuronal Death
  - Multifocal & Diffuse Axonal Injury (DAI)
  - Gliosis
- Metabolic Change
  - Multifocal
  - Global

Factors Influencing Outcomes

- Initial Glasgow Coma Scale
- Length of coma
- Posttraumatic Amnesia
- Age
- Abulia/Amotivation

The Effect of aTBI

<table>
<thead>
<tr>
<th>Brain</th>
<th>Bodily Systems</th>
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<tbody>
<tr>
<td>Person</td>
<td>Family/Significant Others</td>
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Brain Correlates of Severe aTBI

- Diffuse Axonal Injury
- Patchy Ischemia & Hemorrhages
- Mesial Temporal
- Lateral Frontal

What is Recovery (Brain Repair)?

- Normal neurogenesis
  - Subventricular Zone (SVZ)
  - Subgranular Zone (SGZ) of the hippocampus
- Cell differentiation
- Brain injury & neural stem/progenitor cells
- Cell migration & proliferation (peri-damage & beyond)

Recovery

- Stages with Variability
  - For Example: Rancho Los Amigos
    - Levels of Cognitive Functioning
      1. No Response
      2. Generalized Response
      3. Localized Response
      4. Confused-Agitated
      5. Confused-Inappropriate
      6. Confused-Appropriate
      7. Automatic Appropriate
      8. Purposeful & Goal Directed
- Severe Disability
  - Time to follow commands
  - Duration of posttraumatic amnesia
  - Age
  - Brainstem Injury
Clinical Outcomes following aTBI

- Motor/Musculoskeletal
- Organ Systems
- Pain
- Speech and Language
- Cognitive
- Behavioral

Recovery at Two Years

- Disability Levels
- Supervision
- Private Residences
- Spouse/Parents
- Employment

Effects of Moderate to Severe aTBI on Memory

- Global amnesia
- Cognitive deficit
- Frontal lobe deficit
Cognitive Functioning at Five Years

- Protracted recovery
- Full recovery is exceedingly rare
- IQ: Verbal (76%); Perceptual Organization (85%); Working Memory (79%)
- Mental Efficiency (62%)
- Complex attention (38%)
- Verbal Memory (55%); Visual Memory (50%) (Retrieval Deficit)

Behavioral Difficulties following aTBI

- Single most problematic outcome
  - Sense of self (Ribot’s Law)
  - Challenges for caregivers/loved ones
  - Colleagues/Employers

Some basic “Rules of Caring” for Behavioral Difficulties

- Know the person
- Know the family
- Know the injury
  - Structural
  - Neuroendocrine
  - Neurotransmitter
  - Circuity
- Know your resources
- Trust your team***
- “It has an explanation”
Some “Don’ts”
- The diaper
- Let him hit
- Agitation in restraints
- The box

Behavioral Difficulties are not Unitary
- What you see is what you get - “explained”
- Complexity of behavior
  - Frontal Lobe Syndromes
  - Right hemisphere Syndromes
  - Posterior perceptual Reactions
  - Pituitary/Thalamic Dysfunction
  - “Hidden Problems”

Behavior as Complex Output
- Cognition
- Emotion
- Person
- Situation
Alterations of the “Person” following aTBI

• Executive functions
  • Higher-order thinking
  • Reward-related behavior
  • Memory

• Cognitive Disorders
  • Memory
  • Perplexity

• Social Cognition
  • Impulsivity
  • Instability
  • Affective instability
  • Self-awareness deficit

• Attention
  • Reward
  • Decisional drive

• Psychiatric
  • Depression
  • Anxiety
  • PTSD
  • Mania
  • Psychosis
  • Substance abuse
  • Dementia

Approaches to Management

• Post hoc ergo propter hoc
• The problem of attribution
• Predominant need with flexibility
• Variability in presentation
  • Mood instability
  • Decoupling of language with behavior
  • Associated neurological impairments
  • Situational demands and cognition
  • Medication side-effects

Approaches to Management (McAllister, 2013)

• Develop hypotheses as to what is occurring and address as such!
• Syndromes / disorders (not symptoms)

• “....the typical ....”
Approaches to Care

- Pharmacological
- Informed and compassionate care
- Behavioral intervention
- Education (Demystify the disorder)
- Be able to work together (team)

Case Study

- 24 year old, S/P MVA, Initial GCS 3/15, Coma ~3 months
- CT: Bilateral frontotemporal hematoma
- MRI: Bilateral Medial Temporal Shearing (Amygdala, Hippocampus)
- Initial recovery in arousal: Agitation, screaming, aggressiveness
- At 12 months: continued PTA, incomprehensible speech, swearing & directed/nondirected aggression, polyphagia, inappropriate urination/defecation and outlandish sexual conduct.
- Progressive worsening of aggressive behaviors

Case Study

- Antipsychotics, Anxiolytics, Antidepressants, Antiepileptics
- Constant unobtrusive one on one
- Rehabilitation efforts while monitored
- Aggression directed at staff, family; only girlfriend could settle him
- Psychiatric hospitalization (12 months post injury)
  - Med changes
  - Some initial more freedom, less staff direction, two staff assigned to interact
  - Improves, back to rehab & quickly regresses, rehospitalized seven times
  - Each time for one-month with improvement without carryover
  - It was not meds, but the approach
Pharmacological Care (Saout, 2011; Walt, 2016)

- Cochrane Database
- Symptom approach
- Feeney, 1982
  - Amphetamine v Antipsychotics
- Stabilization

The Behavioral-Environmental Approaches

- Stimulus boundedness
- Routine
- Consistency of response
- Multidisciplinary care throughout stages of recovery

Application of Behavioral Principles in Behavior Care (Karol, 2013)

- Stimulus control
- Rewards and punishment
- Schedules of reinforcement
- Prompt/Generalization
- Modeling & learning
- Environmental adjustments
- Family/Significant other care
Behavioral Approaches to Specific Concerns

- Aggression
- Nonadherence
- Impulsivity
- Social Skills

Nonpharmacological Treatments

- Interpersonal Adaptive
  - Stress
  - Structure
  - Respect
  - Notation
  - Go-along
  - Depersonalize
  - Practice
  - Family antecedents
  - Family support

Nonpharmacological Treatments

Holistic

- Global, Coordinated & Intensive
- Aimed at awareness & acceptance of disability

Implication • awareness • malleability • control • acceptance • identity • social rehabilitation
Nonpharmacological Treatments

- Cognitive Behavioral
  - Emphasis on problem solving
  - Frustration tolerance
- Family Therapies

Thank you!!

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