Disorders of Consciousness Management in Outpatient Setting
Disclosure Statement

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Objectives

• Provide an overview of Disorders of Consciousness (DoC)
• Understand the role of outpatient transdisciplinary team as critical part of continuum of care for patients with DoC
• Understand program development for outpatient setting for patients with Disorders of Consciousness
## Arousal vs. Awareness

<table>
<thead>
<tr>
<th>Condition</th>
<th>Arousal</th>
<th>Awareness</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMA</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>VEGETATIVE STATE (VS)</td>
<td>+/-++</td>
<td>-</td>
</tr>
<tr>
<td>MINIMALLY CONSCIOUS STATE (MCS)</td>
<td>+/-++</td>
<td>+</td>
</tr>
<tr>
<td>EMERGED FROM MCS</td>
<td>++</td>
<td>++</td>
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</tbody>
</table>

Arousal vs. Awareness

- Arousal – level of consciousness
- Awareness – content of consciousness
- MUST have arousal before someone can demonstrate awareness

Definition of DoC

DEATH

LIFE

UNCONSCIOUSNESS

CONSCIOUSNESS

COMA

VEGETATIVE STATE

MINIMALLY CONSCIOUS STATE

CONSCIOUS

Courtesy of Dr. Kothari
Behaviors in Vegetative State and MCS

<table>
<thead>
<tr>
<th></th>
<th>COMA</th>
<th>VEGETATIVE STATE</th>
<th>MINIMALLY CONSCIOUS STATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESPONSE TO PAIN</td>
<td>Posturing</td>
<td>Flexion withdrawal</td>
<td>Localization</td>
</tr>
<tr>
<td>MOVEMENT</td>
<td>Reflexive</td>
<td>Patterned/Involuntary</td>
<td>Nonreflexive/unpatterned</td>
</tr>
<tr>
<td>VISUAL</td>
<td>Eyes Closed</td>
<td>Startle</td>
<td>Fixation/Pursuit</td>
</tr>
<tr>
<td>AFFECTIVE</td>
<td>-</td>
<td>Random</td>
<td>Contingent</td>
</tr>
<tr>
<td>VOCAL</td>
<td>-</td>
<td>Non-Contingent vocalization</td>
<td>Intelligible Verbalization</td>
</tr>
<tr>
<td>RESPONSE TO COMMAND</td>
<td>-</td>
<td>-</td>
<td>Inconsistent</td>
</tr>
<tr>
<td>COMMUNICATION</td>
<td>-</td>
<td>-</td>
<td>Unreliable yes/no*</td>
</tr>
<tr>
<td>OBJECT USE</td>
<td>-</td>
<td>-</td>
<td>Object manipulation*</td>
</tr>
</tbody>
</table>

Big Picture: Quick Glance

• Eyes closed, no sleep wake: **comatose**
• Eyes open, sleep wake: **vegetative or unresponsive wakefulness (UWS)**
• Eyes open, inconsistent awareness of environment and/or self: **minimally conscious (MCS)**
• Eyes open, aware of environment and/or self: **emerged**
Assessment of DoC

- 40% of pts diagnosed with Vegetative State were discovered to be conscious with standardized behavioral measures (Schnakers, et. Al, 2009)

- A long-term survival study of adult trauma patients found that patient’s discharged to a skilled nursing facility were 34% more likely to die 3 years post-TBI than those discharged to home or to rehabilitation facilities (Davidson, et. al, 2011)
Assessment of DoC

• Behavioral measures are gold standard
  – Coma Recovery Scale-Revised (CRS-R )
  – Individualized Quantitative Behavioral Assessment (IQBA)
• Require training and frequent repetition
• Can help identify how to structure your treatment

Factors Masking Consciousness

• Hypoarousal
• Medical (medications, hydrocephalus, infection)
• Spasticity and contracture
• Environment
• Apraxia
• Attention span
• Impaired sleep-wake cycles
• Neuromuscular impairments including strength deficits, visual deficits, auditory deficits, etc.

*These are potential factors that should be considered during evaluation and treatment*

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Transition to Outpatient

YOU CAN DO IT!
Outpatient Setting - Evaluation

DoC specific medical background

• Date of injury, type of injury (traumatic vs non-traumatic, anoxic?), time since injury
• Inpatient stay? Identify if CRS-R testing was done and use results to guide evaluation
• Communication system?
• Family/caregiver report of current behaviors, videos if possible

DoC specific medical background

- Medication review
  - Depressants
  - Stimulants? Trialed stimulants? Timing of stimulants
- Arousal throughout the day
- Sleep-wake cycles

Outpatient Setting Examination

Non-DoC specific

- Vitals - Tracheostomy Management, Pulmonary Care, Secretion Management
- Bladder and Bowel management
- Oral and Dental Hygiene
- Spasticity (Modified Ashworth Scale and Tardieu) – Intrathecal Baclofen Pump (ITB)
- Joint Movement and Range of Motion Exercise – Posture and Position
- Mobility Management – Transfers, Bed Mobility, Head Control
- Prevention of Secondary Complications – Skin breakdown, Nutrition, Deep Vein Thrombosis
- Equipment and Orthotics
- Adaptive Technology and Environmental Management
- Communication – Established System, Responding to Yes/No questions
- Family Support – Counseling and Training

Outpatient Setting-Examination

• According to Elliott, Coleman, and Shiel (2005, p. 299) “positional changes may have a significant impact on behaviours in vegetative and minimally conscious patients.”

• Determine the following in a variety of positions and with different stimuli:
  – Are they aroused?
  – Do they move? reflexive, spontaneous, repetitive, to command * (against gravity or gravity eliminated)
  – Do they respond to auditory input?
  – Do they respond to visual input?
  – Do they vocalize?

**Remember to keep in mind what you have learned about their PMH, area of injury and how this may impact their success at demonstrating these things**
Goal Setting

- Collaborative goal setting between family, therapists, physician, and neuropsychologist
- Determine what primary goal is for this patient and this phase of therapy
  - Establishing consciousness, communication, or is it more of caregiver training, HEP, etc.

Sample Goals

• Samples:
  – Consistency of command following
  – Visual tracking
  – Head control
  – Seated balance
  – Standing tolerance
  – Swallowing
  – HEP

• MUST discuss goals with other disciplines to prevent goal replication
  *Refer to Sample OT Goals for examples
Assessment in Outpatient: IQBA

• Emphasis on behavioral assessment in treatment of DoC clients (Giacino et al., 2018)
• IQBAs can be created in the OP setting with Neuropsychology
• IQBA may detect command following quicker than CRS-R (Day, DiNapoli & Whyte, 2017)
• More practical than CRS-R in this setting
• Reasons to use:
  – Used when behavior is ambiguous to see if it can be used for a communication system
  – Used during medication trials for pre- and post-data
• VERY objective, requires consistency with administrators and instruction language
• Development of IQBA, as a team decide:

(1.) Session administration variables such as patient positioning, stimulation to maximize alertness, preliminary range of motion exercises to facilitate motor responding

(2.) The commands to be given, the number to be administered, the manner of administration, and the random order within a particular session

(3.) The operational definition of a response and a format for recording responses

(4.) Control conditions to minimize the influence of coincidental and reflexive responding.

(Whyte, DiPasquale & Vaccaro, 1999)
Assessment in Outpatient: IQBA

- Importance of multidisciplinary team
- Involvement of caregivers
- Clinical uses of IQBA in outpatient
  - Determine if client is following commands
  - Assist in development of communication system
  - Can track progress of recovery and response to treatment
Integrating Behavioral Measures for Treatment

• It is ideal to use what you have observed on standardized, behavioral measures in your interventions.
  – For example, if patient A does not respond to visual stimuli, it may be appropriate to target interventions using auditory input rather than visual input.
Decision Tree

Are the patient’s eyes open? Are they aroused?

- Yes
  - Do they move spontaneously?
    - No
      - Reflexive movement? Posture? Localize?
      - Interventions targeted at improving spontaneous and/or volitional movement
    - Yes
      - On command?
        - Yes
          - Consistent
          - Interventions targeted at improving movement on command
        - No
          - Inconsistent
          - Interventions targeted at establishing communication system
  - Neurostimulating position
- No
  - Medical complications masking arousal
Treatment Interventions

Sessions to target:

- Impaired arousal and/or consciousness
  - Neurostimulating positions and interventions
- ROM restrictions and or spasticity/hypertonicity impairing wheelchair or bed positioning
  - Serial casting, splinting
  - Wheelchair set up or positioning; positioning programs
- Command following
- Home exercise program and family training

Neurostimulating Interventions

• Using consistent commands across disciplines and tracking responses and arousal in sessions

• Commands should be mixed with counter-commands, silence and enough time for the pt to respond
Home Exercise Program (HEP)

- Arousal
- Standing programs
- Range of motion exercises
- Orthotics wear schedule
- IQBA Family could implement IQBA if applicable

Things to Consider

- **Use of equipment and technology:**
  - Switches, e-stim, FES bike, litegait, sEMG

- **Communication with MD:**
  - Medication trials, lumbar puncture, sleep study, ITB pump

- **Barriers and/or facilitators:**
  - Time of day, caregiver support, resources, endurance for activity, order of therapy, expectations for therapy

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Discharge

- Giving clear HEP tailored to level of consciousness
- Expectations of when to return to therapy or return to MD
  - Consciousness change
  - Traditional therapy needed (bracing, equipment, HEP update, etc.)
  - Change in status that opens up new goals for rehabilitation

Outpatient Program Creation

Summer 2017- Present

• Fall 2017:
  – Creation of primary inter-disciplinary team
  – Meeting with inpatient, outpatient medical and outpatient staff

• Winter/Spring 2018:
  – Training modules for all staff and BI-specific (4 modules)
  – Journal Clubs with inpatient team
Outpatient Program Creation

- **Spring/Summer 2018:**
  - Lunch meetings with primary OP team and monthly meetings with IP team
  - First referral Spring 2018

- **Summer/Fall 2018:**
  - Additional patients admitted to program
  - Competency for OP BI Team for DoC
  - Monthly/bi-monthly rounding
Potential barriers in OP

- Insurance limitations
- Staff education (specialized group)
- Communication between staff
- Scheduling
- Family and caregiver support and abilities
- Design of HEP and Plan of Care (POC)
- Measuring of Progress, Outcome measures
- Transportation
- Fatigue
Case Study- LE

- OP Community referral for OPMC, PT/OT/SLP evaluations on 2/9/18
- Patient background information:
  - GSW in 11/4/15 followed by anoxic injury 11/8/15 from cardiopulmonary arrest
  - Inpatient rehabilitation 4/25/16 for 1 month and had short follow-up of home health
  - Pt with very supportive family and living with mother and father, 2 children who his mother observed interacting with grunting/clicking noises, not performing movements spontaneously or to command. HEP including standing in stander, B UE and B LE stretches
  - Family goals- communication system, walk and talk
  - Medicaid required authorization
Case Study- LE

- **Initial Evaluation:**
  - **PT** – total A for all mobility, 10 sec head control when placed in position, moro reflex
    - Initial PT goals: HEP, maintain head control for 30 seconds, caregiver safety of transfer
  - **OT** – total A for all Activities of Daily Living, flexor synergy positioning of Bilateral Upper Extremities
    - Initial OT goals: HEP, donning positioning devices
  - **SLP** – NPO, groaned in response to non-preferred action, localization of sound reported but not observed at evaluation
    - Initial SLP goals: HEP, demonstrate localized response to auditory stimulation, vocalize in response to pain/discomfort, follow stimuli through left and right visual fields, elicit a swallow with thermal tactile stimulation
- **Initial Authorization Visit Count:** PT (8), OT (4), SLP (8)
Case Study – LE

• Action Steps
  – Contacted physician to schedule sleep study
  – Discussed medication trials
  – Discussed sitting schedule to be up more during the day
  – Coordinated scheduling of Lumbar Puncture for possible hydrocephalus
Case Study- LE

- Treatment: started 4/3/18
  - Coordination with PT, OT, SLP of observations of arousal, reflexive and spontaneous movement
  - Trialed variety of stimulation
    - Auditory- music, family voices
    - Visual- pictures of children, familiar objects, mirror
    - Tactile- e-stim, different surfaces, oral stimulation
    - Vestibular- rocking in tilting in space wheelchair, standing, prone, seated positions
  - Creation of IQBA for pt for tracking in session and as HEP
    - Tracking behavior in and out of session
    - Pre- and post-medical intervention
  - Family training for IQBA and HEP
- Pt discharged due to transportation and to return to OP services when mother retires and following possible shunt surgery.
Case Study- LE Results

• Family subjective perceived improvement: improvement in arousal, increased in vocalizations with family
• Unable to establish a communication system
• Inadequate OT goal writing led to decreased authorized visits as compared to SLP and PT
• Importance of family training
Areas for Program Growth & Improvement

• Involve Neuropsychology from the beginning
• Improved rounding and handoffs
• Improved goal writing and documentation
• Referrals from other sources
• Continuum of care, transitioning between settings
References


TIRR Memorial Hermann and the Memorial Hermann Rehabilitation Network

- TIRR Memorial Hermann Entities
- Memorial Hermann Rehabilitation Network Entities