ICU Delirium and Its Relation to Occupational Performance

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Objectives

• Demonstrate understanding of the clinical impact, assessment, and prevention strategies of ICU delirium as they relate to occupational performance

• Analyze best practice client-centered treatment approaches to maximize rehabilitation potential and quality of life for patients facing ICU delirium

• Summarize multidisciplinary approaches and family centered education strategies to prevent and manage ICU delirium
What is Delirium?

* A disturbance of consciousness characterized by:
  - Inattention
  - Change in cognition or perception
  - Develops over a short period
  - Fluctuates over time

Delirium Subtypes

- Hyperactive
  - Agitation
  - Restlessness
  - Pulls catheters/tubes
  - Combative
  - Hallucinations

- Mixed

- Hypoactive
  - Withdrawal
  - Flat affect
  - Apathy
  - Lethargy
  - Diminished response
Incidence of Delirium

MV = mechanically ventilated
MICU = medical intensive care unit
SICU = surgical intensive care unit
TICU = trauma intensive care unit

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Not Limited to the Elderly

Pathophysiology? Not Well Defined

- Neurotransmitter Imbalances (Dopa >> Ach)
- Metabolic Derangements
- Medication-Induced
- Systemic Inflammatory Response
- Inadequate Cerebral Perfusion

# Contributing Factors

<table>
<thead>
<tr>
<th>Host Factors</th>
<th>Acute Illness</th>
<th>Iatrogenic / Environmental</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age &gt; 65 – 70 y/o</td>
<td>*↑ Severity of illness</td>
<td>Sedative use</td>
</tr>
<tr>
<td>Visual / Hearing impairment</td>
<td>Sepsis</td>
<td>Analgesic use</td>
</tr>
<tr>
<td>Malnutrition</td>
<td>*Coma</td>
<td>Anticholinergic agents</td>
</tr>
<tr>
<td>*Alcohol abuse</td>
<td>Dehydration</td>
<td>Corticosteroid use</td>
</tr>
<tr>
<td>CNS malignancy</td>
<td>Hypoxemia</td>
<td>Brain XRT</td>
</tr>
<tr>
<td>*Hx of dementia</td>
<td>Hypercarbia</td>
<td>Physical restraints</td>
</tr>
<tr>
<td>*Hypertension</td>
<td>Hypothermia / Fever</td>
<td>Rectal / bladder catheters</td>
</tr>
<tr>
<td>Hx of renal (SCr &gt; 2) or liver impairment (T bili &gt; 2)</td>
<td>Hypo / Hyperglycemia</td>
<td>↓ Sleep quality / quantity</td>
</tr>
<tr>
<td></td>
<td>Hypo / Hypernatremia</td>
<td>↑ Noise / Lighting</td>
</tr>
<tr>
<td></td>
<td>Hypo / Hyperthyroidism</td>
<td>Uncontrolled pain</td>
</tr>
</tbody>
</table>

CNS = central nervous system; SCr = serum creatinine; T bili = total bilirubin; XRT = Radiation

Sedation and Analgesia in the ICU

- Sedation
  - Benzodiazepines
    - Lorazepam
    - Midazolam
  - Propofol
  - Dexmedetomidine

- Opioids
  - Fentanyl
  - Hydromorphone
  - Morphine

ICU Delirium: so what?...
Outcomes of Delirium

- Increased mortality
- Increased cost (increased ICU & subsequent hospital stay)
- Development of long term post-ICU cognitive impairment
  - Can be similar to dementia
  - 50-75% of survivors experience long term cognitive impairment
Post Intensive Care Syndrome (PICS)

NEW or WORSENING impairments in physical, cognitive, or mental health arising after ICU & persisting beyond acute care hospitalization

- Anxiety
- Depression
- PTSD
- Complicated Grief

Physical Impairments
- Neuromuscular
- Pulmonary
- Physical Function

Cognitive Impairments
- Executive functioning
- Memory
- Attention
- Mental Processing Speed
- Visuo-spatial

Mental Health
- Anxiety
- Depression
- PTSD

Mental Health

Assessment of ICU Delirium

First, you have to know it’s there!
Validated ICU Sedation Assessment Tools

• Very Good
  • Richmond Agitation-Sedation Scale (RASS) - 19.5
  • Sedation-Agitation Scale (SAS) - 19

• Moderate
  • Vancouver Interaction and Calmness Scale (VICS) – 14.3
  • Adaption to the Intensive Care Environment (ATICE) – 13.7
  • Ramsay Sedation Scale – 13.1
  • Minnesota Sedation Assessment Tool (MSAT) – 13
  • Nursing Instrument for the Communication of Sedation (NICS) – 12.8

### Richmond Agitation-Sedation Scale

<table>
<thead>
<tr>
<th>Score</th>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>+4</td>
<td>Combative</td>
<td>Overtly combative, violent, immediate danger to staff</td>
</tr>
<tr>
<td>+3</td>
<td>Very agitated</td>
<td>Pulls or removes tube(s) or catheter(s); aggressive</td>
</tr>
<tr>
<td>+2</td>
<td>Agitated</td>
<td>Frequent non-purposeful movement, fights ventilator</td>
</tr>
<tr>
<td>+1</td>
<td>Restless</td>
<td>Anxious but movements not aggressive vigorous</td>
</tr>
<tr>
<td>0</td>
<td>Alert and calm</td>
<td>Not fully alert, but has sustained awakening</td>
</tr>
<tr>
<td>-1</td>
<td>Drowsy</td>
<td>(eye-opening/eye contact) to <em>voice</em> (≥10 seconds)</td>
</tr>
<tr>
<td>-2</td>
<td>Light sedation</td>
<td>Briefly awakens with eye contact to <em>voice</em> (&lt;10 seconds)</td>
</tr>
<tr>
<td>-3</td>
<td>Moderate sedation</td>
<td>Movement or eye opening to <em>voice</em> (but no eye contact)</td>
</tr>
<tr>
<td>-4</td>
<td>Deep sedation</td>
<td>No response to <em>voice</em>, but movement or eye opening to <em>physical</em> stimulation</td>
</tr>
<tr>
<td>-5</td>
<td>Unarousable</td>
<td>No response to <em>voice</em> or <em>physical</em> stimulation</td>
</tr>
</tbody>
</table>

Sessler et al. *Am J Respir Crit Care Med* 2002; 166:1338-1344
Validated ICU Delirium Screening and Assessment Tools

• Very Good
  • Confusion Assessment Method for ICU (CAM-ICU) - 19.6
  • Intensive Care Delirium Screening Checklist (ICDSC) – 16.8

• Moderate
  • Cognitive Test for Delirium (CTD) – 13.0
  • Nursing Delirium Screening Scale (Nu-DESC) – 12.4

Confusion Assessment Method-ICU (CAM-ICU)

1. Acute onset of mental status changes or a fluctuating course
   and
   2. Inattention
   and
   3. Disorganized Thinking
   or
   4. Altered level of consciousness

= Delirium

CAM-ICU

- Validated in critically ill patients
- Focuses on four features of delirium:
  - 1-acute onset or fluctuating course
  - 2-inattention
  - 3-altered level of consciousness
  - 4-disorganized thinking
- **CAM-ICU positive** = Feature 1 + 2 and either 3 or 4 present
### Intensive Care Delirium Screening Checklist (ICDSC)

1. **Altered level of consciousness:**
   - A) No response or B) the need for vigorous stimulation in order to obtain any response signifies a severe alteration in the level of consciousness precluding evaluation. If there is coma (A) or stupor (B) most of the time period then a dash (-) is entered and there is no further evaluation during that period.
   - C) Drowsiness or requirement of a mild to moderate stimulation for a response implies an altered level of consciousness and scores 1 point.
   - D) Wakefulness or sleeping state that could easily be aroused is considered normal and scores no point.
   - E) Hypervigilance is rated as an abnormal level of consciousness and scores 1 point.

2. **Inattention:** Difficulty in following a conversation or instructions. Easily distracted by external stimuli. Difficulty in shifting focuses. Any of these scores 1 point.

3. **Disorientation:** Any obvious mistake in time, place or person scores 1 point.

4. **Hallucination, delusion or psychosis:** The unequivocal clinical manifestation of hallucination or of behavior probably due to hallucination (e.g., trying to catch a non-existent object) or delusion. Gross impairment in reality testing. Any of these scores 1 point.

5. **Psychomotor agitation or retardation:** Hyperactivity requiring the use of additional sedative drugs or restraints in order to control potential danger to oneself or others (e.g., pulling out iv lines, hitting staff). Hypoactivity or clinically noticeable psychomotor slowing. Any of these scores 1 point.

6. **Inappropriate speech or mood:** Inappropriate, disorganized or incoherent speech. Inappropriate display of emotion related to events or situation. Any of these scores 1 point.

7. **Sleep/wake cycle disturbance:** Sleeping less than 4 h or waking frequently at night (do not consider wakefulness initiated by medical staff or loud environment). Sleeping during most of the day. Any of these scores 1 point.

8. **Symptom fluctuation:** Fluctuation of the manifestation of any item or symptoms over 24 h (e.g., from one shift to another) scores 1 point.

- **Focuses on four features of delirium**
- **Validated in critically ill patients**
- **Based on observation over time**
- **Score of ≥ 4 is positive for delirium**

Beregon et al. *Intensive Care Medicine* 2001; 27(5):859-64
Now that you know it’s there...

How do you manage it???
Approaching Delirium

- Positive Assessment
  - Hypoactive
    - Correct contributing factors
    - Environmental modification
    - No Response (Consider Rx Treatment)
  - Hyperactive or Mixed
    - Immediate Danger to Self or Staff
    - Rx Treatment
      - Correct contributing factors
      - Environmental modification
      - No Immediate Danger
Pharmacologic Treatment

- **Antipsychotics**
  - Typical
  - Atypical

- **Benzodiazepines**
  - * Reserve for EtOH or BZD withdrawal-related delirium

- **Alpha-2 Agonists**
  - Dexmedetomidine

- **Other Agents**
  - Anesthetics
  - AChE inhibitors
  - CNS stimulants

Typical - Haldol
Atypical agents
- Clozapine (Clozaril®)
- Olanzapine (Zyprexa®)
- Risperidone (Risperdal®)
- Quetiapine (Seroquel®)
- Ziprasidone (Geodon®)
- Aripiprazole (Abilify®)
- Paliperidone (Invega®)
Unfortunate Facts

• No data to support the use of haloperidol for the prevention or treatment of delirium

• Atypical antipsychotics *may* reduce the duration of delirium

• The use of dexmedetomidine *may* be beneficial in the treatment of delirium unrelated to alcohol or benzodiazepine withdrawal

Nonpharmacologic Treatment

Address Barriers
- Hearing
- Visual
- Language
- Cultural

Environmental Modification
- Noise
- Lighting
- Sleep / wake cycle
- Sensory stimulation
- Family presence

ICU Care
- Hydration
- Metabolic abnl's
- Patient participation/ADL
- Reorientation
- Early mobilization
Now that you know it's there...

Delirium Prevention
Delirium Prevention

- Prompt pain relief
- Reorientation
- Cognitive stimulation
- Early mobilization
- Timely removal of physical restraints
- Minimization of noise
- ↓ Disruption of sleep
- Provision of eyeglasses and hearing aids
Delirium Prevention

- Hypoxemia
- Acid-base status
- Hydration
- Extreme alterations in sodium & glucose

Avoid Metabolic Disturbances
Delirium Prevention

Pharmacologic Strategies

- Avoid polypharmacy
- Daily sedation/analgesia holidays or light target levels of sedation
- Analgesia first sedation
Conclusion

• ICU delirium
  • Affects up to 80% of the critically ill
  • Increased morbidity, mortality, and health care costs
  • Hypoactive and mixed delirium are most prevalent
  • Routine monitoring for delirium is the standard of care

• Pharmacologic treatment
  • No clear treatment strategies exist
  • Sedation and analgesia practices impact delirium

• Prevention strategies are more effective than treatment strategies
Multidisciplinary Strategies
Our Journey Continues

• Challenges
  • Staff engagement
  • Lack of data to enlist engagement

• Positives
  • Rehab services assigned to the ICU
  • New nursing leadership dedicated to initiatives
  • Use of CUSP methodology and participation in cohort
  • Data! And new engagement
Technical vs. Adaptive Work

Technical Work
- Evidenced-based interventions

Adaptive Work
- Local Culture
# ABCDEF Bundle

<table>
<thead>
<tr>
<th>Symptoms: Pain, Agitation, Delirium</th>
<th>Monitoring: Tools</th>
<th>Care The Bundle</th>
</tr>
</thead>
</table>
| Pain                              | • Behavioral Pain Score (BPS)  
• Critical Care Pain Observation Tool (CPOT) | A: Assess, prevent, and manage pain |
| Agitation                         | • RASS  
• SAS | B: Both SAT and SBTs |
| Delirium                          | • ICDSC  
• CAM-ICU | C: Choice of analgesia and sedation  
D: Delirium: Assess, prevent, and manage  
E: Early mobility and exercise  
F: Family engagement and empowerment |

Ely, 2017
GAP Analysis of ABCDE Bundle

Communication and Collaboration
• Overall rates as “sometimes”

Sedation Awakening Trial / Spontaneous Breathing Trial / Coordination and Choice of Sedation
• Everything in place; need to work on compliance

Delirium Assessment and Management
• Opportunity to develop program

Early Exercise and Progressive Mobility
• Everything in place; need to work on passive ROM by nursing, weekend activities; and communication of mobility during rounds
# How Do We Get Patients Off the Ventilator Quicker?

## Communication and Collaboration
- Establish clear goals
- Communicate goals amongst team
- Communicate with night shift on goals of care

## Sedation
- Increase compliance with current protocols
- Establish accountability
- Reduce use of benzodiazepines
- Avoid overnight increases in sedation

## Early Exercise and Progressive Mobility
- Everybody out of bed
- Team based early mobilization with increased RN participation
- Use protocol
#1 Implement a “morning” bundle composed of the following:
- Place patient in chair position
- Turn on the lights
- Open up the shades and curtain
- Re-evaluate restraints and ensure proper placement
- Complete above interventions by the nursing team between 7 and 8 AM time to prep for SATs and SBTs
- Re-enforcement of the above by the advanced practice providers when seeing patients in the morning
How Does ALLLLL of this Relate to Occupational Performance???
Person-Environment-Occupation Model

Occupational Performance
Clinical Role of OT in the ICU: Interventions at MDACC

Clinical role (may include but not limited to)

- Assess functional cognition
- Preparatory and coordination tasks
- Engaging the person in ADL tasks
- Cognitive stimulation tasks
- Strengthening and ROM
- Patient and family education

Therapeutic approach is driven by the patient’s current functional status

Skilled therapeutic interventions aim to improve/maintain functional independence through occupation-based activities
OT Assessments

cognitive reserve and functional cognition

- Cognitive Assessments
  - CAM-ICU /ICDSC*
  - Allen Cognitive Screening Tools (ACSL)
  - Mini Mental Status Examination (MMSE)
  - Montreal Cognitive Assessment (MoCA)

- Functional cognition in ADL context
  - Arnadottir OT-ADL Neurobehavioural Evaluation (A-ONE)*

- Others
  - Glasgow Coma Scale
  - Ranchos Los Amigos Scale
  - AMPAC
Client/Family Centered Treatment Approaches at MDACC

- Engage and educate importance of participation in functional activities/occupations—at all functional levels
  - Grooming, dressing, toileting, health management, sleep hygiene, bed mobility, transfers, and functional mobility
- Promote mental strengthening activities in conjunction with early mobilization activities
- Functional engagement in daily occupations can facilitate normalization of day and night cycle for improved sleep hygiene
• Encourage purposeful activities  
  • Ease stress response during weaning process with spontaneous breathing trials (SBTs) for patients requiring prolonged mechanical ventilation

• Promote psychological/spiritual health  
  • Visit with chaplain/social worker  
  • Encourage rest  
  • Direct to resources available

• The Intensive Care Unit (ICU): Patient and Family Guide
Technical Work
Technical Work
Most Commonly Used Equipment

1. Hill-Rom Progressa (ICU) bed
2. Barton Chair
3. Neuro Chair
4. ARJO Sara Plus Stander
Transfer Chairs

**Functions**

- Supine to/from sit
- Tilt in space
- Elevating/lowering legs, extending legs
- Preparing chair for transfer
  - Lateral/dependent transfer
    - Positioning with cushion
  - Stand pivot transfer
    - Transfer with ventilator
Functional Mobility Options

Bed mobility
- Bed in chair position
- Sitting at edge of bed
- Standing and side stepping

Neuro chair
- Lateral transfer
- Stand pivot transfer

ARJO Stander
- Standing tolerance
- Activities at standing
- Household mobility
OT Leadership Role of OT in the ICU at MDACC

• Active collaboration in program development, implementation, and evaluation (MDACC ICU EMP)
• Provide strategies and ongoing feedback
• Champions for quality improvement initiatives
  • CUSP (national collaborative looking at early mobilization, delirium, and sedation)
  • Good Morning Bundle
  • Patient and Family Engagement (national collaborative through SCCM)
Adaptive Work

FAMILY/Patient engagement focuses on the following characteristics:

• Keeping patients and families informed
• Actively involving patients and families in decision-making
• Actively involving patients and families in self-management
• Providing both physical comfort and emotional support to patient and families
• Maintaining a clear understanding of patients’ concepts of illness and cultural beliefs
In Summary

• Patients with critical illness frequently develop delirium leading to cognitive deficits associated with decreased quality of life

• Delirium is prevalent, underdiagnosed, and can result in long lasting cognitive deficits

• OTs can improve the care of critically ill patients through both technical and adaptive work
you can.

Make a Difference!
Acknowledgements

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