Delirium in the Hospitalized Patient

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Delirium

- Derived from Latin “deviate from a straight line”
- Celcus (1st C ACE): “transient
  and related to fever, poising or trauma”
- UR history: Engel and Romano
- Reduction in brain metabolic rate
- (EEG findings)

Definition

Delirium is a syndrome of acute confusion marked by periods of waxing and waning levels of consciousness, altered psychomotor behavior, and perceptual impairment.

Why should all medical providers worry about delirium?

- Incidence is high
- Increased mortality
- Increased morbidity
- Significant burden on family, patient and medical care team
- Increased cost
- #1 consult psych C/L and #1 reason for transfer to 19200
Incidence is higher than you might think

- 1/3 of patients presenting to ER
- 1/3 of inpatients aged 70+ on general med units
- 85% experience at end of life
- 25-40% of inpatient cancer patients
- Incidence ranges 5.1% to 52.2% after noncardiac surgery (Dasgupta M et al. J Am Geriatr Soc 2006;54:1578-89)
- Highest rates after hip fracture and aortic surgeries

Increased Mortality

- One-year mortality: 35-40%
- Independent predictor of higher mortality up to 1 year after occurrence
  

Increased morbidity

- Functional decline
- New nursing home placement
- Persistent cognitive decline:
  - Only 18-22% have complete resolution 6-12 months after discharge
  - Many subjects may have had preexisting cognitive impairment previously unrecognized

What is Delirium?

- A fluctuating change in MS, associated with change in alertness
- Assume it’s delirium until proven otherwise
- Then rule out other causes

**Subtypes**

- **HYPERACTIVE**
  - Confusion
  - Agitation
  - Hallucinations
  - Myoclonus

- **HYPOACTIVE**
  - Confusion
  - Somnolence
  - Withdrawn

- **MIXED**

More likely to get Psych consult or transfer to IMIPS

Less likely to be recognized

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**Delirium vs. Dementia**

<table>
<thead>
<tr>
<th>Features</th>
<th>Delirium</th>
<th>Dementia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset</td>
<td>Acute</td>
<td>Insidious</td>
</tr>
<tr>
<td>Course</td>
<td>Fluctuating</td>
<td>Progressive</td>
</tr>
<tr>
<td>Duration</td>
<td>Days – weeks</td>
<td>Months - years</td>
</tr>
<tr>
<td>Consciousness</td>
<td>Altered</td>
<td>Clear</td>
</tr>
<tr>
<td>Attention</td>
<td>Impaired</td>
<td>Normal (unless severe)</td>
</tr>
<tr>
<td>Psychomotor changes</td>
<td>Increased or decreased</td>
<td>Often normal</td>
</tr>
<tr>
<td>Reversibility</td>
<td>Usually</td>
<td>Rarely</td>
</tr>
</tbody>
</table>

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**Pathophysiology**

- Main theory = reversible impairment of cerebral oxidative metabolism + neurotransmitter abnormalities
  - HYPOXIA ISCHEMIA PAIN
  - decreased Ach – (indirect evidence: anticholinergics induce and Alzheimers more susceptible)
  - Increased DA
  - Increased Serotonin
  - Decreased GABA
  - Inflammatory mechanism – cytokines eg interleukin-1 release from cells - destruction of BBB
  - Stress reaction (increased cortisol) + sleep deprivation

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**BUT… dementia is most consistent risk factor**

- Underlying dementia in 25-50%
- Presence of dementia increases risk of delirium by 2-3 times
Etiology
A multifactorial syndrome that arises from an interrelationship between:

- **Predisposing factors** → a patient’s underlying vulnerability
  AND
- **Precipitating factors** → noxious insults

### Predisposing Factors

- Baseline cognitive impairment
- 2.5-fold increased risk of delirium in dementia patients
- 25-31% of delirious patients have underlying dementia
- Medical comorbidities:
  - Any medical illness
  - **Visual impairment**
  - Hearing impairment
  - Functional impairment
  - Depression
  - Advanced age
  - History of ETOH abuse
  - Male gender
Precipitating Factors (insults)

- Medications
- Bedrest
- Indwelling bladder catheters
- Physical restraints
- Iatrogenic events
- Uncontrolled pain
- Fluid/electrolyte abnormalities

I WATCH DEATH mnemonic

- Infections (pneumonia, UTI)
- Withdrawal (alcohol, opiate)
- Acute metabolic (acidosis, renal failure)
- Trauma (acute severe pain)
- CNS pathology (epilepsy, cerebral haemorrhage)
- Hypoxia
- Deficiencies (B12, thiamine)
- Endocrine (thyroid, PTH, hypo/hyperglycaemia)
- Acute vascular (stroke, MI, PE, heart failure)
- Toxins/drugs (prescribed tramadol, dig toxicity, antidepressants, anticholinergics, corticosteroids) recreational
- Heavy metals

Prevention, Screening and Assessment of Delirium

Kim Trombly NP

Patient experience
Precipitating factors
Prevention Methods (nursing)
Screening: ICU-CAM
Patient Experience:

http://www.icudelirium.org/testimonials.html

Patient Testimonials from icudelirium.org

- I just hope one day I will be normal again, and this is temporary.
  
- I was hospitalized for 9 days with respiratory problems. I didn’t recognize my family members that were there. I asked the medical staff to call “Rick” (my husband who passed away 11 years ago). Once hospitalized, one night, I screamed that I was in Florida and people outside were trying to break in. I tried to get up and call 911. But my daughter stopped me.
  
- I felt better and returned to work but was fired 10 weeks later.
  
- It’s been two years and I’m still trying to sort out what was real and what wasn’t. I still think about it several times a week and continue to ask questions of my family. I have a compelling need to know what happened to me. The final diagnosis was ARDS and Encephalopathy, however; they never determined the cause.
  
- I nearly ended my life a few times.
  
- What I recall from work; the work I did before was mechanical and unfulfilling. I became isolated and excluded from everyone. No one seemed to want to be around me. I was some kind of monster they wanted to get out of their way. I ended up being fired in the end. I was told to get on with my life. My family believed that I was faking it all.

Precipitating Factors (Insults)

- Medications
- Bedrest
- Indwelling bladder catheters
- Physical restraints
- Iatrogenic events
- Uncontrolled pain
- Fluid/electrolyte abnormalities
- Infections
- Medical illnesses
- Urinary retention and fecal impaction
- ETOH/drug withdrawal
- Environmental influences

<table>
<thead>
<tr>
<th>Organ System/Therapeutic Category/Drug (s)</th>
<th>Recommendation Rationale</th>
<th>Quality of Evidence (Q) &amp; Strength of Recommendation (Sr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anticholinergics (includes TCA)</td>
<td>Avoid!</td>
<td>Highly anticholinergic clearance reduced with advanced age and tolerance develops when used as hypnotic; increased risk of confusion, dry mouth, constipation, and other anticholinergic effects/toxicity. Use of diphenhydramine in special situations such as acute treatment of severe allergic reaction may be appropriate. QE = High (High-quality Evidence); Moderate (All others); Sr = Strong</td>
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<td>Desloratadine</td>
<td>Avoid!</td>
<td>Not recommended for prevention of extrapyramidal symptoms with antipsychotics; more effective agents available for treatment of Parkinson disease. QE = Moderate; Sr = Strong</td>
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<td>Hydroxyzine</td>
<td>Avoid!</td>
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<td>Olanzapine</td>
<td>Avoid!</td>
<td>Highly anticholinergic; uncertain effectiveness. QE = Moderate; Sr = Strong</td>
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<td>Haloperidol</td>
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<td>Atypical antipsychotics</td>
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<td>Risperidone</td>
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<td>Clozapine</td>
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**Prevention:**  
**Promote Healthy Sleep Patterns**

1. Lights on & curtains open during the day, off at night
2. Decrease noise, distractions and interruptions
3. TV off at night
4. Offer ear plugs and eye mask
5. NO VITALS WHILE ASLEEP?!?!?
6. NO BLOOD DRAWS UNTIL 6 AM?!?!?
7. AVOID sleeping medications !!

**Prevention:**  
**Promote Physical Activity**

1. Ambulate throughout the day
2. AVOID RESTRAINTS!
3. Provide safe exercises
4. Have patient out of bed for meals

**Prevention:**  
**Mental Stimulation**

1. Games, puzzles, reading
2. Engage them in conversation with staff
3. Encourage memorabilia from home

**Prevention:**  
**Promote Healthy Eating and Bodily Functions**

1. Identify patients that need assistance with meals
2. Keep fluids at bedside if appropriate
3. Avoid constipation
4. Avoid urinary retention
Prevention: 
Promote Healthy Hearing and Vision

1. Make sure patient is wearing hearing aids
2. Make sure eye glasses are available and being worn
3. Use proper lighting

Screening: 
Early Identification is Key!

1. Create a culture of delirium awareness
2. Standardize screening
3. Find nursing and provider champions

PICKING A SCREENING TOOL?

- Multiple screening tools available
- Most importantly, pick an assessment tool and adopt delirium monitoring as a standard of care on the unit.
- CAM-ICU—Confusional Assessment Method for ICU
  - Non-proprietary—permission to use not needed.
  - Derived from the original CAM—S.Inouye/HELP
  - Easy to use—takes about 2 minutes to complete
  - ~89% sensitive/86% specific on med/surg units
- bCAM—similar to CAM-ICU but for non ventilated patients.
CAM SCREENING PROCESS

INCLUSION CRITERIA

- ALL Pts. > 65 or with AD/HD/ALZ, DEMENTIA, MENTAL STATUS CHANGES, and etc.
- WITH ANY CHANGE IN MENTAL STATUS AFTER ADM.
- CAM SCREENINGS

CAM SCREENINGS

- PERFORM CAM-ICU SCREENS EVERY 8 HOURS OR AT PROXIMATE TIME.
- ALL CAMS+ - Pt. LIKELY DELIRIOUS
- IF ANY CAM+ - Pt. LIKELY DELIRIOUS

ALL POS CAMS

- REPORT IMMEDIATELY TO PROVIDER ON SITE.
- IF NOT PREVIOUSLY DIAGNOSED -- PROVIDER BEGINS DELIRIUM WORK UP
- PHARM CONSULT FOR MEDICATION EVALUATION REQUESTED.

SCREENING PROCESS

1) Assess level of consciousness:
   - RASS (Richmond Agitation-Sedation Scale)**
   - SAS (Sedation Agitation Scale)
2) Proceed to CAM-ICU assessment tool
   - Q shift or every 8 hours
   - Part of the nursing/provider handoff
   - Pos. CAMs discussed daily at multidisciplinary team rounds.
   - Pharmacist consultation for all positive patients.
   - Patient family education.
Delirium Screening Video

Delirium Management

- Gregory Sherman

Delirium Screening Video

So You’ve Identified Delirium

- New onset
- Inattention
- Waxing and waning cognition, disorientation
- Disrupted circadian cycles
- Agitation, impulsivity, paranoia, hallucinations (Hyperactive Delirium)
- Somnolent, lethargic (Hypoactive Delirium)

Now What?
Initial Steps

- Review their current medications (Hospital and Home)
  - Stop deliriogenic agents (safely, please)
- Appropriate Laboratory Workup
  - CBC, BMP, Hepatic Function Panel
  - Urinalysis
  - TSH, B12, folate, prealbumin, mag, phos, U.Tox, levels of medications if available/appropriate
- Other screening tests
  - CT vs MRI
  - EEG
  - CXR, KUB

Initial Steps

- Collateral Contacts
  - Assessment of baseline function, onset of symptoms, recent changes.
  - PCP, family, living facility
- Cognitive Assessment
  - SLUMS, MOCA, MMSE
  - Can be useful in trending their cognition during and after resolution of delirium.

Safety and Communication

- Minimization of risks
- Removing potentially dangerous objects
- Reducing fall risk
  - Avoid intermittent pneumatic compression, telemetry, constant IV tubing if possible
- May require additional assistance and redirection
  - 1:1, GPS
- Communicate with staff, request documentation about behaviors/confusion/agitation
- Communicate with family members

Environmental Interventions

- Glasses, hearing aides, dentures
- Cueing with clocks, calendar (or date on whiteboard), family pictures, etc
- Restore circadian rhythm with natural light and appropriate timing of lights
- Reduce sleep disturbances (vitals, blood draws, etc)
- Reorientation with reassurance
- Attempt to limit restraints
### Somatic Interventions

- **STOP medications that may be perpetuating delirium**
- **Treat any withdrawal syndromes (EtOH, benzo [esp after prolonged ICU stay])**
- **Treat underlying conditions**
- **Appropriate pain management**
- **Antipsychotics remain the mainstay of acute intervention for delirium**

#### Haloperidol
- **High-potency (binds tightly to dopa receptors)**
- More likely to cause EPS, less anticholinergic effects
- Has demonstrated reduction in severity and duration of agitation
- Can be given IV (2:1 dose equivalent IV:PO)
- Metabolized by CYP450 2D6, lower dose for hepatic impairment
- Lower doses required with dementia or neurocognitive DO's
- 2-5 mg IV for mild-moderate agitation, 7.5-10 mg IV for severe agitation. Repeat q30 minutes until calm, q2-6 hours as needed once improved
- (In elderly, trial doses 1/3 of what is usually prescribed. The APA guidelines recommend 0.25–0.5 mg every 4 hours)

#### Risperidone
- **High potency (dopamine, serotonin) second generation**
- Not available IV/IM, is available in dissolvable (M-tab) formulation
- 0.25-4 mg BID

#### Olanzapine, quetiapine
- Can be acutely sedating, less potent dopamine blockade
- Carry anticholinergic SE’s
- Neither available IV, Olanzapine has a dissolvable form
- Olanzapine can be given IM but NOT with benzos due to hypotension

### Somatic Interventions

- **Antipsychotic Management Considerations**
- Please use the lowest effective dose and taper down as able
- If you start an antipsychotic for delirium and their delirium resolves, PLEASE taper and D/C
The Warning Slides

- NMS
  - muscle rigidity, fever, autonomic instability, delirium, markedly elevated CK.
  - Typically with rapid dose changes

- EPS
  - Parkinsonism: masked facial appearance, stooped/shuffling gait, tremor, rigidity, cogwheeling, gait instability
  - AIMS, Modified Simpson Angus
  - Akathisia
    - Uncontrollable sense of restlessness (skin crawling), psychomotor agitation

The Warning Slides

- Acute Dystonia
  - Manage with IM benadryl.
  - Stop antipsychotic.

- QTc
  - prolonged QTc interval (>450 ms in men, >470 ms in women)
  - Hodges Formula: \[ QTc = QT + 1.75 \times (\text{heart rate} - 60) \]
  - Risk of torsades/ventricular arrhythmias
    - Other risks for torsades: MI, CHF, age, bradycardia, medical conversion from a/fib, hepatic/renal dysfunction

The Warning Slides

- FDA Black Box Warning
  - U.S. Boxed Warning: Elderly patients with dementia-related psychosis treated with antipsychotics are at an increased risk of sudden death compared to placebo.

- Risk:Benefit Ratio
Somatic Interventions

- Cholinergics
  - Donepezil: theorized that acetylcholinesterase inhibition may reduce the burden of delirium in patients whose AMS is caused by anticholinergic effects
  - Could be beneficial in those who need ongoing management with anticholinergics (urinary meds, respiratory meds)