Delirium in the Elderly Patient

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Disclosure

Dr. Jacobson has disclosed that she does not have any personal financial arrangements that would constitute a conflict of interest for this presentation. She receives indirect salary support for clinical drug trials conducted at BSHRI from Avid, Baxter, Bayer, BMS, Forest, GE, Janssen, Eli Lilly, Medivation, and Wyeth. She will mention two commercial products from these companies: Abilify from BMS and Risperdal from Janssen. She will be discussing unlabeled use of drugs during this presentation.

Objectives

- Recognize clinical features of delirium.
- List risk factors & etiologies.
- Describe the diagnostic work-up.
- List specific delirium interventions.
- Describe the course & prognosis of delirium in elderly patients.
The Case of Edgar T.

- 86 year-old male ADM from home
- “mental status changes”
- Med Hx: HTN, hyperlipidemia, CABG
- Multiple medications
- HR=102, cough, tremulous

Q: is Edgar T delirious?

Delirium: Core Features

- Disturbed consciousness with reduced attention
- Cognitive impairment or perceptual disturbance
- Develops acutely
- Symptoms fluctuate

(DSM-IV-TR, 2000)

Delirium: Core Features

- Disturbed awareness with reduced attention
- Cognitive impairment
- Develops acutely
- Symptoms fluctuate

(DSM-V, 2013)
Awareness

- Normal awareness
- Occlusion
- Coma
- Delirium

Cognitive Impairment: MMSE

- Orientation to time (5)
- Orientation to place (5)
- Recall (3)
- Serial 7s (5)
- Writing a sentence (1)
- Drawing pentagons (1)

Perceptual Disturbances

(Wolff & Curran, Arch Neurol Psychiat 1935)
Acute Onset

Symptom Fluctuation

Associated Symptoms

- Sleep disturbance
- Thought disorganization
- Delusions
- Agitation (intermittent)
- Mood/personality changes
- Aggression
- Autonomic instability
Rate of Delirium

![Graph showing the rate of delirium across different settings: Elderly patients on admission, ED, Post operative, Nursing homes, and ICU.](Jacobson, J Clin Sleep Med 2008)

Delirium Morbidity

**Unsafe Behaviors**
- falls
- self-extubation
- noncompliance

**Medical Sequelae**
- pneumonia
- dehydration
- decubiti

### Table 3. Primary Risk Adjusted Analyses and Secondary Unadjusted Analyses

<table>
<thead>
<tr>
<th></th>
<th>Delirium, No.</th>
<th>No Delirium, No.</th>
<th>Summary Estimates</th>
<th>Trim-and-Fill Estimates</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Events</td>
<td>Total Patients</td>
<td>Events</td>
<td>Total Patients</td>
</tr>
<tr>
<td>Mortality in hospital</td>
<td>771</td>
<td>371</td>
<td>895</td>
<td>614</td>
</tr>
<tr>
<td>Mortality 1 mo</td>
<td>193</td>
<td>463</td>
<td>1026</td>
<td>514</td>
</tr>
<tr>
<td>Mortality 6 mo</td>
<td>179</td>
<td>577</td>
<td>1067</td>
<td>516</td>
</tr>
<tr>
<td>Mortality 1 yr</td>
<td>144</td>
<td>546</td>
<td>2001</td>
<td>965</td>
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<tr>
<td>Mortality 2 yr</td>
<td>115</td>
<td>385</td>
<td>1913</td>
<td>762</td>
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<tr>
<td>Mortality 3 yr</td>
<td>79</td>
<td>285</td>
<td>1414</td>
<td>567</td>
</tr>
<tr>
<td>Mortality 4 yr</td>
<td>50</td>
<td>170</td>
<td>1082</td>
<td>444</td>
</tr>
<tr>
<td>Mortality 5 yr</td>
<td>28</td>
<td>95</td>
<td>910</td>
<td>349</td>
</tr>
<tr>
<td>Mortality 6 yr</td>
<td>18</td>
<td>55</td>
<td>627</td>
<td>221</td>
</tr>
<tr>
<td>Mortality 7 yr</td>
<td>10</td>
<td>30</td>
<td>467</td>
<td>145</td>
</tr>
<tr>
<td>Mortality 8 yr</td>
<td>6</td>
<td>16</td>
<td>455</td>
<td>131</td>
</tr>
<tr>
<td>Mortality 9 yr</td>
<td>4</td>
<td>10</td>
<td>451</td>
<td>123</td>
</tr>
<tr>
<td>Mortality 10 yr</td>
<td>2</td>
<td>7</td>
<td>449</td>
<td>117</td>
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</tbody>
</table>

Note: For mortality, unadjusted analysis was statistically adjusted to other factors in the model. All variables were significant at p<0.01. The OR is the odds ratio of death in the delirium group compared to the no delirium group. The OR is adjusted for factors in the model. The OR is not adjusted for factors in the model. The OR is adjusted for factors in the model. The OR is not adjusted for factors in the model.

(Witlox, J. et al. JAMA 2010;304:443-451)

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### Graph

**Mortality Rates**

- **in hospital:** 22.76%
- **1 mo:** 15%
- **6 mo:** 25%
- **1 yr:** 40%

*(DSM-IV-TR, 2000)*

**Graph 1:**

- **Cost:**
  - ICU: $13,332
  - Hospital: $41,836

- **Cost Comparison:**
  - Never Delirium (n=141)
  - Ever Delirium (n=180)

- **Statistics:**
  - p<0.002

*(Milbrandt, Crit Care Med 2004)*

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Delirium Risk Factors

Predisposing

- Advanced age
- Dementia
- Medical illness
- Polypharmacy
- Alcoholism
- Chronic pain
- Depression
- Undernutrition
- Visual impairment

Precipitating

- Infection
- Fever
- Dehydration
- Constipation
- Electrolyte imbalance
- Anemia
- Sleep deprivation
- Immobilization
- Stress

A Threshold Phenomenon

dementia
polypharmacy
infection
dehydration

Delirium: Relative Risk

Visual impairment
Severe medical illness
Dementia
Dehydration

(Inouye, Ann Intern Med 1993)
Tip of the Iceberg

Reduced awareness
Cognitive impairment

pneumonia
cardiac dysrhythmia
silent MI

Etiologies

- systemic disease
  - infection
  - fluid/electrolyte imbalance
  - metabolic derangement
  - cardiovascular

- toxicity
  - medications
  - drugs of abuse
  - poisons

withdrawal states
post-operative states
- hip fracture repair
- cardiac surgery
primary brain disease
- stroke
- trauma
- infection
- neoplasm
- vasculitis

Medications: the Top 5

- Opioids
- Benzodiazepines
- Anticholinergics
- NSAIDs
- Methyldopa

(Liptzin & Jacobson, CTP 9th Ed 2009)
Etiology: The Usual Suspects

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Nursing Home</th>
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<tbody>
<tr>
<td>Infection</td>
<td>Dehydration</td>
</tr>
<tr>
<td>Dehydration</td>
<td>Constipation</td>
</tr>
<tr>
<td>Metabolic Derangement</td>
<td>Medications</td>
</tr>
<tr>
<td>Post-Operative</td>
<td></td>
</tr>
</tbody>
</table>

(Jacobson & Leuchter, Psychiat Clin N Am 1997)

Diagnostic Work-Up

**History**

**Physical Exam**

- vital signs
- neurological screening
- cardiac exam
- pulmonary exam

Diagnostic Work-Up

**Mental Status Exam**

- Reduced LOC
- Inattention
- Delusions
- Hallucinations
- Psychomotor agitation/retardation
- Cognitive impairment (MMSE)
Diagnostic Work-Up

Standard Lab Exam
- CBC with differential, platelets
- Chemistries (Chem-10)
- Drug/medication levels
- Urinalysis
- EKG
- CXR

Extended Lab Exam
- EEG, ESR or CRP, ABG, CSF studies, etc.

EEG in Delirium
- Slowing of background rhythm
- Generalized slowing (theta & delta)
- Disorganization
- Loss of reactivity to eye opening & closing

(Jacobson, Sem Clin Neuropsychiat 2000)

Normal EEG
Medical Interventions

- Definitive treatment takes precedence.
- Taper to DC non-essential medications.
- Determine schedule to monitor VS, I/O.
- Ensure that patient is hydrated.
- Avoid immobility.

Environmental Interventions

- Optimize vision - glasses, magnifiers, large-dial phones and call buttons.
- Optimize hearing - wax disimpaction, hearing aids, speech amplifiers.
- Ensure sleep - noise reduction, door closed, schedule adjustment, bedtime snack.

Educational Interventions

- Talk to family about the natural history of delirium and its prognosis.
- Educate staff regarding care of the patient with delirium.
- Reassure the patient frequently.
- Provide frequent reorientation.
Pharmacologic Treatment

- Haloperidol
- Atypical antipsychotics
- Benzodiazepines
- Acetylcholinesterase inhibitors
- Dexmedetomidine

Haloperidol

Effective
- Psychosis
- Severe agitation

Excellent profile
- No respiratory depression
- No hemodynamic effects
- Little anticholinergic effect

Also Cheap!
Haloperidol

Side effects
- QTc prolongation
- Tardive dyskinesia
Bad reputation

Risk Factors for QTc Prolongation

<table>
<thead>
<tr>
<th>Any risk factor</th>
<th>68/70 (97)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrolyte imbalance</td>
<td>27/68 (40)</td>
</tr>
<tr>
<td>Underlying cardiac disease</td>
<td>32/68 (47)</td>
</tr>
<tr>
<td>Concomitant proarrhythmic agents</td>
<td>39/68 (57)</td>
</tr>
<tr>
<td>Other drugs influencing cardiac function</td>
<td>23/68 (34)</td>
</tr>
<tr>
<td>Baseline QTc &gt;450 msec</td>
<td>18/68 (26)</td>
</tr>
</tbody>
</table>

(Meyer-Massetti, J Hosp Med 2010)

Haloperidol to Treat Delirium

- Screen for risk factors
- Keep dose low (< 2 mg/day)
- Sample orders:
  1. 0.25-0.5 mg IV q8h (and q6h prn; NTE 2 mg)
  2. 0.5-1 mg PO q12h (and q8h prn; NTE 2 mg)
- Treat for 2 to 3 days, then taper off over 3 days
Atypical Antipsychotics

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage</th>
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<tbody>
<tr>
<td>risperidone</td>
<td>0.25-0.5 mg q12h (and q6h prn)</td>
</tr>
<tr>
<td>(Risperdal)</td>
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</tr>
<tr>
<td>quetiapine</td>
<td>12.5-25 mg q12h (and q6h prn)</td>
</tr>
<tr>
<td>(Seroquel)</td>
<td></td>
</tr>
<tr>
<td>aripiprazole</td>
<td>2.5 to 5 mg qhs (and 2.5 mg q12h prn)</td>
</tr>
<tr>
<td>(Abilify)</td>
<td></td>
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</table>

Benzodiazepines

<table>
<thead>
<tr>
<th>Variable</th>
<th>Odds Ratio</th>
<th>p</th>
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<tbody>
<tr>
<td>Delirious on previous day</td>
<td>26.5</td>
<td>.001</td>
</tr>
<tr>
<td>Benzodiazepine dose</td>
<td>6.8</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Opioid dose</td>
<td>0.5</td>
<td>&lt;.001</td>
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(Agarwal, J Burn Care Res 2010)

Cholinesterase Inhibitors

- Ineffective in treating delirium
- Ineffective in preventing delirium
- One possible exception?

(Gamberini, Crit Care Med 2009)
Course of Delirium

prodromal  overt  resolving

1-3 days  days to months

(Jacobson, Psychiat Clin N Am 1997)
Duration in the Elderly

(Koponen, Acta Psychiatr Scand 1989)

Delirium Recall

(Breitbart, Psychosomatics 2002)

Delirium: Summary

- Disturbed consciousness with reduced attention
- Cognitive impairment or perceptual disturbance
- Acute onset, fluctuating symptoms
- Always has a medical cause
Summary

- Risks: dementia, polypharmacy, severe illness, etc.
- Common etiologies: infection, fluid/electrolyte imbalance, meds
- Diagnostic work-up and treatment on two levels

Summary

- Medical and environmental interventions are key
- Pharmacologic interventions
- Course may be prolonged
- Recall is variable