Alcohol Withdrawal in the ICU
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Intensivist - Kenmore Mercy
Background

- Estimated 8 million alcohol (EtOH) dependent individuals in the United States
- 500,000 episodes of withdrawal requiring pharmacological treatment

Who is prone to withdrawal?

- 1955 experiment
  - EtOH-naive volunteers given continual EtOH
  - Longer periods of EtOH = inc. severity of withdrawal

- Also possible genetic component (EtOH AND withdrawal)

DT Risk Factors

- Sustained EtOH
- Previous history
- Age >30
- Comorbidities
- Longer time to presentation (inadequate early control of symptoms)
Mortality

- Early 20th century 37%
  - Now ~5%
- Arrhythmia, complications (aspiration)
- Failure to answer two questions
  1. Are these symptoms secondary to EtOH withdrawal? (r/o toxic, metabolic, CNS)
  2. Was there something that lead to cessation of EtOH? (Panc, hepatitis, CNS)
Pathophysiology

- CNS depressant
  - Inc. inhibitory tone via gamma-aminobutyric acid (GABA)
  - EtOH binds to GABA with very high specificity (4)
  - Dec. excitatory tone via blocked glutamate/N-methyl-D-aspartame (NMDA)

- Chronic EtOH yields GABA insensitivity and increased sensitivity to glutamate
  - Need more EtOH to maintain normal tone
In a nutshell...

Chronic EtOH → Insensitive GABA → Sensitive NMDA
In a nutshell...

- EtOH works by inc. inhibitory tone (GABA) and dec. excitatory tone (NMDA)
  - Results to inhibition

- Withdrawal of chronic EtOH results in dec. inhibitory tone and inc. excitatory tone
  - Results in excitation and symptoms of EtOH withdrawal
Early Withdrawal

- Onset 6 hours
- Minor
  - Insomnia, tremulouness, anxiety, GI upset, HA, diaphoresis, tachycardia, palpitations
- May occur with significant BAC
- Resolves in 24-48 hrs if no progression
Later Withdrawal

- Onset usually 12-48 hrs
- May occur only after 2 hrs (9)
- Seizures - usually GTC
  - Usually fleeting
  - Prolonged, status deserves further investigation
- Treatment: benzos, phenobarbital
- No PHT/fPHT
- Failure to txt can lead to DTs in 1/3 of pts

Later Withdrawal

- Onset 12-24 hrs
- Hallucinations (not DTs)
  - Usually visual. No general clouding of sensorium. VS normal.
- Resolve 24-48 hrs
Late Withdrawal

- Onset 48-96 hrs
- DTs
  - Hallucinations, disorientation, tachycardia, HTN, diaphoresis, fever (hypovolemia), tachypnea (alkalosis), dec. cerebral blood flow (15)
- Resolution 1-7 days
Electrolyte Abnormalities

- Hypokalemia (renal, extrarenal loses, aldosterone alterations)
- Hypomagnesemia with arhythmias, seizures
- Malnutrition: hypophosphatemia (cardiac failure, rhabdo), hyponatremia
Who needs the ICU??

- Age >40
- Cardiac disease (CHF, arrhythmia, angina, myocardial ischemia, recent MI)
- Hemodynamic instability
- Marked acid-base disturbances
- Severe electrolyte defects (hypokalemia, hypophosphatemia, hypomagnesemia, hypocalcemia)
- Respiratory insufficiency (hypoxemia, hypercapnia, severe hypocapnia, pneumonia, asthma, COPD)
- Potentially serious infections (wounds, pneumonia, trauma, urinary tract infection)
- Signs of gastrointestinal pathology (pancreatitis, GI bleeding, hepatic insufficiency, suspected peritonitis)
- Persistent hyperthermia (T >39°C [103°F])
- Evidence of rhabdomyolysis
- Renal insufficiency or increased fluid requirements
- History of prior alcohol withdrawal complications (e.g., delirium tremens, alcohol withdrawal seizures)
- Need for frequent or high doses of sedatives or an intravenous infusion to control symptoms
- Withdrawal despite an elevated ethanol concentration
Management

- Generally supportive
  - Quiet room, IVF, nutritional supplementation (Thiamine!), electrolyte monitoring, NPO
  - Symptom-triggered medication
Drugs

- Benzos are first-line (remember GABA stimulation!)
  - Diazepam (Valium) short onset, long acting 2/2 active metabolites
  - Lorazepam (Ativan) in cirrhosis (shorter $t_{1/2}$) to prevent oversedation
  - Almost always IV in ICU (access important)
Symptom-triggered therapy

- Results in less medication and shorter LOS compared to fixed schedule benzos (ie, Librium)
- Initial frequent evaluation (q 5-10 min)
  - Hourly once controlled
- Can use longer acting for prophylaxis in high risk patients without symptoms (not treatment)

Assessment Tools

- Clinical Institute Withdrawal Assessment for Alcohol Scale (CIWAS-Ar)
  - Requires verbal participation (serial 7s)
  - Treat >8

- Richmond Agitation-Sedation Scale (RASS)
  - Goal 0 to -2
CIWAS-Ar

Clinical Institute Withdrawal Assessment Scale for Alcohol, Revised (CIWA-Ar)

**Nausea and Vomiting**
0 - No nausea or vomiting
1
2
3
4 - Intermittent nausea with dry heaves
5
6
7 - Constant nausea, frequent dry heaves and vomiting

**Pallor/Sweats**
0 - No sweat visible
1 - Barely perceptible sweating, palms moist
2
3
4 - Beads of sweat obvious on forehead
5
6
7 - Drenching sweats

**Anxiety**
0 - Normal activity
1 - Somewhat more than normal activity
2
3
4 - Moderate fidgety and restless
5
6
7 - Fades back and forth during most of the interview or constantly thrashes about

**Visual Disturbances**
0 - Not present
1 - Very mild photosensitivity
2 - Mild photosensitivity
3 - Moderate photosensitivity
4 - Moderately severe visual hallucinations
5 - Severe visual hallucinations
6 - Extreme severe visual hallucinations
7 - Continuous visual hallucinations

**Tremor**
0 - No tremor
1 - Not visible, but can be felt at finger tips
2
3
4 - Moderate when patient's hands extended
5
6
7 - Severe, even with arms not extended

**Tactile Disturbances**
0 - None
1 - Very mild paraesthesia
2 - Mild paraesthesia
3 - Moderate paraesthesia
4 - Moderately severe hallucinations
5 - Severe hallucinations
6 - Extremely severe hallucinations
7 - Continuous hallucinations

**Headache**
0 - Not present
1 - Very mild
2 - Mild
3 - Moderate
4 - Moderately severe
5 - Severe
6 - Very severe
7 - Extremely severe

**Auditory Disturbances**
0 - Not present
1 - Very mild harshness or ability to frighten
2 - Mild harshness or ability to frighten
3 - Moderate harshness or ability to frighten
4 - Moderately severe hallucinations
5 - Severe hallucinations
6 - Extremely severe hallucinations
7 - Continuous hallucinations

**Orientation and Clarity of the Sensorium**
0 - Oriented and can do serial additions
1 - Cannot do serial additions
2 - Disoriented for date but not more than 2 calendar days
3 - Disoriented for date by more than 2 calendar days
4 - Disoriented for place/person

**Cumulative Score**

<table>
<thead>
<tr>
<th>Score</th>
<th>Approach</th>
</tr>
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<tbody>
<tr>
<td>0-8</td>
<td>No medication needed</td>
</tr>
<tr>
<td>9-14</td>
<td>Medication is optional</td>
</tr>
<tr>
<td>15-20</td>
<td>Definitely needs medication</td>
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<tr>
<td>&gt;20</td>
<td>Increased risk of complications</td>
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## RASS

<table>
<thead>
<tr>
<th>Score</th>
<th>Descriptor</th>
<th>Characteristics</th>
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<tbody>
<tr>
<td>+4</td>
<td>Combative</td>
<td>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 nonpurposeful movement, fights ventilator</td>
</tr>
<tr>
<td>+1</td>
<td>Restless</td>
<td>Anxious, apprehensive but movements not aggressive or vigorous</td>
</tr>
<tr>
<td>0</td>
<td>Alert and calm</td>
<td></td>
</tr>
<tr>
<td>-1</td>
<td>Drowsy</td>
<td>Not fully alert, but has sustained awakening to voice (eye opening and contact &gt;10 seconds)</td>
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<tr>
<td>-2</td>
<td>Light sedation</td>
<td>Briefly awakens to voice (eye opening and contact &lt;10 seconds)</td>
</tr>
<tr>
<td>-3</td>
<td>Moderate sedation</td>
<td></td>
</tr>
<tr>
<td>-4</td>
<td>Movement or eye opening to voice (but no eye contact)</td>
<td></td>
</tr>
<tr>
<td>-5</td>
<td>Deep sedation</td>
<td>No response to voice, but movement or eye opening to physical stimulation</td>
</tr>
<tr>
<td>-5</td>
<td>Unarousable</td>
<td>No response to voice or physical stimulation</td>
</tr>
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http://ccn.aacnjournals.org
General Approach

- Diazepam 5 mg IV q5-10 min for RASS >0, CIWAS-Ar >8
- May need a lot! (500 mg - GABA insensitivity)
- Older with more comorbidities may require more sedation (ie, CAD)
Refractory DTs

- Perhaps 2/2 low GABA levels, receptor changes
- Phenobarbital 130-260 mg IV q15-20 min
  - Can be used with benzos
  - Benzos open GABA, barbs keep open longer
- Propofol (open chloride channels, inhibit excitatory amino acids)
- Endotracheal intubation


Alternative Agents

- EtOH (Special population. Prophylaxis/minor withdrawal in surgical pts. Difficult to titration. Use enough!)
- Antipsychotics (haloperidol) lower seizure threshold, prolong QT (use only in psychotic pts)
- AEDs not recommended
- Baclofen (GABA-B agonist) unproven
65yo male with severe withdrawal requiring frequent doses of diazepam (received 200 mg thus far). MD starts dexmedetomidine (Precedex) to "save the patient from intubation". Running at 0.3 mcg/kg/hr. Standing order for diazepam 5 mg IV q5 min PRN RASS >0. Dexmedetomidine order to titrate to RASS <+1. Patient's current RASS is +2. Do you...
A) Increase dexmedetomidine to 0.5 mcg/kg/hr
B) Give diazepam 5mg IV x1. Have more close by.
C) A & B
D) Ask MD why they ordered two meds for the same thing
Dexmedetomidine

- Centrally acting alpha-2 agonist (dexmedetomidine, Precedex)
- No respiratory suppression in lower doses (<0.7 mcg/kg/hr)
- Titrateable (good or bad?)
- Not primary treatment
- Dearth of studies
Take Home Points

- EtOH withdrawal is a clinical diagnosis
- r/o other diagnoses that mimic or lead to withdrawal
- Recognition, treatment and recovery requires a multidisciplinary team (MD, RN, RT, PT, RD, spiritual care, social work)
- Know risk factors. Suggest prophylaxis.
- Withdrawal can happen early (even with high BAC)
- DTs are an immediate threat to life
- Give the patients what they need (symptom-triggered therapy) using a validated tool
- Ask questions
Questions???