Alcohol Use & Abuse in Acutely and Critically Ill Patients: Don't Be Fooled

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General Effects
- Mask Signs & Symptoms of underlying problems
- Alters drug metabolism & interactions
- Complicates recovery from critical illness or injury

Challenges for health care providers

Special Patient Populations
- Trauma
- Elderly
- Pediatric

Alcoholism
- ETOH consumed by up to 80% of the population
- Occasional beneficial effects
- More than 2 drinks/day
  - Abuse & dependence
  - Decreased life span
  - 80% increase in health problems
  - Worsens pre-existing disease states

Who is an "Alcoholic"
- BA > 300mg/dl at any time
- BA > 150 mg/dl for routine visit
- BA > 150 mg/dl in a patient who does not appear confused
Basic Physiology

- **Absorption site**
  - Mouth & esophagus: small amounts
  - Stomach & large bowel: modest amounts
  - Proximal small intestine (major site)
- **Rate**
  - Rapid gastric emptying (carbonated drinks)
  - Absence of proteins, fats, or carbohydrates
  - Absence of additive ingredients for taste
  - Dilution

Significant Blood Levels

- **Legal BA** 80 mg/dl (.08)
- **Metabolism Rate** 12-50 mg/hr
- **Apnea & Coma** > 400 mg/dl

Effects of Blood Alcohol Levels

- **50 mg/dl**
  - Difficulties with balance, impaired concentration, decreasing awareness of stimuli
- **100-150 mg/dl**
  - Marked decline of cognitive & motor functioning, ataxia, slurred speech, impaired short-term memory and judgement
- **200 mg/dl**
  - Unresponsive to stimuli
- **250 mg/dl**
  - Loss of consciousness

Differential Diagnosis

- **History/Mechanism of Injury**
- **BA Level**
- **Differential diagnosis**
  - Traumatic brain injury
  - Stroke
  - Seizure
  - Other drugs
  - Hypoxia, hypoglycemia, shock
  - Brain infections, tumors
- **Diagnostics:** CT, Labs

Physiologic Effects

Central Nervous System (Brain)

- Brain cell structure disruption
- Altered transmission of neurological signals
- Peripheral neuropathy
- Inadequate cerebral blood flow
- Decrease in brain mass
- Sleep disturbances, psychoses, loss of memory & motor control
Physiologic Effects - CV

- Catecholamine surge (acute)
- Dysrythmias (acute)
- Vasomotor depression (acute)
- Decreased cardiac output
- Mitochondrial damage

Alcoholic Cardiomyopathy

- 2nd leading cause of cardiomyopathy
- 8-21 drinks/day for 5-16 years
- Men: onset @ age 38-44, more common, higher mortality
- Women: 45-50 years, better functional status
- Outcomes related to presence of other conditions

Physiologic Effects - GI

- Structural changes in the heart
  - Loss of cardiac cells due to apoptosis
  - Enlarged, dilated heart
  - Thin walls
  - Poor contractile strength

- Loss of plasma proteins
- Flattened villi
- Decreased enzyme production
- Altered amino acid & glucose transport
- Exacerbation of other GI problems

Physiologic Effects - Respiratory

- Decreased respiratory drive (acute)
- Increased risk of aspiration (acute)
- Increased risk of pneumonia & ARDS
- Drug interactions potentiate respiratory depression

Physiologic Effects - Liver

- Damage to cell structure & function
- Depletes vitamins & trace elements
- Fat accumulation, necrosis, fibrosis
- Major pathologic consequences
  - Cirrhosis
  - Abnormal glucose metabolism
  - Bleeding
  - Vulnerability to infection
  - Malnutrition
Physiologic Effects - Fluid Balance

- Diruensis (acute)
- Water intoxication (acute & chronic)
- Electrolyte imbalances (acute & chronic)
- Acidosis (chronic)

Physiologic Effects - Hematologic

- Anemia
- Potential for infection
- Coagulopathies
- Pathophysiological consequences

Physiologic Effects - Stress Response

- 3 day binge drinking episode
  - Decreases the "fight or flight" response
  - Suppresses inflammatory reaction
  - Creates an anti-inflammatory state
  - Increases susceptibility to infection

Physiologic Effects - Cancer

- Breast Cancer in Women  → 1.5 times
- Oral & esophageal  → 3 times
- Rectal cancers  → 1.5 times
- > 7-8 drinks/day  → 5 times in many cancers

Potential Risks for Alcoholic in the ICU

- Tissue hypoxia
- Cardiac failure
- Overwhelming sepsis
- Shock
- Hemorrhage
- Thromboembolism

Withdrawal Syndromes

- Nearly all patients will undergo WD
- Only 5% will develop severe WD problems
- DTs have 15-20% mortality
- Severity of sx dependent on drinking pattern and metabolic rate
Differentiation of Intoxication from Withdrawal

<table>
<thead>
<tr>
<th>Intoxication</th>
<th>Withdrawal</th>
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<tbody>
<tr>
<td>Relaxation</td>
<td>BA 0 or falling</td>
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<tr>
<td>Euphoria</td>
<td>Agitated</td>
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<tr>
<td>Poor judgement</td>
<td>Hyperventilating</td>
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<tr>
<td>Ataxia</td>
<td>Diaphoresis</td>
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<tr>
<td>N &amp; V</td>
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<td>Coma</td>
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Withdrawal Syndromes

- Early or minor
- Alcoholic Hallucinosis
- Alcoholic Seizures
- Delirium Tremens

Early or Minor WD

- Sx within 8 hours of last drink
- Sx peak within 24-36 hours
- Multiple sx
  - Jitters/shakes, intense craving for ETOH, insomnia, vivid dreams, anxiety, N & V, anorexia, sweating, weakness, myalgias

Alcoholic Hallucinosis

- Occurs in 25% of heavy drinkers
- Not a predictor of DTs
- Visual and auditory hallucinations
- Minimal autonomic arousal

Alcohol Related Seizures

- More common in patients with epilepsy
- Occurs 8-24 hrs after last drink, before the BA returns to 0
- Presents as one generalized seizure or a rapid burst of several seizures

Delirium Tremens

- Clouding of consciousness
- Common in patients with prior hx of WS episode
- Occurs 48 hr after last drink
- Missed diagnosis in 50% of patients
- Major physiologic consequences
**Complications of DTs**
- Volume depletion
- Electrolyte imbalance
- Acute rhabdomyolysis
- Dysrhythmias
- Lactic acidosis
- Ketoacidosis
- Systolic hypertension
- GI problems
- Sepsis

**Other Causes for Delirium**
- Sepsis
- Meningitis
- Hypoxia
- Hyperglycemia
- Hepatic disease
- Renal disease
- Hypothermia
- Thiamine deficiency
- Post-ictal state
- CNS toxins
- Intracerebral hemorrhage

**Treatment Goals for WD**
- Thorough drinking history
- Control & prevention of symptoms
- Replacement of fluids and metabolic deficiencies
- Management of complications
- Attempt rehabilitation

**Screening, Brief Intervention, & Referral for Treatment (SBIRT) (Schermer, 2006)**
- Usual care:  22% arrested for DUI
- 30-minute BI:  11% arrested for DUI

50% reduction in DUI if BI performed

One DUI prevented for every 9 BIs performed.

**Summary of SBIRT Studies in Trauma Patients**

<table>
<thead>
<tr>
<th>Study</th>
<th>Drinking</th>
<th>Injury</th>
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<tbody>
<tr>
<td>Sommers (2006)</td>
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<td>Gentilello</td>
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<td>Longabaugh (2001)</td>
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<td>Monti (1999)</td>
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<td>Zatzick (2004)</td>
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<td>Soderstrom (2007)</td>
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**Risk Assessment - CIWA Scale**

*Clinical Indicators & Withdrawal Assessment (Observational, Score 0-7)*

- N & V
- Tremor
- Paroxysmal sweats
- Anxiety
- Agitation
- Tactile Disturbance
- Auditory Disturbances
- Visual Disturbances
- Headache, Fullness
- Orientation/Clouding of Sensorium
Sedation

| Score > 20 | Call HO | Call HO |
| Score 16-20 | Lorazepam 2 mg IV q 4 hr | Diazepam 10 mg IV q 4 hr |
| Score 10-15 | Lorazepam 1 mg IV/PO q 4 hr | Diazepam 5 mg IV/PO q 4 hr |
| Score < 10 | Lorazepam 1 mg PO q 4 hr, prn | Diazepam 5 mg PO q 4 hr, prn |
| PRN: If breakthrough | Lorazepam 1-2 mg IV/PO prn q 1 hr |

Other Medications

- Thiamine 100 mg IV/PO q day x 3 days
- Multivitamins with Folate 1 mg PO/IV qd
- Pneumococcal Vaccine 0.5cc IM prior to discharge
- Catapres
- Beta-blockers

IV Fluids

- Normotensive: D5.45 with lytes
- NA < 120 meq/l 3-5% Saline
- NA > 120 meq/l 0.9% Saline

Electrolyte Replacement

- Mg will raise seizure threshold
- Give 2 Gm IV q 8 hr x 3
- Give Mg before Ca
- Replace Ca, K, Phos prn

Fever Control

- Rule out other causes
- Antipyretics
- Cooling blankets
- Antibiotics after cultures

Coagulopathy Management

- Correct anemia
- Component therapy
- Vitamin K
Safety

- Quiet, well-lit room
- Seizure precautions
- Close observation
- Re-orient frequently

Conclusions

- Don’t trivialize effects of alcohol WD
- Carefully evaluate etiology of symptoms
- Early history means early prevention
- Refer to rehab for immediate intervention