Alcohol Withdrawal Syndrome

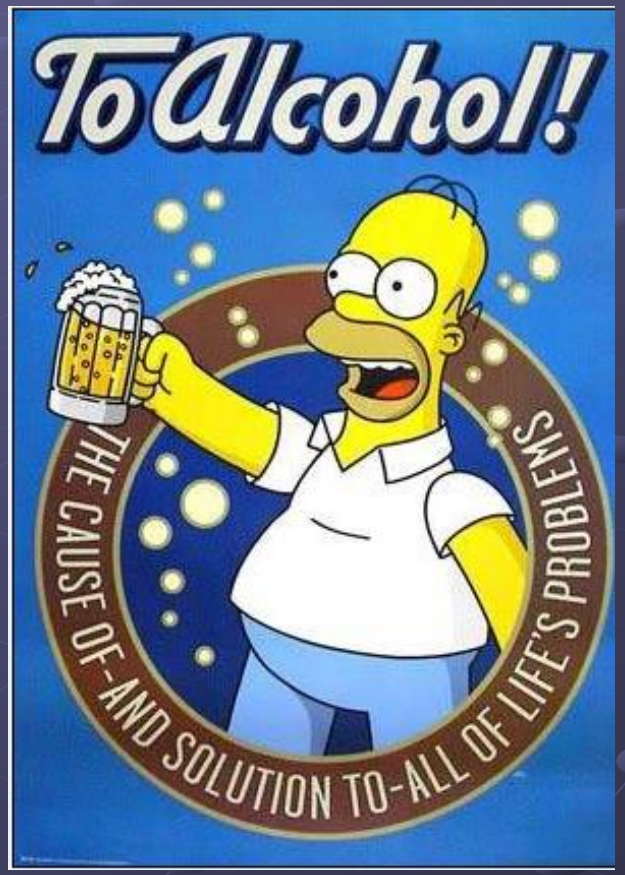
Tom Scullard RN MSN CCRN
Clinical Care Supervisor
Medical Intensive Care Unit
Hennepin County Medical Center
Minneapolis Minnesota

Objectives

- 1) Explain the pathophysiology of Alcohol Withdrawal Syndrome
- 2) Describe signs and symptoms of patients in Alcohol Withdrawal Syndrome
- 3) Identify nursing interventions and supportive therapies that are associated with the patient experiencing Alcohol Withdrawal Syndrome

Alcohol Withdrawal Syndrome

- 50% of adults in westernized countries are classified as alcohol consumers
- Pleasurable safe experience with minimal health risk

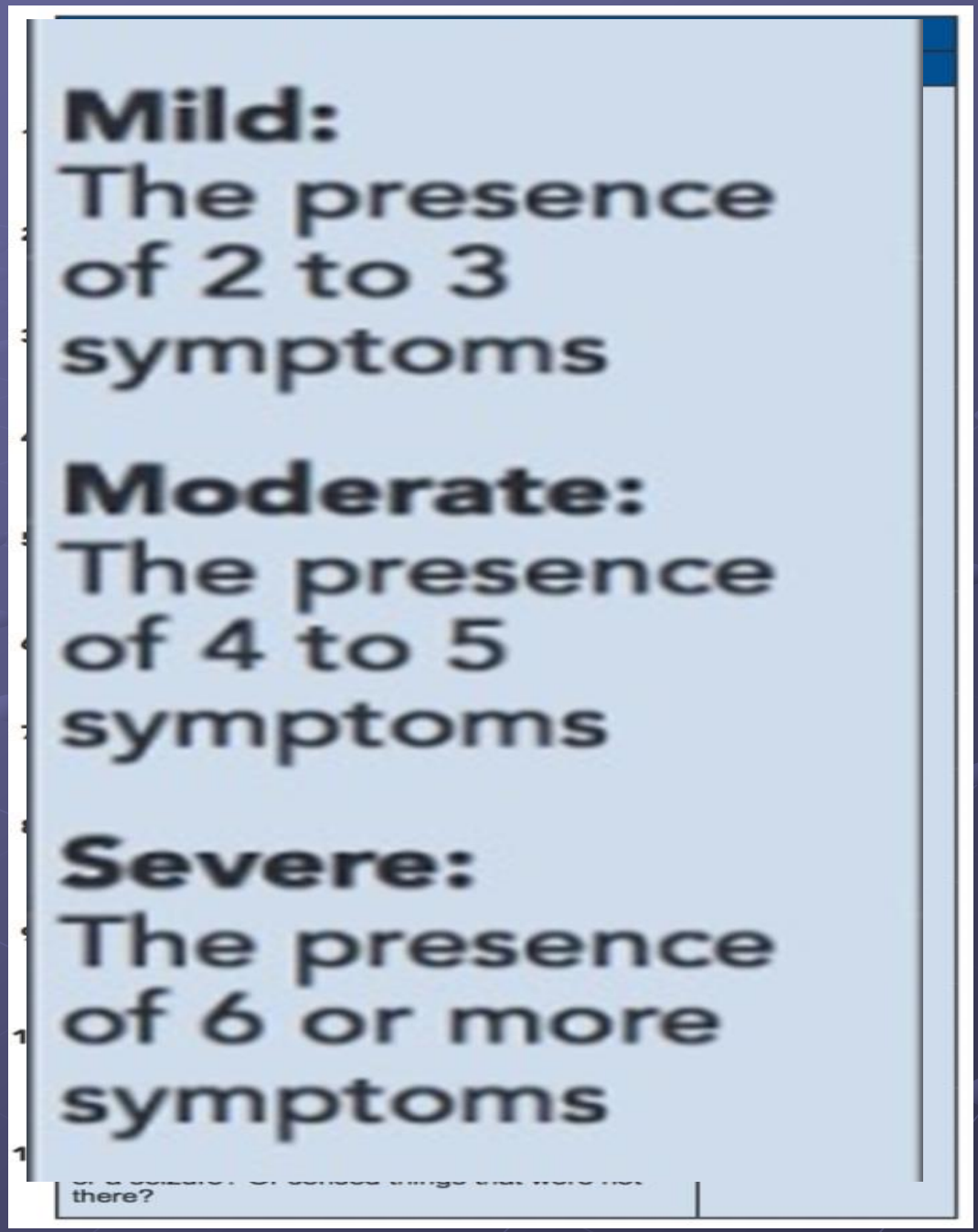


Alcohol Withdrawal Syndrome

- May 2013 American Psychiatric Association updated Diagnostic and Statistical Manual of Mental Disorders
- Combined alcohol abuse and alcohol dependency into a single disorder

Alcohol Use Disorder

- Meet 2 of 11 criteria during the same 12 month period = diagnosis of AUD
- Mild
- Moderate
- Severe


Mild:
The presence of 2 to 3 symptoms
Moderate:
The presence of 4 to 5 symptoms
Severe:
The presence of 6 or more symptoms
there?

Alcohol Use Disorder

- Estimate 18 million Americans have unhealthy alcohol use
- 2010 1.9 million hospital discharges included at least 1 alcohol related diagnosis
- 2-60 % of medical inpatients have AUD
- 50% of trauma patients
- Cost $225 billion annually due to lost productivity, health care, and property damage

Alcohol Withdrawal Syndrome

- Up to 40 % of inpatient beds used to treat health conditions related to alcohol consumption
- 2011 23.9% of Canadians 25+ reported alcohol consumption above the low level threshold

Alcohol Withdrawal Syndrome

- Medical
  - 9% of admissions to MICU alcohol related
- Surgical / Trauma
  - 40-50% are intoxicated and 94% have substance abuse problem
  - 5x more likely to die in MVC
  - 16x more likely to die in falls
  - 10x more likely to become fire or burn victims
  - 2-3x mortality rate
  - 50% longer hospital stay
- Elderly
  - 7-22% of elderly inpatients abuse alcohol

Alcohol Withdrawal Syndrome

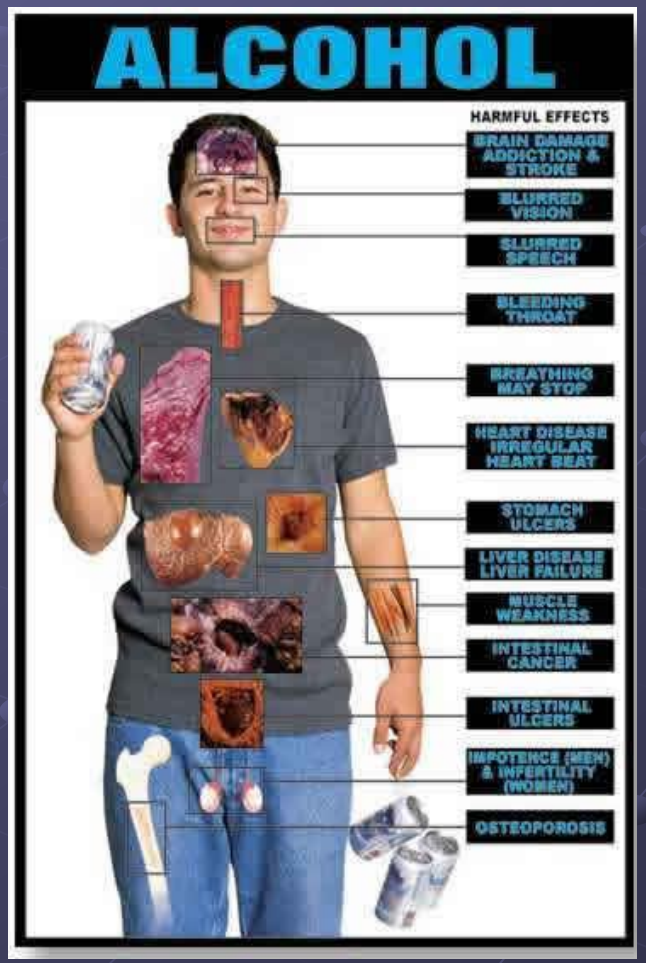
- 20 % of hospitalized patients will experience delirium tremens if not treated appropriately.
- Delirium tremens 5 % of people with alcohol withdrawal syndrome

1955 Experiment

- 7-34 days minor withdrawal symptoms
- 48-87 days major withdrawal
- Most people are vulnerable to the effects of abrupt cessation

Complications

- Cardiac
  - Arrhythmias
  - Cardiomyopathy
- Neurological
  - Wernickies encephalopathy
  - Altered mental status
- Respiratory
  - Pneumonia
  - ARDS
- Gastrointestinal
  - Bleeding
  - Varacies
  - Pancreatitis
  - Liver failure
- Metabolic and renal
  - Hypoglycemia
  - Acute renal failure



Wernicke's Encephalopathy

- Wernicke's is caused by a deficiency in the B vitamin thiamine. Thiamine plays a role in metabolizing glucose to produce energy for the brain. An absence of thiamine, therefore results in an inadequate supply of energy to the brain

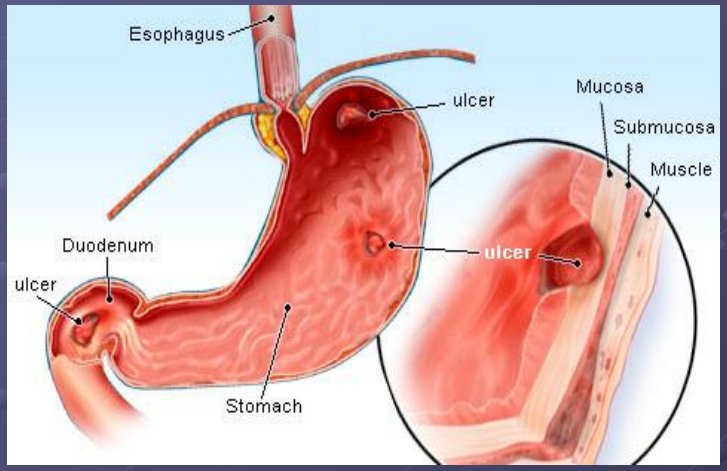
Wernicke's Encephalopathy

- Encephalopathy
  - Profound disorientation
  - Indifference
  - Inattentiveness
- Oculomotor dysfunction
  - Nystagmus
  - Conjugate gaze palsies
- Gait ataxia
  - Wide based gait

- Treatment
  - Intravenous thiamine

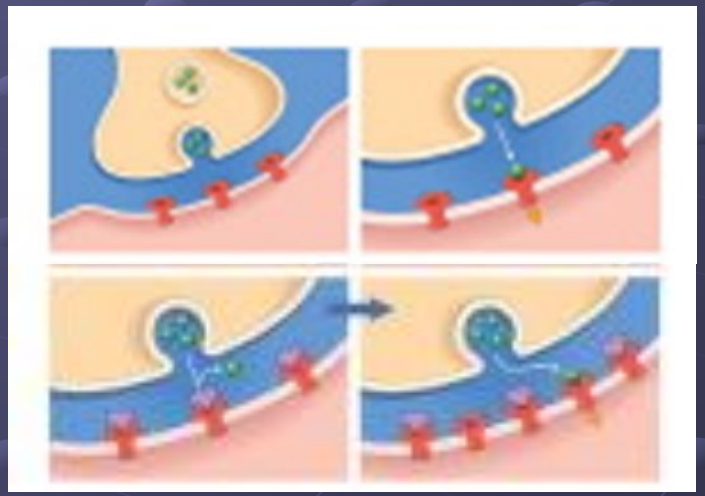
Pathophysiology

- Alcohol is absorbed through the stomach wall and enters the blood stream in about 7 minutes
- Alcohol is central nervous system depressant
- Metabolized in liver



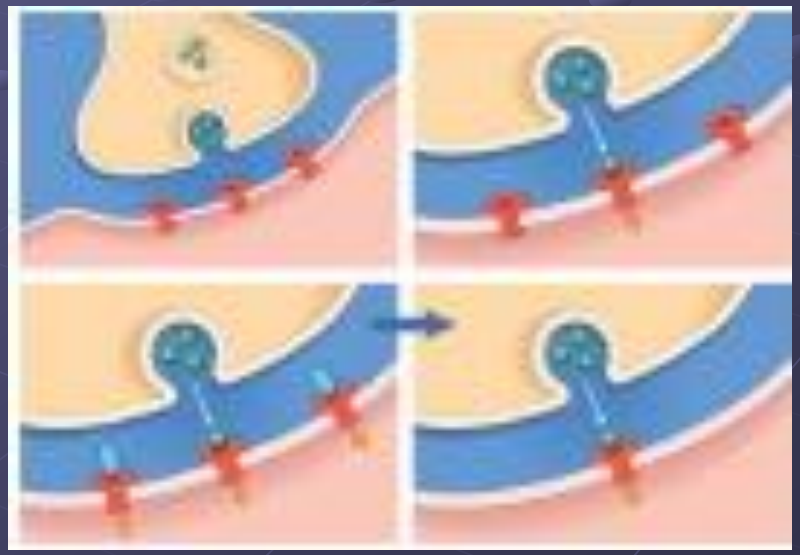
Pathophysiology

- **Upregulation:** An increase in the number of receptors on the surface of target cells, making the cells more sensitive to a hormone or another agent



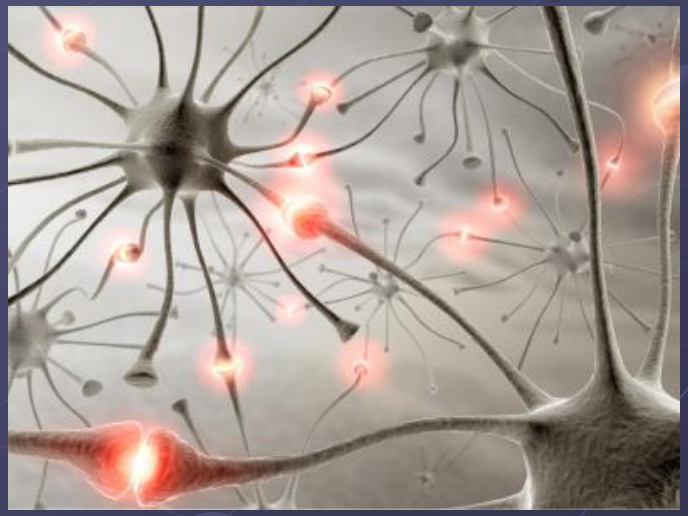
Pathophysiology

- **Downregulation:** A decrease in the number of receptors on the surface of target cells, making the cells less sensitive to a hormone or another agent



Pathophysiology

- Alcohol enhances neurotransmission at the A receptors of gamma-aminobutyric acid (GABA).
  - **Primary inhibitory neurotransmitter**
- Inhibits N-methyl-d-aspirtate (NMDA) and non-NMDA glutamate receptors
  - **Primary excitatory neurotransmitter**



Pathophysiology

- Initially this causes decreased brain excitability
- After prolonged use adaptation occurs
- Fewer GABA receptors (inhibitory neurotransmitter) **downregulation**
- Increased glutamate receptors (excitatory) **upregulation**
- Occurs as brain tries to maintain homeostasis in the presence of persistent drug use

Pathophysiology

- These responses lead to increased tolerance
- Need higher blood alcohol concentration to maintain the same intoxicating effects
- Brain overcompensates to maintain homeostasis (increased excitatory neurotransmitters)

Pathophysiology

- The adaptation that has occurred results in increased excitatory activity, which leads to symptoms called alcohol withdrawal syndrome.
- Symptoms of alcohol withdrawal correlate with the amount and duration of alcohol consumed.

Alcohol Withdrawal Syndrome

- Mortality rate 2-10 % down from 35 %
  - Arrythmias
  - Fluid depletion
  - Electrolyte imbalance
    - Hypokalemia, hypomagnesium, hypophosphotemia
  - Pneumonia
  - Fat emboli
  - Older age
  - Core temperature of 104* F
  - Coexisting liver disease

Definition of Alcohol Withdrawal Syndrome

- Diagnostic and Statistical Manual of Mental Disorders IV, text revised
  - 1) cessation of (or reduction in) alcohol use that has been heavy and prolonged
  - 2) two or more of the following symptoms developing in several hours to a few day after cessation

Definition of Alcohol Withdrawal Syndrome continued

- Autonomic hyperactivity
- Increased hand tremors
- Insomnia
- Nausea or vomiting
- Transient hallucinations or illusion (tactile, visual, or auditory)
- Psychomotor agitation
- Anxiety
- Grand mal seizures

Phases of Alcohol Withdrawal

- Divided into 4 phases
  - Autonomic hyperactivity
  - Hallucinations
  - Seizures
  - Delirium tremens

Phase 1
Autonomic Hyperactivity

6-12 Hours (peak 24-48 hours)

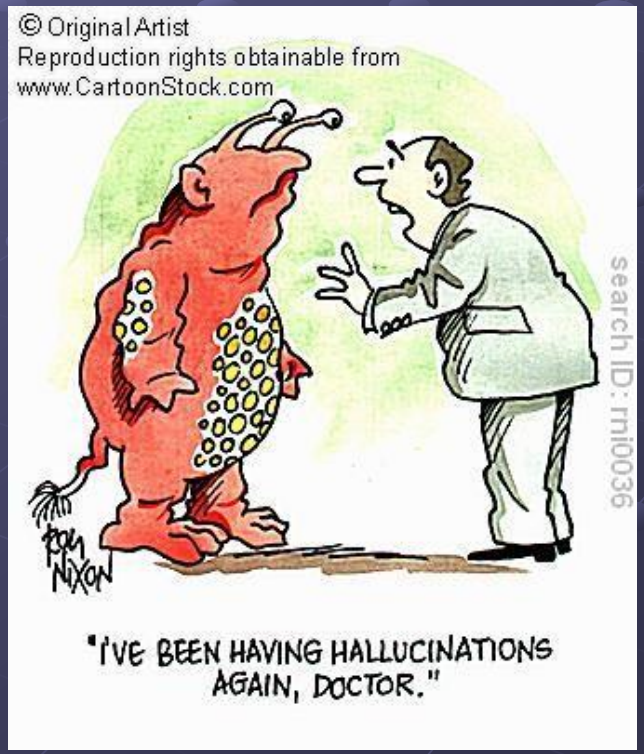
- Insomnia
- Tremulousness
- Mild anxiety
- Gastrointestinal upset
- Headache
- Palpations
- Sweating

Phase II Hallucinations

12-24 Hours

- Hallucinations (Alcohol Hallucinosis)

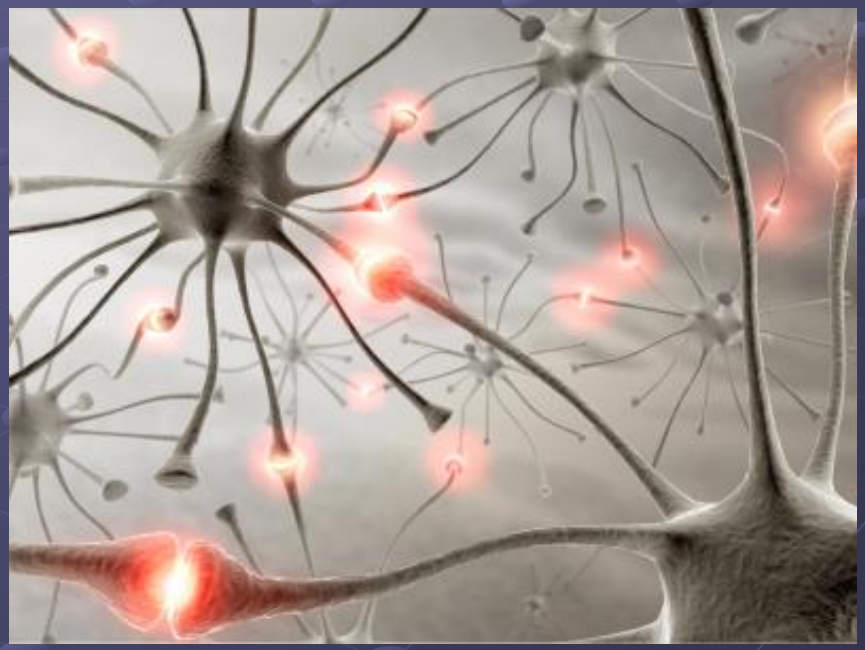
  (Rum Fits)
  - Persecutory
  - Visual
  - Clear sensorium



Phase III Seizures

24-48 Hours

- Generalized tonic-clonic seizure
  - Usually one
    - If more need to investigate
  - Increased chance of seizures dependent upon number of withdrawal episodes
  - 1st admission -10%
  - > 5 admissions – 42%



Phase IV
Delirium Tremens

48-72 Hours

- Alcohol withdrawal delirium (DT)
  - Disorientation
  - Hallucinations (visual)
  - Hypertension
  - Tachycardia
  - Agitation
  - Sweating

Phases of Alcohol Withdrawal Syndrome

- Typically lasts for 5-7 days
- Can last up to 2 weeks

S	M	T	W	T	F	S
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	1	2	3
4	5	6	7	8	9	10

Delirium Tremens

- Increased length of stay in the ICU
- Increased length of stay in hospital
- Increased costs due to increased medical treatment
- Confused with other problems
  - Sepsis
  - Worsening closed head trauma
  - Delirium

Treatment Goals

- The American Society of Addiction Medicine lists three goals for drug and alcohol detoxification:
- (1) *To provide a safe withdrawal from the drug(s) of dependence and enable the patient to become drug-free.*
- (2) *To provide a withdrawal that is humane and thus protects the patient's dignity*
- (3) *To prepare the patient for ongoing treatment of his or her dependence on alcohol or other drugs*.

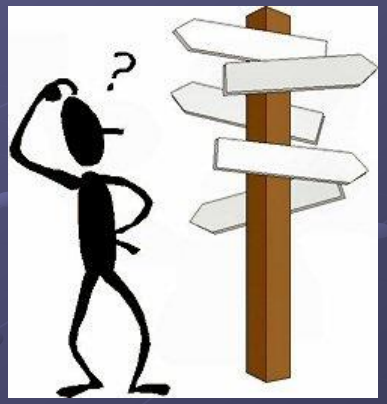
Treatment for Alcohol Withdrawal

- Medication that is cross tolerant with alcohol
- Rapid onset
- Long half life

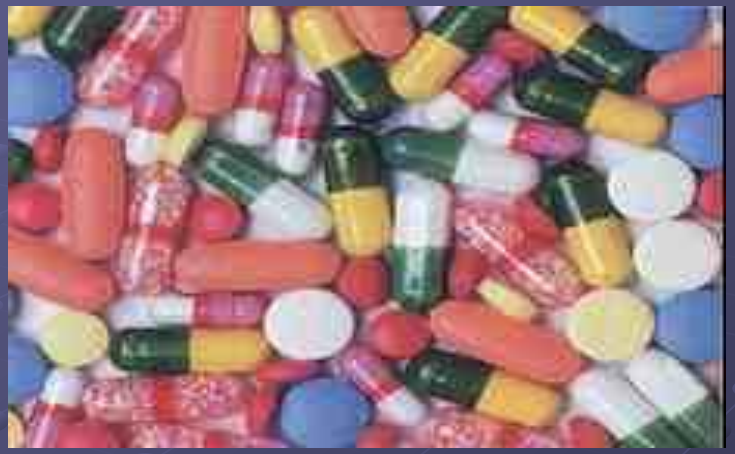
Benzodiazepines

Side effects

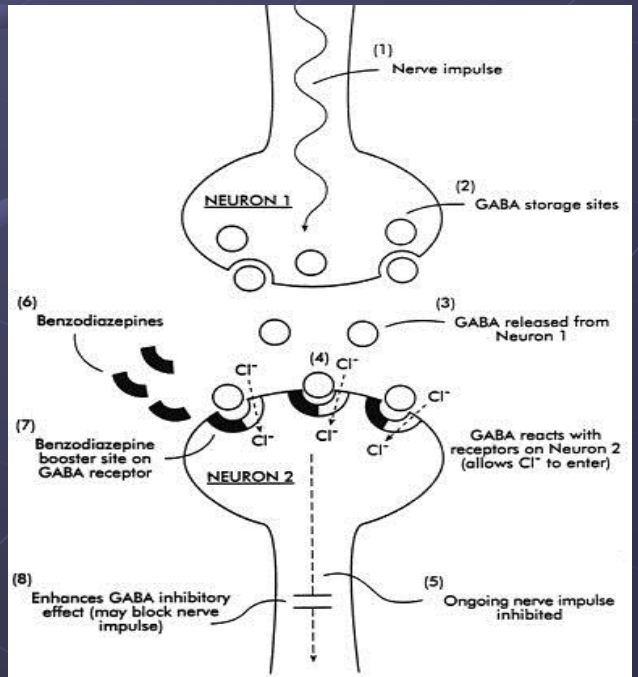
- Confusion
- Decreased level of consciousness
- Respiratory depression



Benzodiazepines



- First-line therapy
  - Reduce signs and symptoms of withdrawal
  - Significant reduction in seizures.
- Benzodiazepines enhance the effects of the neurotransmitter gamma aminobutyric acid which results in sedative, hypnotic, anxiolytic, anticonvulsant, muscle relaxant and amnesic



Benzodiazepines

- No particular agent proven better than others
- Often prefer agents with fast onset in acute setting
  - diazepam
  - lorazepam (preferred in hepatic dysfunction)
- Oxazepam, chlordiazepoxide and alprazolam also found to be effective
- Patients with severe withdrawal may require very large doses of benzodiazepines
  - Excessive sedation, increased rates of intubation
  - Some patients not controlled even at high doses (reports of >1000mg)

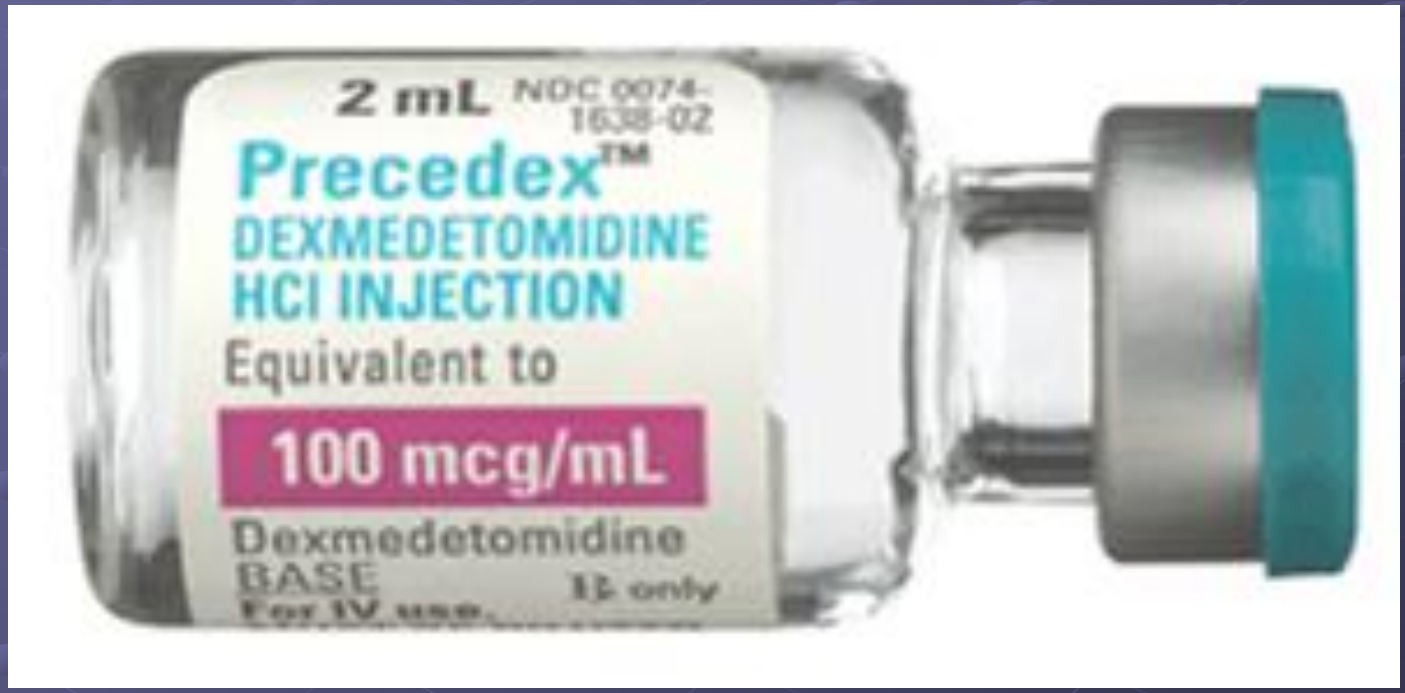
Benzodiazepines

- Diazepam (Valium)
  - Longer ½ life
  - Multiple metabolites
  - Metabolized in the liver
  - Propylene glycol diluent
- Lorazepam (Ativan)
  - No active metabolites
  - Preferred in liver disease

Many alternatives and adjunctive therapies have been studied

- Anticonvulsants
  - phenobarbitol
  - carbamazepine, oxcarbamazepine
  - valproic acid
  - phenytoin
  - topiramate
  - tiagabine
- GABA receptor agonists/antagonists
  - gabapentin
  - GHB
  - flumazenil
  - baclofen
  - ***propofol***
  - phenobarbitol
- Antipsychotics
  - olanzapine
  - promazine
  - chlorpromazine
  - ***haloperidol***
- Beta blockers
  - atenolol
  - propranolol
- clonidine
  - PO and transdermal
- ***ethanol***
  - ***IV and PO***
- magnesium
- ***dexmedetomidine***

Precedex
Dexmedetomidine



Precedex and Alcohol Withdrawal

1. Rovasalo A, Tohmo H, Aantaa R, Kettunen E, Palojoki R. Dexmedetomidine as an adjuvant in the treatment of alcohol withdrawal delirium: a case report. Gen Hosp Psychiatry 2006;28:362-3
2. Maccioli GA. Dexmedetomidine to facilitate drug withdrawal. Anesthesiology 2003;98: 575-7
3. Darrouj J, Puri N, Prince E, Lomonaco A, Spevetz A, Gerber D. Dexmedetomidine Infusion as Adjunctive Therapy to Benzodiazepines for Acute Alcohol Withdrawal. The Annals of Pharmacotherapy 2008:42:1703-5

Dexmedetomidine Precedex

- **Dexmedetomidine is a newer and potentially more specific/potent alpha-2 receptor agonist**
- Anxiolytic, analgesic, sedative, and sympatholytic characteristics
- No significant respiratory depression

Precedex Dosing

- Loading dose: 0.25 - 1 mcg/kg **over 10 minutes**.
  - Bradycardia, Hypertension, Hypotension
- Maintenance: 0.2 – 1.5 mcg/kg/HR

Fixed Schedule Therapy

- Medication given at a fixed interval (front loading)
- Helps to prevent at risk patient from going into withdrawal

Symptom Triggered Therapy

- Medications administered in response to signs and symptoms of alcohol withdrawal
- Less risk of over sedation or under treatment
- Less medication administered
- Shorter treatment time

Withdrawal Scales

- Total Severity Assessment and Selected Severity Assessment (Gross et al. 1973),
- Abstinence Symptom Evaluation Scale (Knott et al. 1981)
- Clinical Institute Withdrawal Assessment Scale [CIWA] (Shaw et al. 1981)

Clinical Institute Withdrawal Assessment of Alcohol (CIWA-A or CIWA-Ar)

- Rapid symptom severity assessment using 10 item scale
- An objective guide for medication administration
  - Medication typically withheld until score ≥ 10
  - Protocols may vary by institution

Sullivan et al. British Journal of Addiction 1989;84

Shaw et al. Journal of Clinical Psychopharmacology 1981

McKeon et al. J Neurol Neurosurg Psychiatry 2008;79

Kosten et al. NEJM 2003;348

Appendix. Clinical Institute Withdrawal Assessment for Alcohol.*

Category	Range of Scores	Examples
Agitation	0–7	0=normal activity 7=constantly thrashes about
Anxiety	0–7	0=no anxiety, at ease 7=acute panic states
Auditory disturbances	0–7	0=not present 7=continuous hallucinations
Clouding of sensorium	0–4	0=oriented, can do serial additions 4=disoriented as to place, person, or both
Headache	0–7	0=not present 7=extremely severe
Nausea or vomiting	0–7	0=no nausea, no vomiting 7=constant nausea, frequent dry heaves and vomiting
Paroxysmal sweats	0–7	0=no sweat visible 7=drenching sweats
Tactile disturbances	0–7	0=none 7=continuous hallucinations
Tremor	0–7	0=no tremor 7=severe, even with arms not extended
Visual disturbances	0–7	0=not present 7=continuous hallucinations

* The Clinical Institute Withdrawal Assessment for Alcohol measures 10 categories of symptoms, with a range of scores in each. The maximal score is 67. Minimal-to-mild withdrawal symptoms result in a total score below 8; moderate withdrawal symptoms (marked autonomic arousal), in a total score of 8 to 15; and severe withdrawal symptoms, in a total score of more than 15. High scores are predictive of seizures and delirium.

CIWA-AR

- 67 point scale
  - Minimal to mild withdrawal < 8
  - Moderate 8-15
  - Severe > 15
- High scores predictive of seizures and delirium
- Give medication until score < 10

Nausea and Vomiting: Ask, "Do you feel sick to your stomach? Have you vomited?" Observation:

0 No nausea and no vomiting
1 Mild nausea and no vomiting
2
3
4 Intermittent nausea with dry heaves
5
6
7 Constant nausea, frequent dry heaves and vomiting.

Tactile Disturbance: Ask, "Have you any itching, pins and needles sensations, any burning, any numbness, or do you feel bugs crawling under your skin?" Observation:

0 None
1 Very mild itching, pins and needles, burning or numbness
2 Mild itching, pins and needles, burning or numbness
3 Moderate itching, pins and needles, burning or numbness
4 Moderate severe hallucinations
5 Severe hallucinations
6 Extremely severe hallucinations
7 Continuous hallucinations

Tremor: Arms extended and fingers spread apart. Observation:

0 No tremor
1 Not visible but can be felt fingertip to fingertip
2
3
4 Moderate, with patient's arm extended
5
6
7 Severe, even with arms not extended

Auditory Disturbances: Ask, "Are you more aware of sounds around you? Are they harsh? Do they frighten you? Are you hearing anything that is disturbing to you? Are you hearing things you know are not there?" Observation:

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

Paroxysmal Sweats: Observation:

0 No sweat visible
1
2
3
4 Beads of sweat obvious on forehead
5
6
7 Drenching sweats

Visual Disturbances: Ask, "Does the light appear to be too bright? Is the color different? Does it hurt your eyes? Are you seeing anything that is disturbing to you? Are you seeing things you know are not there?" Observation:

0 Not present
1 Very mild sensitivity
2 Mild sensitivity
3 Moderate sensitivity
4 Moderately severe hallucinations
5 Severe hallucinations
6 Extremely severe hallucinations
7 Continuous hallucinations

Anxiety: Ask, "Do you feel nervous?" Observation:

0 No anxiety, at ease
1 Mildly anxious
2
3
4 Moderately anxious, or guarded, so anxiety is inferred
5
6
7 Equivalent to acute panic states, as seen in severe delirium or acute schizophrenic reactions

Headache, Fullness in Head: Ask, "Does your head feel different? Does it feel like there is a band around your head?" Do not rate dizziness or lightheadedness. Otherwise, rate severity.

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

Agitation: Observation

0 Normal activity
1 Somewhat more than normal activity
2
3
4 Moderately fidgety and restless
5
6
7 Paces back and forth during most of the interview, or constantly thrashes about

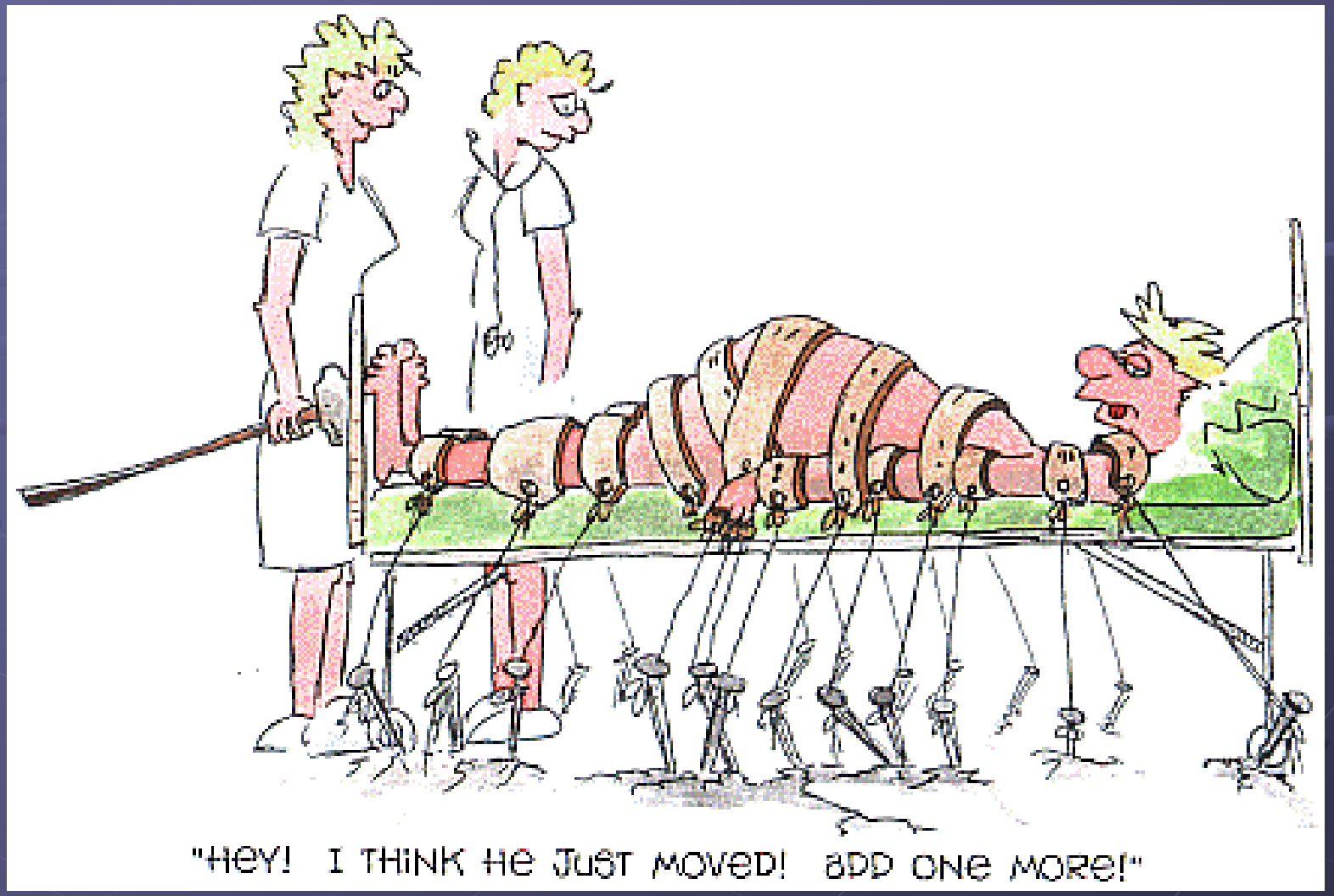
Orientation and Clouding of Sensorium: Ask, "What day is this? Where are you? Who am I?" Observation:

0 Oriented and can do serial additions
1 Cannot do serial additions or is uncertain about date
2 Disoriented for date by no more than 2 calendar days
3 Disoriented for date by more than 2 calendar days
4 Disoriented for place and/or person

Nursing Care

- Calm quite environment
- Orient / reorient to environment
- Nutrition / hydration / elimination
- Patent IV access
- Level of consciousness
- Monitor heart rate, blood pressure, respiratory rate, 02 sats

Restraints



Nursing Care

- Reposition as needed
- Assess for skin breakdown
- Elevate head of bed
- Frequent checks
- Replace electrolytes
- Monitor labs
- Seizure precautions

Screening

- CAGE
  - 4 questions
  - Reliable, valid, and practical
- Lab tests
  - Mean corpuscular volume (MCV)
  - Gamma-glutamyltransferase (GGT)
  - Carbohydrate-deficient transferrin (CDT)
- Likely to be abnormal with regular consumption of 6-8 ounces of alcohol a day

CAGE

- 1. Have you ever felt you should *cut* down on your drinking?
  - Yes
  - No
- 2. Have people *annoyed* you by criticizing your drinking?
  - Yes
  - No
- 3. Have you ever felt bad or *guilty* about your drinking?
  - Yes
  - No
- 4. Have you ever had a drink first thing in the morning to steady your nerves or get rid of a hangover (*eye*-opener)?
  - Yes
  - No

CAGE

- More than 2 positive responses strongly suggest alcohol dependence
- Recent guidelines suggest that if score>2 or score >1 and 1 lab is positive then patient should be considered alcohol dependent and at risk for alcohol withdrawal

11/30
2100

- 47 year old male history of alcohol use
- Transferred from outside hospital where he was being treated for alcohol withdrawal
- Over past 24-36 hours mental status worsened, increased confusion and agitation
- Last drink 3 -10 days ago
- A-fib esmolol started
- Thiamine 100mg IV given
- Mag. 1.6
- Phos 2.4
- K 4.2
- Placed on seizure precautions and CIWA-ar protocol

12/1

- Received > 300 mg valium in less than 24 hours
- Hallucinating about a one inch man running around the room
- Disoriented to time and place
- Agitated, pulling out IV access, crawling out of bed (restrained)

	12/1/09					
	0900	1000	1030	1200	1600	200
	CIWA Scale					
Nausea/vomiting	0	0	0	0	0	
Tremor	7	6	4	2	7	
Sweats	6	4	4	3	4	
Anxiety	7	5	4	2	6	
Agitation	7	6	4	2	6	
Tactile Disturbance	6	4	3	0	4	
Auditory Disturbances	4	4	3	0	3	
Visual Disturbances	7	4	0	0	4	
Headache	0	0	0	0	0	
Orientation	4	4	4	4	4	
CIWA Score	48	37	26	13	38	

12/2

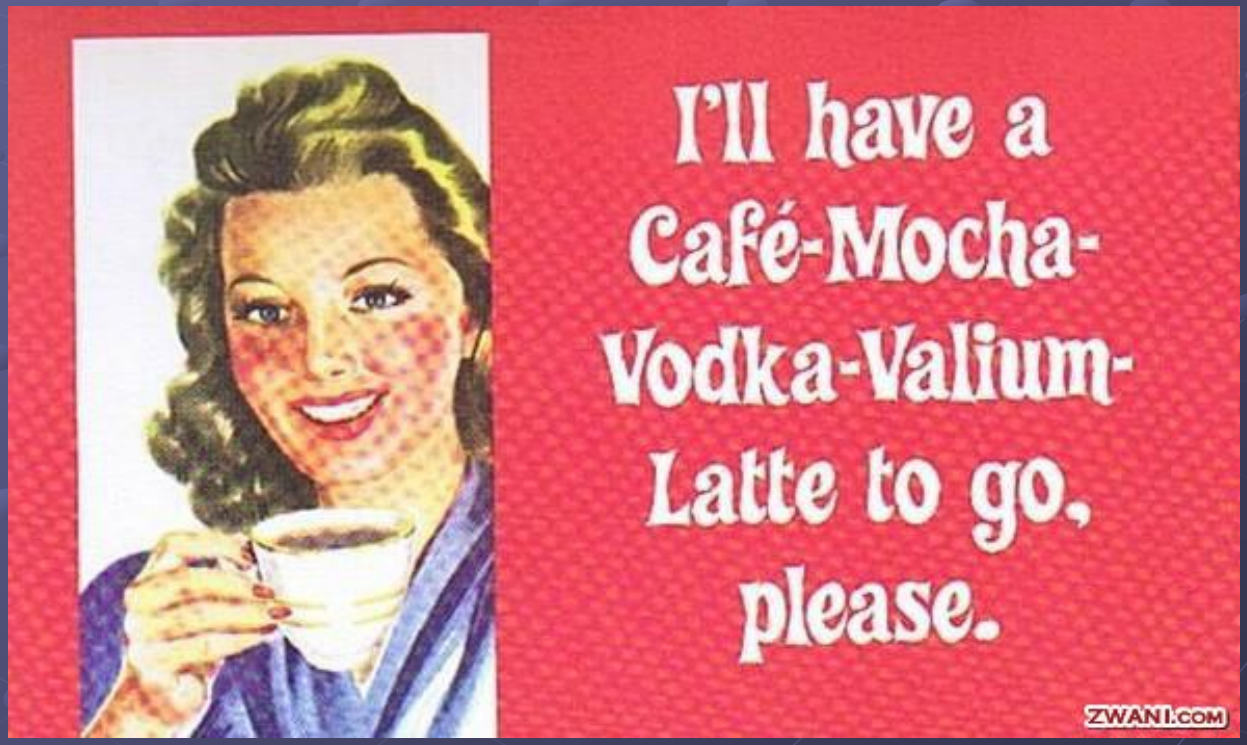
- Received > 300 mg intravenous valium
- Dexmedetomidine started and titrated to 1.2 mcg/kg/hr for 24 hours.
- Continued on Ciwa-ar protocol
- Received 40 mg of valium while on dexmedetomidine

12/3

- Dexmedetomidine stopped
- Esmolol stopped and placed on oral Beta-blocker
- Patient was transferred out of unit
- Continued on CIWA-ar scale
- Evaluated by Chemical Dependency
- Discharged home on 12/4
- Treatment to start on 12/ 5

Questions ?

- Tom.Scullard@hcmed.org



REFERENCES

AL-Sanouri, I, Dikin, M, Soubani, A. Critical Care Aspects of Alcohol Abuse Southern Medical Journal 2004; 98(3): 372-381

Bayard, M, MCintyre,J, Hill, K, Woodside, J. Alcohol Withdrawal Syndrome. American Family Physician. 2004:69;1443-50

Charness, E, M., Yuen,T, S. (2009). Wernicke's encephalopathy. UpToDate

Compton, P. Caring for an alcohol-dependent patient. Nursing 2006, 2002; 32(12) 58- 64.

Crumpler, J, Ross, A. Development of an Alcohol Withdrawal Protocol. Journal of Nursing Care Quality; 2005 20(4) 297-301

REFERENCES

Gold, S, M., Aronson, D, M. (2009). Screening for and diagnosis of alcohol problems. UpToDate

Guirguis, B, A., Kenna, A, G., Treatment considerations for alcohol withdrawal syndrome. (2005). U.S. Pharmacist.

Hoffman, R., Weinhouse, G., (2009). Management of moderate and severe alcohol withdrawal syndromes. UpToDate

Lukan, J., Reed, D., Looney, S,. Spain, D., Blondell, R. Risk factors for delirium tremens in trauma patients. (2002). The Journal of trauma: injury, infection and critical care, 53(5), 901-906.

Smith-Alnimer, M, Watford, M. American Journal of Nursing. 2004; 104(5) 72A-75G