SUBSTANCE USE DISORDERS

EMERGENCIES AND MANAGEMENT
Objectives

- Review importance of substance use disorders (SUDs)
- Identify emergencies related to SUDs
- Discuss general principles of management
- Discuss management of specific emergencies
A Few Statistics

- One million ER visits per year
  - Drug use primary problem
- 20-40% of hospital admissions
- 20% of primary care visits
- 50-75% of trauma visits
- Up to 200,000 deaths per year
- ~40% of suicides involve drugs/alcohol
- Economic cost in US - $130 billion
Comorbidity with Psychiatric Disorders

- Comorbidity is the rule (not the exception)
- Alcohol use disorders – 44%
- Drug use disorders – 64%
- Mental health diagnoses – 30% have alcohol/drug use disorder
- Investigate drug/alcohol use in all patients with mental health issues
Emergencies

- **Intoxication**
  - Alcohol, opioids, sedative/hypnotics, stimulants, others

- **Withdrawal**
  - Alcohol, sedative/hypnotics

- **Delirium, other cognitive disorders**

- **Psychosis**

- **Anxiety, depression**
General Principles of Management

- **Supportive care**
  - Airway
  - Breathing
  - Circulation
  - Evacuation of GI tract
  - Activated charcoal
  - Control life-threatening behavior

- **Specific treatments**
  - Antidotes
  - Treatment of withdrawal syndromes
  - Treatment of anxiety, psychosis
  - Other
Patient Evaluation

- History
- Vital signs
- Physical, neurological exams
- Diagnostic tests
  - Breathalyzer
  - Toxicology screens
  - EKG, CXR, CT scan as indicated
  - Other lab tests
Alcohol – Intoxication

- **20-100 mg/dl**
  - Changes in mood, behavior
  - Decreased fine motor control
- **100-200 mg/dl**
  - Lethargy, ataxia, labile mood
  - Poor judgment
- **200-300 mg/dl**
  - Lethargy, marked ataxia
  - Slurred speech, nausea/vomiting
- **300-400 mg/dl**
  - Severe dysarthria
  - Amnesia
  - Stupor, coma
- **Over 400 mg/dl**
  - Respiratory failure, coma, death
Alcohol - Intoxication

- One drink = 10-12 grams alcohol
  - Increases BAC 15-20 mg/dl
  - Metabolize about 15-20 mg/dl per hour
  - 12 oz beer
  - 5 oz glass of wine
  - 1.5 oz of 80 proof whiskey
  - Legal limit = 80-100 mg/dl
- Women
  - Higher BACs – same amount of ETOH
  - Less alcohol dehydrogenase in gastric mucosa
Management of Intoxication

- Diagnosis
  - History, physical
  - Blood alcohol

- Signs and symptoms
  - Depressed CNS functioning
  - Depressed respirations
  - Hypothermia

- Treatment – supportive
  - No alcohol antagonists
  - Lavage, charcoal – not helpful
  - A,B,Cs
  - Thiamine
  - Treat hypoglycemia
  - Evaluate for medical complications, mixed overdose
Alcohol - Withdrawal

- ~90% mild-moderate withdrawal

**Clinical features**
- Begins 6-24 hours after d/cing ETOH
- Duration: 2-7 days
- Autonomic hyperactivity
- Seizures
  - 8-24 hrs after last drink
- Delirium Tremens (DTs)
  - Severe autonomic hyperactivity
  - Global confusion, agitation
  - Visual hallucinations
Alcohol Withdrawal

- HALLUCINATIONS
- WITHDRAWAL SIGNS AND SYMPTOMS
- DELIRIUM TREMENS
- SEIZURES

Last drink
Management

- Mild withdrawal
  - Supportive nonpharmacologic care
    - Adequate nutrition, hydration, thiamine
- Moderate and severe withdrawal
  - Patient assessment
    - History, physical, vital signs
    - Evaluate other medical, psychiatric problems
    - Lab data - BAC, CBC, lytes, LFTs, UDS
    - Alcohol Withdrawal Severity Scales
      - CIWA
      - CIWA-Ar
Management

- Supportive care - reassurance, reality orientation
- Adequate nutrition, hydration
- Thiamine
- Pharmacologic Management
  - Benzodiazepines
  - Clonidine and beta-blockers ??
  - Anticonvulsants ??
Benzodiazepines

- Prevent seizures
- Effective for withdrawal symptoms
- Longer acting - (diazepam, chlordiazepoxide)
  - Smoother withdrawal course
  - Excessive sedation
- Shorter acting – (lorazepam, oxazepam)
  - Rapid onset of action
  - Abuse potential
- Considerations
  - Route
  - Age of patient
  - Renal, hepatic failure
- Dosing - symptom-triggered vs fixed dose
Alternative/adjunctive Agents

- Barbiturates – less effective
- Beta-blockers, clonidine
  - Treat autonomic hyperactivity
  - Do not prevent seizures, DTs
- Neuroleptic agents
  - Decrease hallucinations
  - Lower seizure threshold
- Alcohol – NO!
- Magnesium
  - No change in course of withdrawal
Anticonvulsants

- Phenytoin - not effective
  - Does not treat withdrawal
  - Does not prevent withdrawal seizures
- Carbamazepine, valproate, gabapentin
  - Effective for mild - moderate withdrawal
  - May prevent withdrawal seizures
  - May prevent DTs
  - Adjunct?
  - Helpful for “post-acute withdrawal”
Treatment of Delirium Tremens

- Supportive care – hospitalize!
- Observation, vital signs
- Manage fluids, electrolytes
- Thiamine, multivitamins
- Treat infection, bleeding, other medical problems
- Sedation
  - Benzodiazepines
    - Large doses of IV medication may be needed
Case #1

- 48 yo man found at bus stop – brought to ER by EMS
- Extremely tremulous, incoherent speech, ? hallucinating
- VS
  - BP:176/109; P=136; R=18; T=38.5
- Physical exam
  - Tachycardic; otherwise unremarkable
Differential Diagnosis

- Intoxication
  - Cocaine
  - Amphetamines
  - MDMA (Ecstasy)
  - PCP
- Withdrawal
  - Alcohol
  - Sedative hypnotics
    - Benzodiazepines
    - Barbiturates
  - Opioids
Opioids

- US - Nearly 1 million users of illicit opioids
- Derived from opium
- No nonaddictive opioid analgesics
- Abused opioids – mu agonists
- Similar symptoms
  - Intoxication
  - Withdrawal
Opioid Effects

- Analgesia
- Tranquility, decreased anxiety, euphoria
- Respiratory depression
- Suppression of cough reflex
- Miosis
- Decreased sympathetic activity
- Decreased activity of spinal reflexes
- Decreased GI motility
- Histamine release
- Nausea, vomiting
Toxicity

- Rarely seen with oral administration
- Acute overdose
  - CNS depression - stupor or coma
  - Respiratory depression
  - Miosis - pinpoint pupils
- Other
  - Pulmonary edema; endocarditis; HIV; HCV;
  - Adverse drug interactions
    - MAOI and meperidine – serotonin syndrome
  - Seizures - toxic metabolites
Management

- **Supportive care**
  - May need intubation, mechanical ventilation

- **Opioid antagonists**
  - Naloxone, nalmefene
    - Half-life of naloxone = one hour
    - May need continuous IV infusion

- **Assess and treat medical complications**
Withdrawal

- Rarely an emergency
- Complications in medically compromised patients
- Time course and severity differ among drugs
- Symptom severity
  - Drug used
  - Total daily amount
  - Duration of use
  - Anticipatory anxiety
Withdrawal

- **Intensity**
  - Duration of use
  - Amount of drug used

- **Onset and duration of withdrawal**
  - Rate drug is cleared from receptors
    - Heroin, morphine vs. methadone (brief vs. long)
    - Buprenorphine – mild withdrawal

- **Dysphoria, unstable mood may follow acute withdrawal**
Opioids

- Effects
  - Analgesia
  - Euphoria
  - Tranquility
  - Miosis
  - Decreased sympathetic activity
  - Decreased activity of spinal reflexes

- Withdrawal
  - Hyperalgesia
  - Dysphoria, irritability
  - Anxiety, restlessness
  - Dilated pupils
  - Hypertension, fever, tachycardia
  - Spinal reflex hyperactivity
Opioids

**Effects**
- ↓ GI motility
- ↓ cough reflex
- Respiratory depression
- Alteration in temperature regulation
- Histamine release
- Urinary retention

**Withdrawal**
- Nausea, vomiting, cramps, diarrhea
- Sleep disturbance
- Lacrimation
- Rhinorrhea
- Yawning
- Diaphoresis
- Muscle aches, bone pain
- Piloerection
Treatment

- Objective - make symptoms tolerable
- Medically compromised patient
  - Treat hypertension, tachycardia, hyperthermia
- Pharmacologic agents
  - Methadone
  - Clonidine
  - Buprenorphine
  - Other – tylenol, NSAIDs, muscle relaxers
Case #2

- 34 year old man found at bus stop unable to arouse brought in by EMS
- Vitals: BP 102/82  p88  RR 8  T 101
- Pupils are 2mm and sluggish
- Barely arousable to sternal rub, gag reflex absent
- Heart: RRR 2/6 diastolic murmur
- Lungs: Rales – left base
- Skin – multiple small abscesses on lower extremities
Stimulants

- **Cocaine**
  - Most common drug of abuse in ER visits
  - > 9 million people use cocaine + ETOH
  - Many unintentional deaths
  - ~25% of violent deaths
Cocaine

- Causes widespread neurotransmitter release
  - Dopamine
  - Epinephrine, norepinephrine
  - Serotonin

- Intoxication
  - Hypertension
  - Mydriasis
  - Diaphoresis
  - Hyperthermia
  - CNS activation -- agitation
Cocaine Intoxication

- Hypertensive crises
  - Myocardial ischemia/infarction
  - Aortic dissection
  - CVA, CNS hemorrhage
  - Local ischemic events
- Cardiac conduction abnormalities
- Acute pain syndromes
- Seizures
- Delirium – severe agitation, violence
- Severe hyperthermia
  - Dehydration – electrolyte abnormalities
  - Rhabdomyolysis – renal failure
Evaluation

- History
- Physical, neurological, mental status exams
- Vital signs
- Toxicology
- EKG
- CK – muscle, cardiac injury
- UA - myoglobin
- CBC, electrolytes, liver function tests, etc.
Management

- Supportive care
  - Airway
  - Maintain circulation – IV fluids
  - Control agitation
    - Benzodiazepines
    - Avoid antipsychotics
    - Minimize stimulation
    - Restrain if necessary
Treatment of Medical Complications

- Hyperthermia
  - Fluids, cooling measures

- Hypertension
  - Avoid beta-blockers
  - Phentolamine

- Rhabdomyolysis
  - Fluids
  - Monitor lytes, renal function

- Seizures
  - IV diazepam

- Appropriate treatment of other medical complications
Amphetamines

- Release of catecholamines
- CNS stimulation
  - Agitation
  - Violence
- Sympathetic hyperactivity
  - Hyperthermia
  - Hypertensive emergencies
  - Dysrhythmias
  - Myocardial ischemia
- Evaluation and management – similar to cocaine
Stimulants – Withdrawal States

- Symptoms – opposite of intoxication
  - Craving
  - Depression
  - Anorexia - then increased appetite
  - Insomnia – then increased sleep
  - Anhedonia
  - Anxiety
- Major concern – suicide
  - Admit, monitor closely
  - ? Role of medications

Major concern – suicide
Case #3

- 34 year old woman brought in by EMS for chest pain
- Vitals: BP 182/102  p120  RR 18  T 38
- Smells of alcohol
- Pupils are 7mm and reactive
- Speech is pressured
- Patient agitated, paranoid, but oriented
- Physical exam remarkable for tachycardia
- EKG shows ST elevations in anterior leads
Sedative/hypnotics

- Benzodiazepines
- Barbiturates
- GABA Agonists

Effects
- Reduce anxiety
- Sedation
- Increase seizure threshold

Not usually primary drugs of abuse
**Barbiturates**

- **Sedation**
  - Mild to coma, respiratory arrest
  - Mimics ETOH intoxication

- **Evaluation**
  - Rule out other causes
  - Vitals, careful patient exam
  - Blood levels, routine labs, EKG, X-Rays

- **Management**
  - Supportive care
  - Gastric lavage, charcoal
  - Alkalization of urine
Benzodiazepines

- Hepatic metabolism
- Rapidly absorbed orally
- Therapeutic uses
  - Sleep
  - Anticonvulsant
  - Treatment of withdrawal states
  - Treatment of anxiety disorders
  - Treatment of parasomnias
  - Treatment of catatonia and acute agitation
Adverse effects

- Impaired memory
- Ataxia, incoordination, falls
- Drowsiness
- Vertigo
- Impaired concentration
- Impaired visual/spatial ability
- Psychiatric effects – disinhibition, hostility, delirium, depression
Toxicity

- Generally not lethal
- Symptoms
  - CNS and respiratory depression
- Treatment
  - Maintain airway, ventilatory support if needed
  - Evacuate GI tract
  - Activated charcoal
  - Supportive care
  - Flumazenil
Withdrawal

- Signs and symptoms
  - CNS hyperactivity
  - Anxiety
  - Tremors
  - Insomnia
  - Seizures
  - Delirium
- Evaluation
  - History, physical, labs, toxicology
  - CXR, EKG
Management

- Tapering of benzodiazepine
  - By 5mg diazepam equivalents or 10% of total dose qweek or qowee
  - Final 20% of taper at half previous dose reduction over twice the interval
- Substitution and tapering
  - Substitute long-acting benzodiazepine or phenobarbital
Management of withdrawal

- Other agents
  - Carbamazepine
  - Valproate
  - Propranolol – not shown to be effective
  - Clonidine – not shown to be effective
  - Buspirone – not shown to be effective
Hallucinogens

- Old and large class of drugs-diverse group

- Definition(s)
  - Changes in thought, perception and mood dominate
  - Intellectual and memory impairment minimal
  - Stupor, narcosis, excessive stimulation not prominent effects
  - Minimal autonomic effects
LSD-like drugs

- Changes in thought, mood, perceptions
- No confusion, disorientation
- Minimal autonomic effects
  - Mild sympathomimetic effects
  - No nystagmus, ataxia, muscle rigidity
- Adverse reactions
  - Panic
  - Paranoid delusions
  - Agitation
  - Injury because of perceptual distortions
  - Psychosis, depression
  - Flashbacks
Management of Intoxication

- Supportive care
- Reassurance
- Prevention of injury
- Benzodiazepines for agitation
- Antipsychotics
- No abstinence syndrome has been described
PCP (Phencyclidine)

- Adverse reactions limit popularity
- Often a contaminant in other drugs
- Unpredictable effects, long clinical course
- Violence
- Multiple effects on CNS neurotransmitters
  - NMDA receptor antagonist
  - Affects mu and sigma opioid receptors
  - Blocks dopamine uptake
  - Inhibits serotonin uptake
PCP

- Behavior – bizarre, confused, violent
- Increased HR, BP, RR, temperature
- Ataxia, muscle rigidity
- Increased acetylcholine activity - sweating, flushing, drooling, pupillary constriction
- Incoordination, slurred speech, nystagmus
- Rhabdomyolysis
- Seizures
- Thought disorder, paranoia, delirium
- Respiratory depression, cardiac arrest
Management

- Supervise
- Protect from injury
- Supportive care
- Benzodiazepines for seizures
- Chemical sedation and restraint if necessary
- Treat hypertension
- Acidify urine
Club Drugs

- Used at raves, dance parties
- Other drugs and alcohol often used as well
- MDMA (Ecstasy)
- GHB
MDMA

- Methylenedioxy-methamphetamine
- Effects produced by flooding the brain with serotonin
  - Stimulates release of serotonin
  - Inhibits reuptake of serotonin
  - Depletes up to 80% of CNS serotonin
  - Inhibits synthesis of new serotonin
  - Rapid tolerance occurs (no serotonin left to release)
MDMA

- Increases sense of closeness with others
- Produces sense that all is right with the world
- Increase senses of touch, taste, smell, vision, proprioception and self-awareness
- Mild stimulant
MDMA

- Toxic effects
  - Delirium
  - Tachycardia, tachypnea, diaphoresis, hyperthermia
  - Acute renal failure, cardiovascular collapse
  - Disseminated intravascular coagulation, hepatic failure
  - Cerebral infarct or hemorrhage
  - Death
  - Toxic effects resemble serotonin syndrome
  - Risk increased in people lacking 2D6 or taking 2D6 inhibitors
MDMA

- Long term effects
  - Chronic mood instability
  - Cognitive impairment
  - Psychosis
  - Decreased CNS serotonin
  - Damage to serotonergic neurons

- Hepatotoxicity
  - Fulminant hepatic failure
  - Increased LFTs
MDMA

- Management of intoxication
  - Basic supportive care
  - Avoid neuroleptics and SSRIs
  - Benzodiazepines to treat agitation
  - No withdrawal syndrome has been reported
GHB- Gamma Hydroxybutyric Acid

- Overdose, withdrawal – may be life-threatening
- Naturally occurring neurotransmitter
- Use limited – causes seizures
- Therapy for narcolepsy – increases REM sleep
- Enhances effects of steroids and stimulates release of human growth hormone
GHB

- Studied for treatment of:
  - Alcohol dependence
  - Opiate withdrawal
  - Weight control
  - Neuroprotection in cerebral ischemia

- Partial GABA-B agonist
- No GABA-A activity
- Initial suppression of dopamine; subsequent dopamine release
- Increases CNS acetylcholine, serotonin, and GABA
GHB

- Toxic effects
  - Dizziness
  - Nausea, vomiting
  - Hallucinations
  - Seizures
  - Abnormal respirations
  - Coma, death
  - Explosive and violent behavior
GHB

- Acute intoxication
  - No antidotes are known
  - Protect airway
  - Supportive care, observation
  - Patients often recovery spontaneously in 6-12 hours
GHB

- Serious withdrawal reactions reported

- Treatment
  - Admit to ICU
  - Lorazepam drip – titrate to HR<90 and BP<140/90
  - Valproate ??
  - When stable switch to po benzodiazepine and taper slowly
Marijuana

- Adverse reactions rare
- Intoxication
  - Euphoria
  - Impaired motor performance
  - Impaired concentration
  - Visual distortions
  - Paranoia
- Overdose
  - Inhibition of vomiting