Cocaine and Heroin

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Cocaine

- Stimulant alkaloid derived from leaves of coca plant.
- Serotonin–Dopamine–Norepinephrine reuptake inhibitor (triple reuptake inhibitor TRI).
- Non-specific voltage gated sodium channel blocker = wide QRS = sudden cardiac death.
- Stimulates alpha 1 + 2, beta 1 + 2 adrenergic receptors via NE = vasoconstriction.
- Increases glutamate and aspartate, excitatory amino acids, in nucleus accumbens.

Cocaine

- Highest use is amongst 18-25 year olds.
- Don't be surprised by use in 45 to 65 year olds.
- ED visits tripled since 1988.
- Cost: Powder \$50/bag Rock: \$10-\$20
- Nasal use peaks in 30 minutes and has a 1-3 hour duration.
- IV and inhalation peak within 1-2 minutes and a 30 minute duration.

Routes of Administration









Crack Stems and Crack Pipes





A New Spin on Crack Cocaine + + + = =

Acute Intoxication

- <u>Desired Effects</u>: alertness, euphoria, increased energy, increased motor activity, egomania, enhanced sexuality and socialization.
- <u>Undesired Effects</u>: anxiety, hyperthermia, diaphoresis, paranoia, tachycardia, restlessness, bruxism, insomnia, hallucinations, delusions.
- <u>Potentially Fatal Effects</u>: arrhythmias, seizures, HTN, MI, stroke, heart failure, coma, SCD.

Cocaine Associated Chest Pain

- 40% of cocaine associated ED visits.
- 6% will have elevations of cardiac biomarkers.
- Sx: chest pain/tightness, SOB, & diaphoresis.
- Work Up: CMP, BUN & creatinine, CK, UA, UDS, EKG, CIPs and CXR
- Rx: benzodiazepines and NTG, ASA
- HTN Rx: phentolamine (alpha-adrenegic antagonist) 1-2.5mg IV q 5 to 15 minutes

Cocaine Induced HTN Crisis

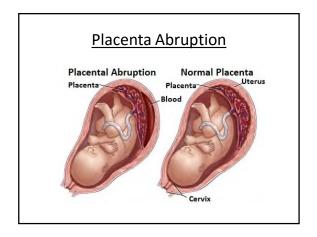
- Avoid beta-blockers = "unopposed alpha" causes extreme hypertension.
- Rx: Benzodiazepine of choice.
- Rx: Nitroglycerin SL → IV drip.
- Rx: phentolamine (alpha-adrenegic antagonist) 1-2.5mg IV q 5 to 15 minutes.
- Rx: nitroprusside (increases NO) can be used as well 0.25-0.3 mcg/kg/min IV → 3-4 mcg/kg/min average dose (max 10 mcg).

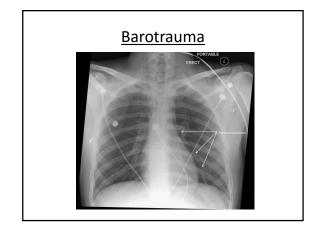
Cocaine Associated Conditions

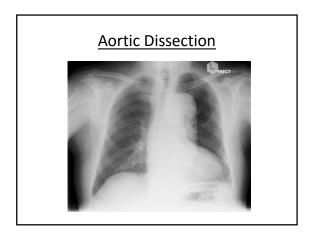
- Nosebleeds, "coke nose", septal perforation
- Rhabdomyolysis
- Placental Abruption
- Barotrauma
- Aortic Dissection
- Seizures
- End Organ Dysfunction
- "Crack Lung"
- Hypertensive Crisis
- Wide complex tachydysrhythmia and QRS prolongation
- Levamisole associated vasculitis and/or neutropenia

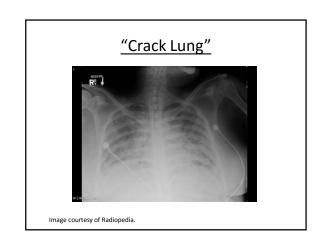
Septal Perforation

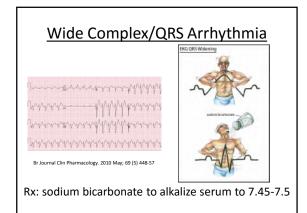


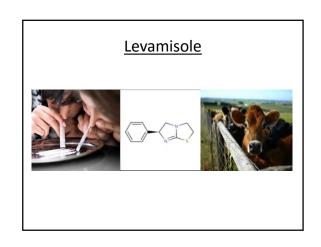








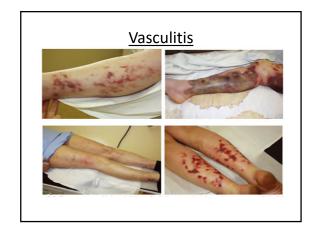




Levamisole

- Jannessen Pharmaceuticals 1966.
- Imidazothiazole drug.
- Immune Modulator and anti-helminthic
- 69-82% of US cocaine supply is cut with it.*
- Neutropenia, Agranulocytosis, Vasculitis.
- Effects are Reversible.
- Bulking Agent / Stimulant Effect / Purity Test (Purity Test = Think Melamine and Dog Food)

Lee, Ladizinski, et. al. Complications Associated With Use of Levamisole-Contaminated Cocaine: An Emerging Public Health Challenge. Mayo Clin Proc. 2012 Jun; 87(6): 581–586.



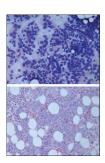




Typical Reticular Patterns Seen in Vasculitis from Levamisole cut Cocaine. Expect an extremely low WBC count and Neutrophil Count on CBC. Urine Drug Screen May/May Not Test Positive for Cocaine.

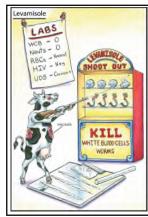


Agranulocytosis - Bone Marrow Slides



Normal Marrow

Neutropenic Marrow

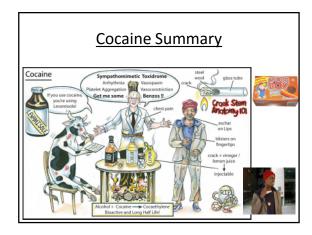


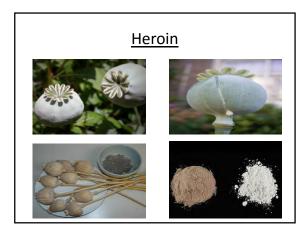
Levamisole

- De-worming agent
- In 75% of US cocaine
- Vasculitis
- Agranulocytosis
- 80% of US cocaine users will test positive

Cocaine Cutting Agents

- Benzocaine/lidocaine/procaine numbing
- Levamisole/tetramisole Purity testing, active itself?
- Caffeine stimulant
- Amphetamine stimulant
- Mephedrone stimulant "bath salt"
- Inert White Powders ASA, talc, etc.



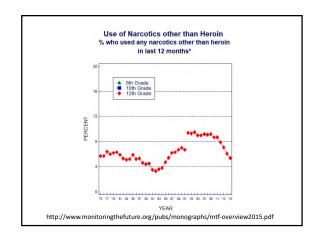


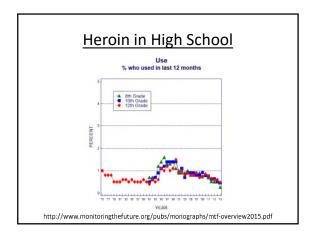












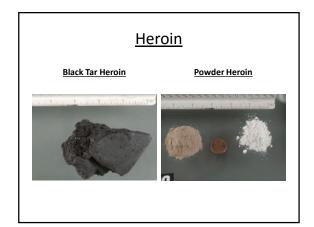
Heroin on the Rise

- 1990's Increased Purity
- Decreased Barrier to Entry
- 5th Vital Sign 1996 American Pain Society
- Oxycontin 1996 Purdue
- Prescription Drug Gateway 80%
- Prescription Drug Restrictions Coming Soon



<u>Heroin</u>

- Diacetylmorphine 2-4x as potent as morphine and more rapid onset of action.
- Produced by morphine, extracted from opium.
- Afghanistan and Mexico are leading producers.
- Mu opiate agonist
- Ingested: orally, nasally, IM, IV, vaporized.







Opiates and Heroin - Overdose

- Respiratory depression, AMS, miosis (not universal), orthostatic hypotension, histamine release, decreased GI motility and urinary retention.
- Can cause pulmonary infiltrates and ARDS.
- Treatment: naloxone 0.4mg 2 mg IVP up to 10 mg total. Onset 1-2 minutes with 20-60 minute duration. IV infusion of 2/3 the total reversal dose/hour.



Opiate Toxidrome

- Somnolence
- Miosis
- Bradypnea
- Hypo-active Bowels
- Hypotension

Opiates - Drug Seeking

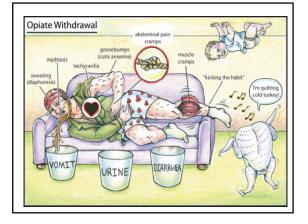
- Pain is the number one presenting symptom to the Emergency Department.
- Dental Pain, Back Pain, Medication Refill, Headache, Extremity Pain, Kidney Stone, Abdominal Pain...
- Common Techniques: meds stolen, brings outside MRIs and records, brings partner to confirm history, visiting from out of town, fictitious hematuria, refuses dental block, specific requests, allergic to all things but...

Opiates and Heroin - Withdrawal

- Opiate withdrawal is the source of such colloquialisms as "quitting cold turkey" and "kick the habit".
- Symptoms: anxiety, insomnia, yawning, lacrimation, diaphoresis, rhinorrhea, piloerection, mydriasis, diffuse myalgia, nausea, vomiting, diarrhea, hot and cold flashes, muscle fasciculations in legs and feet and abdominal cramping.
- Onset: within 8 hours and peaks in 48-72 hours.

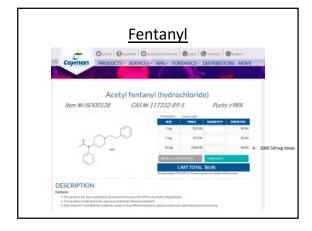
Opiates - Withdrawal Management

- Supportive: clonidine 0.1-0.2 mg po tid, ibuprofen, diphenhydramine, phenergan or promethazine, loperamide, ondansetron.
- Buprenorphine HCl/naloxone can be obtained both legally and illegally.
- Methadone Clinics.



Heroin Cutting Agents

- Fentanyl "Body Bag" brand in Philadelphia 2006 stronger and more potent = frequent OD
- Fentanyl cut heroin has returned across US 2014
- Strychnine
- Clenbuterol beta agonist/stimulant
- Caffeine causes vaporization at lower temp
- Chloroquine anti-malarial drug
- Acetaminophen bitter taste
- Lactose common in black tar heroin





Cotton Fever

- Post-injection fever onset within 20 minutes to several hours after IVDU.
- "Shooting the Cottons"
- T Max 101-104.5 F → Leukocytosis
- Headache, malaise, chills, rigors, nausea, myalgia, SOB, tachycardia, back and flank pain.
- Tx: Symptomatic, Blood cultures, observation, presume endocarditis until proven otherwise

Cotton Fever

- · Transient and self-limiting
- Blood cultures often negative.
- Etiology: pyrogenic reaction to cotton/heroin, transient bacteremia, multiple pulmonary micro-emboli, unknown mechanism.

Shragg, T. "Cotton Fever" in Narcotics Addicts, JACEP, 7:7 July 1978

Transient Limb Edema – Missed Vein



Transient Limb Edema

- Missed vein = no rush
- Acute localized edema = some wheal and flare
- All compartments soft, no erythema
- 50 mg IV Benadryl → resolved in 15 minutes
- No medical case reports
- Anecdotal reports on Opiophile.com

Non-Cardiac Pulmonary Edema



Non-Cardiac Pulmonary Edema

- Heroin OD → Narcan (naloxone)
- 0.8-2.4% of heroin overdoses develop NCPE
- Onset within 2-4 hours → resolves in 24 hours
- Dx: hypoxia <90% RA, RR >12, w/i 24 hour OD
- Sx: hypoxia, dyspnea, cough, frothy sputum

Non-Cardiac Pulmonary Edema

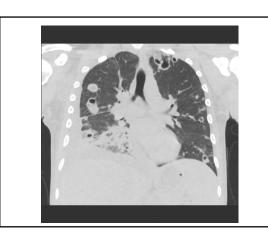
- Rx: oxygen, NIPPV, intubation (33%)
- Etiology: unknown. Hypoxia induced lung damage, anaphylaxis, <u>histamine surge</u>, neurogenic effects, humoral or immune complex response, depressed cardiac function?

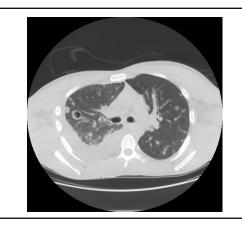
Sporer, K. Dorn, E. Heroin-Related Noncardiac Pulmonary Edema, Clinical Investigations in Critical Care, Chest, 120/5/November 2001

IV Drug User Case Report

- 31 y/o male IVDU "clean" x 2 weeks c/o fatigue and myalgia x 3 days.
- Pain in right shoulder and right great toe x 2 weeks.
- Denied: fever/chills, chest pain, cough, abdominal pain, N/V.
- T: 98.6, HR: 106, BP: 103/65, RR: 16
- PE: Ronchi RLL, mild BLE edema & erythema
- Labs: WBC 26k

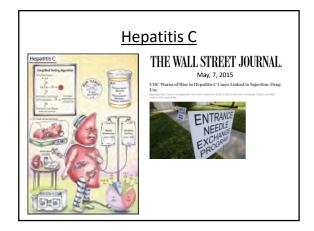






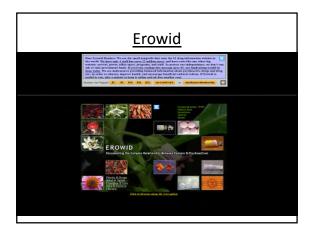
Follow Up

- Zosyn and Vancomycin
- Tricuspid valve endocarditis
- Septic emboli: lungs, knee, toe
- Right empyema chest tube
- VRSA treated with daptomycin
- 1 month inpatient IV Abx
- Deceased 8 months later florid sepsis, multisystem organ failure



Internet and Drug Abuse

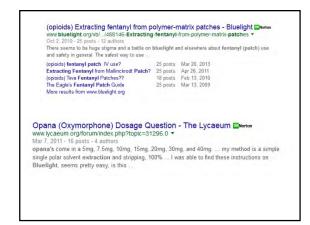
- Erowid.com user experiences
- StreetRx.com price shopping for schedule drugs
- Opiophile.com user forum on narcotic use and abuse
- BlueLight.com user forum/blog
- Dancesafe.org promotes safety and offers testing

















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