

Substance Abuse and the Kidney

- Substance Abuse Disorder
- Opioid Use Disorder
- Acute Opioid Intoxication in Adults
- Opioid Withdrawal
- Trends in Heroin Use in the US
- Renal Effects of Drug Abuse
- Chronic Nephropathies of Cocaine and Heroin Abuse

- Substance use disorder – A psychiatric diagnosis of substance dependence
- Physical dependence- A state of adaptation that is evidenced by a withdrawal syndrome when there is an abrupt cessation of a substance or tolerance (need for increasing doses) to a substance.
- Addiction-a neurobiologic disease with genetic, psychosocial and environmental factors characterized by impaired control over use despite harm. Accompanied by craving

Physical Findings of Substance Use Disorder

- Evidence of localized or systemic infections
- Enlarged or shrunken liver (alcohol/hepatitis)
- Skin or soft tissue abscesses often from MRSA
- Infective Endocarditis
- Increased risk of pneumonia and TB
- STD's
- Atrophy of the nasal septum
- Needle or track marks
- Weight loss/sleep disturbance
- (Depression)

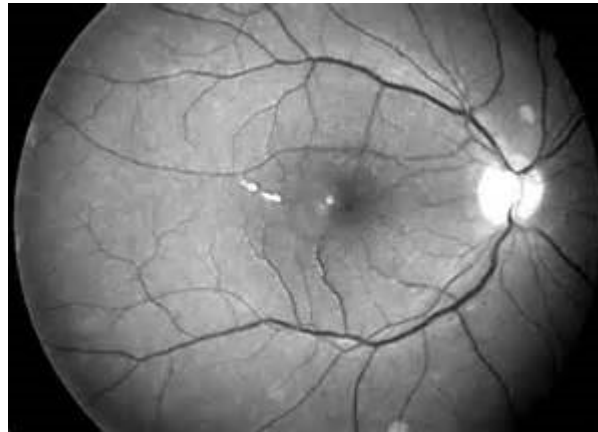
Opioid Use Disorder

- Misuse of prescribed, diverted opioid medications or illegal opioids i.e. heroin
- A chronic relapsing illness with high morbidity and mortality
- An OPIOID is a natural or synthetic substance that acts at one of the 3 main opioid receptors and can cause analgesia, CNS depression and euphoria

- Heroin is a derivative of morphine
- Opium is an extract from the opium poppy and includes morphine and codeine
- Endorphin- produced by the human body and causes pain relief
- Synthetic opioids include fentanyl, methadone
- Semi-synthetic opioids include oxycodone and hydrocodone

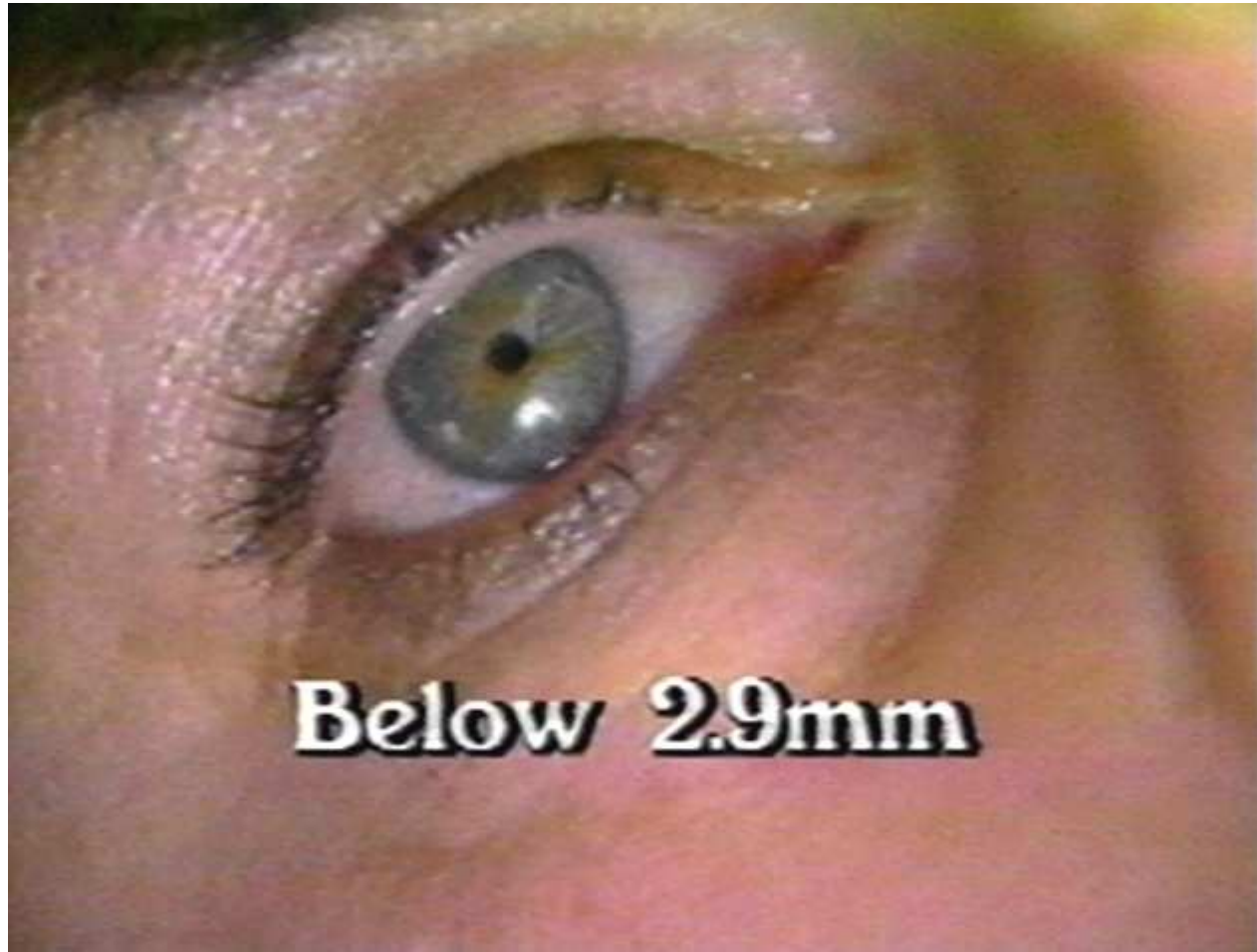
- Opium receptors are located in the nervous system
- Heroin has a $t_{1/2}$ of 30 minutes but a duration of action of 4-5 hours due to active metabolites including morphine.
- Health consequences include infections, pain, narcotic bowel syndrome, accidents, overdose and death

- Abscess from IVDA



Acute Opioid Intoxication

- Signs:
 - Depressed mental status
 - Decreased respiratory rate
 - Decreased tidal volume
 - Decreased bowel sounds
 - Constricted pupils
 - Hypotension from histamine release
 - Hypothermia



Below 2.9mm

- Can be caused by body packing (swallowing packets or containers of drug) or body stuffing (swallowing smaller quantity to avoid arrest)
- Can cause lung injury/ARDS
- Toxicity of adulterants like gasoline, lighter fluid, quinine, strychnine, scopolamine, clenbuterol

Opioid Withdrawal

- Signs
- GI distress – abdominal cramping, diarrhea, nausea or vomiting
- Flu-like symptoms – watery eyes, runny nose, sweating, shivering, goosebumps
- Sympathetic nerve and CNS arousal – constricted pupils, hypertension, tachycardia, anxiety, irritability, insomnia, agitation, restlessness, tremor and possible low grade fever and tactile sensitivity
- Yawning, sneezing, anorexia, dizziness, myalgias/arthralgias, leg cramps

Trends in Heroin Use in the US

- In 2013 169,000 individuals aged 12 or older used heroin for the first time (460/day)
- Same year – 6.9 million individuals aged 12 or older were classified as having a drug use disorder and 517,000 were dependent on heroin.
- This is higher than a decade ago
- There is a “changing face” of heroin. In the 1960’s users were mainly young men with a mean age of 16.5 years and first used heroin

Heroin



- More recent users are older at 22.9 years of age including men and women living in less urban areas who were introduced to opioids through prescription drugs.
- Whites and non-whites equally represented in the 1980's
- 90% of users in the last decade were white and selected heroin because it was more accessible and less expensive than prescription opioids.

- The US is experiencing an epidemic of drug overdose deaths.
- Since 2000 the rate of deaths from drug overdoses has increased 137% with a 200% increase in the rate of overdose deaths involving opioids.
- Between 2013 and 2014 the age-adjusted rate of death involving natural and semisynthetic opioid pain relievers, heroin and synthetic opioids increased 9%, 26% and 80%



- Black Tar Heroin



- More people died from drug overdose in the US in 2014 than during any previous year on record.
- Heroin overdoses more than tripled in 4 years
- The increased availability of heroin, combined with low price and high purity drives this trend

Renal Effects of Drug Abuse

- Heroin and renal disease first described in the 1970's
- Heroin has been associated with nephrotic syndrome, FSGS, MPGN, Interstitial Nephritis, amyloidosis, rhabdomyolysis
- Morphine may have direct effects on the glomerular cells and mesangial cells and scarring may occur as a result
- Because Heroin can cause so many different types of renal diseases it is more likely that it is not from direct effects but from other causes associated with the IVDA

- Cocaine activates the sympathetic nervous system and causes intense vasoconstriction.
- It can lead to stroke, MI, arterial dissection, thrombosis and rhabdomyolysis
- It has been associated with glomerular, tubular, vascular and interstitial injury as well as malignant hypertension

- Levamisole is a contaminant or adulterant in cocaine and can cause vasculitis and nephrotic syndrome





