Urine Drug Testing in Pain Management: A Patient Centered Approach

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Declaration of Potential Conflict of Interest

- The content of this presentation is noncommercial and does not represent any conflict of interest

Learning Objectives

- Describe a patient centered approach to urine drug testing (UDT)
- Explain the differences between the clinical vs workplace/forensic test pool
- Express the importance of “testing strategy” in the clinical use of UDT
- List common myths/misconceptions of urine drug testing analysis

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Why do we test?

- Forensics
- Treatment compliance/concurrent drug use
- Advocacy
  - With 3rd party, motivate/support behavioral change, identify abuse/addiction: Avoid “gotcha” syndrome
- Risk management

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Nonclinical vs Clinical Testing

- In nonclinical testing, the majority of donors are expected to be nonusers
  - Thresholds are set based on donor characteristics NOT lab capabilities
  - "-ve test results can harm the donor"
- In pain practices this is NOT the case
  - Majority of donors are user of common drugs of misuse
    - Difference is they're legitimately +ve

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What's worse than not doing UDT?

- Doing UDT inappropriately
  - Clinicians (and lab directors) must resist the urge to reach beyond the scientific AND clinical limits of the test
- Using 'clinical' test strategies for 'forensic' purposes
  - Agreeing to monitor for CPS/drug court
  - This is a dangerous practice

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When to Test

- Consider urine drug testing (UDT) in all patients
  - Especially those starting opioid therapy
  - When making major changes in therapy
  - In response to aberrant behavior
- Testing frequency
  - Low risk—initially and yearly if no problems?
  - High risk—weekly? Monthly if stable?
- Cheap, effective, and well tolerated by patients
  - Only patients 'philosophically opposed' to UDT are those patients with problems who don't want help

How to Test

- There is no 'right or wrong' way to test
  - Laboratory testing
  - Point-of-care ('test strips')
- Never do a test if you don't know how to interpret the results
  - You must have a testing strategy
  - Need an action plan to deal with results

Testing Strategies

- Routine vs random testing
  - Random more reliable, more complex
  - Routine easier to 'prepare' for
- Reliability
  - Witnessed require same-sex observers
  - Can use temperature strips
- How to use the results
  - Avoid "gotcha" syndrome

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Testing Techniques

- Presumptive
  - Immunoassay (EMIT)
- Definitive (identification)
  - GC/MS, LC/MS-MS, etc
- Point-of-care testing ('test strips')
  - Immunoassay

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Adulteration, Substitution, Volume Loading

- People do cheat!
- Witnessed vs unwitnessed collection
- Temperature monitoring
  - Min volume, time, within 1°C body temp
- pH, creatinine, “urine fingerprinting”
- Volume loading
  - Deliberately ingest H_2O to lower SG, Cr
    - Cr<1.8 mmol/L AND SG<1.003 = suspicion

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Drugs of Abuse

- NIDA-5 (aka “federal five”)
  - Cocaine
  - Opiates
  - THC
  - Amphetamines
  - PCP
- Benzodiazepines, barbiturates, methadone, etc

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Cocaine

- Screen for metabolite, benzoylecgonine (BEG) NOT cocaine parent
- Metabolite t ½ >> parent t ½
- H_2O soluble ∴ does not accumulate
- Detectable at 300ng/mL for 3-5 day
- Cocaine (parent) implies very recent drug use ie hours

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Opiates

- Really codeine/morphine
  - Cross reacts with many other opioids
- Threshold varies – DOT 2000 ng/mL; typically 300 ng/mL (total opioids)
- Heroin use confirmed by 6-AM (6-MAM)
  - t ½ short makes detection difficult
  - Never detect heroin parent*
  - Can't distinguish morphine from heroin/morphine/codeine metabolism

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Opioids 101

Natural	Semi-Synthetic	Synthetic
Codeine	Hydrocodone	*Meperidine*
Morphine	Hydromorphone Diacetyl Morphine	Fentanyl (Sufenta, Alfenta, Remifentanil)
Thebaine	Oxycodone, Oxymorphone, Buprenorphine. Naltrexone, Naloxone	Methadone, Propoxyphene

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THC

- Screen looks for all canabinoids
- Variable cut-offs (50ng/mL / 15ng/mL)
- Fat soluble
- GC/MS looks only at THC-COOH
- Infrequent users detect for <3d
- Frequent, heavy users >7d (20 ng/mL 77days positive)

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Amphetamines

- EMIT screens triggered with decongestants, antihistamines
- May react to MDMA (Ecstasy), MDA etc
- Many prescription and OTC drugs give false positive EMIT screens
- Cut-off 1000 ng/mL, confirms 500 ng/mL
- "Vicks Nasal Inhaler" dilemma (USA)
- Typically detectable for <3 d

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PCP

- Phencyclidine (also reacts with Ketamine)
- Low yield except with specific patient populations *in certain areas*
- Cut-off of 25 ng/mL
- Detectable for < 7 d

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Other Drugs

- Specific opioids
  - Hydromorphone—may need to ask lab for assistance
  - Oxycodone—needs specific assay
  - Hydrocodone
  - Buprenorphine (immunoassay)
  - Methadone/fentanyl do NOT yield +ve 'opiate' screens
- Benzodiazepines
  - Difficult to reliably detect, especially clonazepam even when abused—check with lab regarding sensitivity

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Poppy Seeds

- Poppy seeds don't give false positives
  - They lead to TRUE positives
  - Can exceed DOT cutoffs for several hours
  - May show both morphine and codeine
  - NEVER accounts for 6-MAM
- *People on UDT programs should not eat poppy seeds*

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Passive Marijuana

- 'Incidental' exposure does not lead to +ve UDT
- Depends on cut off concentration
- Can not easily distinguish prescribed oral THC from smoked marijuana
- Single use does not lead to persistent +ve results

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Passive Cocaine

- Nasal cocaine (cocaine HCl) can not be put in cigarette to give positive result
  - Crack cocaine can lead to positive result
- Cocaine base sublimates when heated ∴
  - Found on many surfaces where crack cocaine is used
  - $20 bills frequently test positive for cocaine
- Medical uses result in positive results
  - ENT, ophthalmology, plastic surgery

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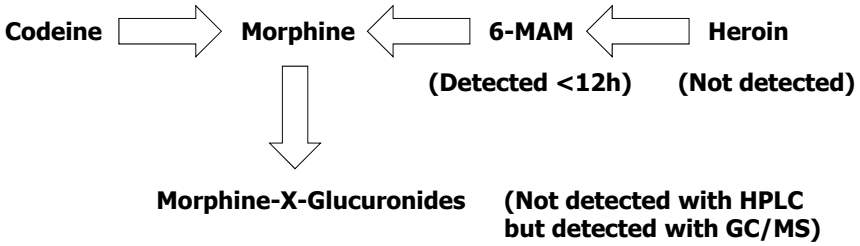
Opioid Metabolism



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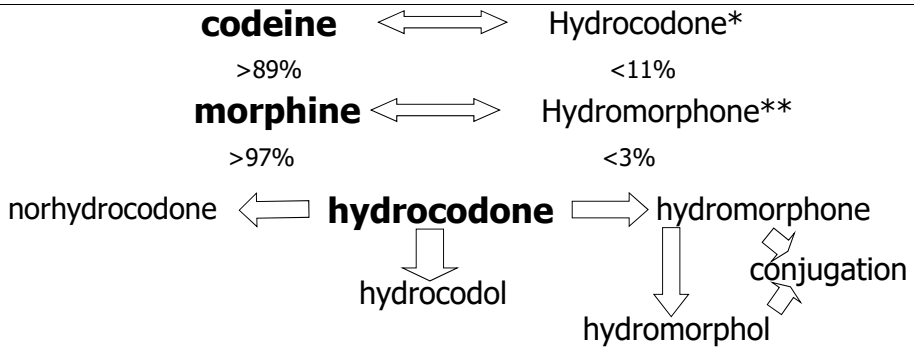
Drug Testing Traps



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* **Identification of Hydrocodone in Human Urine Following Controlled Codeine Administration, JM Oyler et al Journal of Analytical Toxicology 24(7) 2000 p530-535**

****Evidence of Morphine Metabolism to hydromorphone in pain patients chronically treated with morphine, E Cone et al, Journal of Analytical Toxicology 30(1) 2006 p1-5**

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Test Interpretation (GC/MS)

Test	Codeine	Morphine	6-MAM	Drug (s)
1		+		M/H>12h
2	+	+		C/M+C/H> 12h
3		+	+	H<12
4	+	+	+	H<12h

M = Morphine C = Codeine H = Heroin

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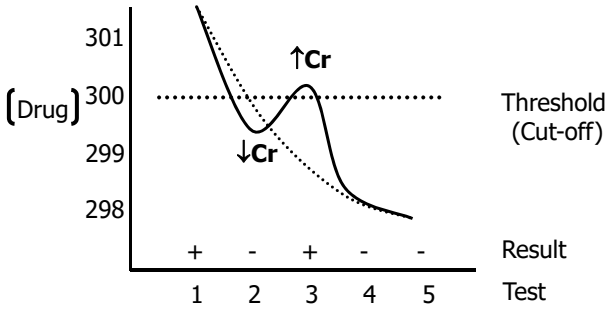
New Use? (Consider Creatinine)

Day 1	Day 2	Day 3	Day 4	Day 5
+	-	+	-	-



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What to do with unexpected results?

- First, call the lab
  - If unexpected +ve, check for legitimate reasons for true positives
    - ENT cocaine for epistaxis
    - Morphine in codeine user
    - Hydrocodone in codeine user (~11% or less)
  - If unexpected –ve, check for test sensitivity, subthreshold results, dilute sample, lab error
- Speak with patient
  - Ask about ALL drug use including OTC and time of last use
    - When truly negative, look for bingeing (ie, running out)
- Never ignore an aberrant result!

Test Interpretation Traps: Urinary Levels

- Urinary drug and drug metabolite excretion are a function of many factors which may not be static
  - Volumes of distribution, urinary pH, state of hydration, time of last dose, GI absorption effects etc
  - It is unwise to draw any conclusions based solely or largely on urinary analyte concentrations
  - Drug testing is the beginning not the end of discussion—use 'social engineering' to solve the problem

Using the Results: (it's all in the strategy)

- First, do the results "fit" ?
  - If yes, could they be 'hiding' an abnormal result? ie, +ve opiates / +ve bzd
    - Beware of the expected analyte
- Compliance testing
  - What does the –ve mean?
    - Have a diff Dx for the unexpected result
- Can you interpret the results?
  - Ask before collecting sample
    - New meds? New OTC drugs? Recreational use?

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Approaching the Patient

- "Offer" drug testing to the patient
  - Majority of patients will have no problems with UDT
    - If patient is 'philosophically opposed' to UDT, bodes poorly for this patient
    - Remind patient that this will severely limit the pharmacologic choices for treating their pain
  - Reassure the patient that UDT is part of a comprehensive risk management strategy

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Case Discussion

- Case I
  - "Opiate +ve, no opiate seen" with patient on Cipro
  - Is this a false positive d/t the antibiotic?
    - +/- sub threshold opioid use?
- Case II
  - "Cocaine +ve UDT in patient who recently had dental surgery"
    - Possible explanations?
- Case III
  - "Strongly +ve methadone parent, no EDDP seen"
    - Possible explanations?
- Case IV
  - "EDDP +ve, no parent seen"–possibilities?

Conclusions

- UDT, when done with respect and sensitivity can be an important part of a comprehensive care plan for all, not only high risk patients that
  - Reduces patient stigma
  - Improves patient care
  - And hopefully, reduces risk
- The clinical context is essential for proper UDT interpretation
  - Risk management is FOR the patient

Resources

- http://www.UDTmonograph6.com
  - For UDT monograph
- dgourlay@cogeco.ca

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