Welcome to the TEAMS/ECHO Pain Clinic

Agenda
12:15-12:20  Introductions
12:20-12:30  Pearl Presentation
   Tools for Effective Interpretations of Urine Drug Screens
   Jacqui Dages, PharmD
12:30-1:15  Case Presentation, Discussion & Recommendations
1:15-1:30  Open Q&A with Consultants

If your computer does not have a microphone and speakers, please also join by phone: dial 1-646-558-8656
Participant ID: Shown on your computer
Meeting ID: 513 378 3671

Press MUTE when you are not speaking to eliminate background noise!

Use the Chat Feature:
Enter your full name for attendance and ask questions throughout the clinic!

If you are in full-screen mode, hover your mouse towards the top of your screen—click ··· to access chat or change your settings
Project TEAMS CME Information
10/1/2015

Course Objectives
At the end of this course, participants should be able to:
1. Demonstrate greater comfort and self-efficacy when treating patients with chronic pain.
2. Acquire and utilize a larger variety of resources when treating patients with chronic pain.
3. Demonstrate greater knowledge and interest in improving care of patients with chronic pain.

Speaker Disclosures
In accordance with the ACCME Standards for Commercial Support of CME, the speakers for this course have been asked to disclose to participants the existence of any financial interest and/or relationship(s) (e.g., paid speaker, employee, paid consultant on a board and/or committee for a commercial company) that would potentially affect the objectivity of his/her presentation or whose products or services may be mentioned during their presentation. The following disclosures were made:

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Nancy Elder - No Relevant Relationships
Jill Boone - No Relevant Relationships
Susan McDonald - No Relevant Relationships
Barb Forney - No Relevant Relationships

Course Director/Speaker
Jacqui Dages - No Relevant Relationships

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Learner Assurance Statement
The University of Cincinnati is committed to resolving all conflicts of interest issues that could arise as a result of prospective faculty members’ significant relationships with drug or device manufacturer(s). The University of Cincinnati is committed to retaining only those speakers with financial interests that can be reconciled with the goals and educational integrity of the CME activity.

Accreditation Statement for Directly Provided Activity
The University of Cincinnati is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians. The University of Cincinnati designates this live activity for a maximum of 1 AMA PRA Category 1 Credit(s)™. Physicians should claim only the credits commensurate with the extent of their participation in the activity.

Disclaimer Statement
The opinions expressed during the live activity are those of the faculty and do not necessarily represent the views of the University of Cincinnati. The information is presented for the purpose of advancing the attendees’ professional development.
Tools for Effective Interpretation of Urine Drug Screens

Jacqui Dages, Pharm.D., BCPS

Nov 5 2015

Project ECHO - UC
Objectives

• Define different types of urine testing assays
• Understand basic metabolism of tested substances
• Identify potential false-positive and false-negative results
Why Test?

- Confirm medication adherence
- Identify misuse or addiction
- Urgent setting to determine possible presence of harmful substances

Frequency of testing should be determined by clinical judgment

Urine Characteristics

- Creatinine
  - >20 ng/mL
- pH
  - 4.5 – 8.0
- Temp
  - 90-100°F
- Specific Gravity
  - >1.003

Urine Drug Testing Methods

<table>
<thead>
<tr>
<th>Enzyme-Multiplied Immunoassay (EMIT)</th>
<th>Gas Chromatography-Mass Spectrometry (GC-MS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibodies to detect specific drugs or metabolites</td>
<td>Breaks down drug then identifies substances based on mass-to-charge ratio</td>
</tr>
<tr>
<td>Initial testing</td>
<td>Confirmatory testing</td>
</tr>
<tr>
<td>Qualitative</td>
<td>Quantitative</td>
</tr>
<tr>
<td>Rapid, inexpensive, widely available</td>
<td>Time consuming, expensive</td>
</tr>
<tr>
<td>High sensitivity, low specificity</td>
<td>High sensitivity AND specificity</td>
</tr>
</tbody>
</table>

Drug Detection Windows

1. Amphetamines
   - Up to 3 days
   - Single: 1-3 days
   - Chronic: Up to 30 days

2. THC
   - Hours
   - BEG: 2-4 days

3. Cocaine
   - Hours

4. Prescription Opiates
   - Codeine / Morphine: 2-3 days
   - Oxycodone: 2-4 days
   - Methadone: 3-6 days

5. Heroin
   - 40 minutes
   - 6-MAM: 4-12 hours

6. BZDs
   - Days to weeks

References:
• Immunoassay:
  – Very responsive to morphine and codeine
  – Lower sensitivity to semisynthetic and synthetic opioids

<table>
<thead>
<tr>
<th>From opium</th>
<th>• Opium, <strong>morphine</strong>, <strong>codeine</strong>, thebaine</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Semisynthetic</strong></td>
<td>• Heroin, hydrocodone, hydromorphone, oxycodone</td>
</tr>
<tr>
<td><strong>Synthetic</strong></td>
<td>• Methadone, propoxyphene, meperidine, fentanyl</td>
</tr>
</tbody>
</table>

Opioids

• Metabolism

[Diagram showing the metabolism of opioids, including Heroin, 6-MAM, Morphine, Hydromorphone, Codeine, and Hydrocodone.]

Opioids

- Metabolism

Opioids

• False-Negatives:
  – Ultra-rapid CYP2D6 metabolizers
  – Concomitant use of CYP2D6 inducers

• False-Positives:
  – Poppy seeds
  – Fluoroquinolone antibiotics
  – Rifampin
  – Diphenhydramine, doxylamine, chlorpromazine, clomipramine, quetiapine, thioridazine, verapamil (methadone only)
  – Trazodone (fentanyl only)

Benzodiazepines

- Metabolism

<table>
<thead>
<tr>
<th>Medication</th>
<th>Metabolites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alprazolam (Xanax)</td>
<td>Alpha-hydroxy-alprazolam</td>
</tr>
<tr>
<td>Chlordiazepoxide (Librium)</td>
<td>Nordiazepam, Oxazepam</td>
</tr>
<tr>
<td>Clonazepam (Klonopin)</td>
<td>Aminoclonazepam, Clonazepam</td>
</tr>
<tr>
<td>Diazepam (Valium)</td>
<td>Diazepam, Nordiazepam, Oxazepam, Temazepam</td>
</tr>
<tr>
<td>Lorazepam (Ativan)</td>
<td>Lorazepam</td>
</tr>
<tr>
<td>Oxazepam (Serax)</td>
<td>Oxazepam</td>
</tr>
<tr>
<td>Temazepam (Restoril)</td>
<td>Temazepam, Oxazepam</td>
</tr>
</tbody>
</table>

1. Physician’s Reference for Urine and Blood Drug Testing and Interpretation. AIT Laboratories. 08/19/2011
Benzodiazepines

- Immunoassay based on diazepam antibodies oxazepam and nordiazepam
- False-negatives:
  - Clonazepam
  - Lorazepam
- False-positives:
  - Oxaprozin
  - Sertraline

Marijuana

• High sensitivity and specificity
• False-positives:
  – Dronabinol
  – Efavirenz
  – PPIs (pantoprazole)
• False-negatives:
  – Adulterants (eg Visine eye drops)
• No false-positive from passive inhalation
• Hemp products’ THC concentration are usually low enough to prevent positive results

Cocaine

- Assess the presence of cocaine’s main metabolite benzoylcegonine (BEG)
- High predictive value
- Low cross-reactivity
- Potential positive:
  - Coca leaf teas
  - Exposure to cocaine smoke in heavily contaminated environments
  - Topical anesthetics containing cocaine

Amphetamines

- Highly cross-reactive
- False-Positives:
  - Amantadine
  - Benzphetamine
  - Bupropion
  - Chlorpromazine
  - Clofibenzorex
  - I-Deprenyl
  - Desipramine
  - Dextroamphetamine
  - Ephedrine
  - Fenproporex
  - Isomethetene
  - Isoxsuprine
  - Labetalol
  - MDMA
  - Methamphetamine
  - l-Methamphetamine (Vick’s inhaler)
  - Methylphenidate
  - Phentermine
  - Phenylephrine
  - Phenylpropanolamine
  - Promethazine
  - Pseudoephedrine
  - Ranitidine
  - Ritodrine
  - Selegiline
  - Thioridazine
  - Trazodone
  - Trimethobenzamide
  - Trimipramine

Precautions to Interpretation

• Metabolism is patient-specific
• Unable to determine appropriate use
  – Under- and over-users of prescribed therapy can produce same immunoassay result
• False-negatives
  – Adulterated, substituted, or diluted urine samples may result in inability to detect drug
• False-positives
  – Immunoassays are subject to cross-reactivity

# Test Your Skills

<table>
<thead>
<tr>
<th></th>
<th>Ref Range</th>
<th>6/9/15 2:30 PM</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BENZODIAZEPINES</strong></td>
<td></td>
<td>NOT PRESENT</td>
</tr>
<tr>
<td>Nordiazepam</td>
<td>ng/mL 10</td>
<td></td>
</tr>
<tr>
<td>Oxazepam</td>
<td>ng/mL 40</td>
<td></td>
</tr>
<tr>
<td>Temazepam</td>
<td>ng/mL 12</td>
<td></td>
</tr>
<tr>
<td><strong>CANNABINOIDS</strong></td>
<td></td>
<td>NOT PRESENT</td>
</tr>
<tr>
<td><strong>CNS STIMULANTS</strong></td>
<td></td>
<td>NOT PRESENT</td>
</tr>
<tr>
<td><strong>OPIOID ANALGESICS</strong></td>
<td></td>
<td>PRESENT</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>ng/mL 39</td>
<td></td>
</tr>
<tr>
<td>Oxymorphone</td>
<td>ng/mL 49</td>
<td></td>
</tr>
<tr>
<td><strong>OPIOID ANTAGONISTS</strong></td>
<td></td>
<td>NOT PRESENT</td>
</tr>
<tr>
<td><strong>SEDATIVES/MUSCLE</strong></td>
<td></td>
<td>NOT PRESENT</td>
</tr>
<tr>
<td><strong>RELAXANTS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TRICYCLIC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ANTIDEPRESSANTS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urine Creatinine</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>Nitrite</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>Glutaraldehyde</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>pH</td>
<td>4.0 - 10.0</td>
<td>7.0</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>1.005 - 1.015</td>
<td>1.009</td>
</tr>
<tr>
<td>Bleach</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>Pyridinium</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>Chlorochromate</td>
<td>Normal</td>
<td>Normal</td>
</tr>
</tbody>
</table>
Summary

• Immunoassays are quick screening tools to detect presence or absence of drugs
• GC-MS provides confirmation for presence of specific agents
• Results should always be interpreted with caution using knowledge of the sample, patient, medication properties, and interfering factors

Questions?

55 year old female

Background: 55 year old female with severe left knee pain secondary from osteoarthritis and meniscal tear.

Medical comorbidities include: Morbid Obesity (BMI 54), Diabetes mellitus type 2, Sleep apnea, Hypertension, Hypercholesterolemia, Hypothyroidism, Asthma, Previous NSTEMI Dec 2010, Anxiety & depression, ? peripheral neuropathy

Pain History: Left Knee pain secondary to osteoarthritis & meniscal tear. Short term relief obtained with corticosteroids and patient is requesting escalating oxycodone doses. Orthopedic opinion sought however patient weight needed to be < 300 lb before consideration of Total Knee Replacement.

Treatment/Medications: Current medications for pain is Oxycodone 5 mg BID. Not responsive to paracetamol, adverse effects with NSAIDs and Gabapentin

Key Questions:
1. What can I use for pain treatment & management (especially if patient cannot achieve weight goal for TKR)?
2. How do I manage patients’ request for increasing oxycodone doses for knee pain? (Patient’s current PEG score is 9).
Thank You!
TEAMS/ECHO Pain Clinic

Please look for an email with a link to a short survey!

You must complete this evaluation to receive your CME and UC Health Citizenship credits!

Next TEAMS/ECHO Pain Clinic:
Thurs. December 3 12:15-1:15 PM

Questions or comments?
Email: blockssn@uc.edu
Call: 513-558-5999