Drug Testing When Child Maltreatment Is Suspected

WI CAN Educational Series

Hillary W. Petska, MD, MPH
Child Advocacy and Protection Services
Children’s Hospital of Wisconsin

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Key Points

• Drug exposure negatively affects infants and children.

• Drug testing should be considered in cases of suspected child maltreatment.

• Drug testing has many limitations that complicate interpretation.
Epidemiology

- >500,000 kids/yr exposed to drugs
- >50,000 kids/yr treated in ED for drug exposures
- 400,000 infants/yr exposed prenatally:
  - Illegal drugs: 4.4%
  - Alcohol: 10.8%
  - Cigarette: 16.3%

Drug-Endangered Children

- 8.7 million children with a parent with a substance use disorder
- >270,000 children placed in foster care in 2016
- Infant born every 25 minutes with opioid withdrawal

Effects of Prenatal Drug Exposure

<table>
<thead>
<tr>
<th></th>
<th>Nicotine</th>
<th>Alcohol</th>
<th>Marijuana</th>
<th>Opiates</th>
<th>Cocaine</th>
<th>Methamphetamines</th>
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<tbody>
<tr>
<td>Growth</td>
<td>X</td>
<td>XX</td>
<td></td>
<td>X</td>
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<td>X</td>
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<tr>
<td>Anomalies</td>
<td>?</td>
<td>XX</td>
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<tr>
<td>Withdrawal</td>
<td></td>
<td></td>
<td>XX</td>
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<td>?</td>
<td></td>
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<tr>
<td>Neurobehavior</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Behavior</td>
<td>?</td>
<td>XX</td>
<td>?</td>
<td>X</td>
<td>?</td>
<td>?</td>
</tr>
<tr>
<td>Cognition</td>
<td>X</td>
<td>XX</td>
<td>?</td>
<td>X</td>
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<td>Language</td>
<td>X</td>
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<tr>
<td>Achievement</td>
<td>X</td>
<td>XX</td>
<td>?</td>
<td>?</td>
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<td>?</td>
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</table>
Risk of Harm

- Direct
  - Exposure to the substance
  - Exposure to hazards in the home
- Indirect
  - Poor supervision, neglect
  - Interpersonal violence

Effects on Parenting

- Physical/mental impairments
- ↓ response to child’s needs
- Difficulty controlling emotions
- ↓ parent-child attachment
- Spending money on alcohol/drugs instead of food/necessities
- Spending time seeking out, manufacturing, or using alcohol/drugs
- Incarceration
- Estrangement from family/social supports

Adverse Childhood Experiences

Caregiver with substance abuse disorder = ACE
- Mental health issues = ACE
- Child neglect and abuse = ACE
- Domestic violence = ACE
- Chaotic living environment (incarceration, unemployment, housing instability)
Adverse Childhood Experiences Study:
- Obesity, drug/alcohol abuse, smoking, depression, suicide, teen pregnancy, incarceration
- Diabetes, hypertension, heart disease, liver disease, cancer, stroke

Diabetes, hypertension, heart disease, liver disease, cancer, stroke

What is a drug?
- Illegal (amphetamine, cannabinoid, cocaine, opiates, PCP, benzodiazepines)
- Prescription
- OTC

How are drugs detected?
- Signs and symptoms
- History (self-report)
- Lab testing

Symptoms
- Altered mental status
- Unexplained irritability
- Unexplained seizures
- Syncope/arrhythmias

Known/suspected exposures
- Witnessed ingestion
- Suicide attempt
- Drug-endangered environment
- Toxidromes
Toxidromes

- Sympathomimetic (meth, amphetamines, cocaine, opiate withdrawal, PCP)
  - Hyperthermia (increased body temperature), tachycardia (increased heart rate), hypertension (increased blood pressure), mydriasis (dilation of the pupil), warm/moist skin, agitation
- Cholinergic (organophosphates, betel nut, VX, soman, sarin)
  - SLUDGE (Salivation, Lacrimation, Urinary incontinence, Diarrhea, Diaphoresis, GI upset/hyperactive bowel, Emesis)
- Anticholinergic (antihistamines, atropine, phenothiazines, TCA)
  - Hyperthermia, tachycardia, hypertension, hot/red/dry skin, mydriasis or unreactive pupils, urinary retention, absent bowel sounds
- Opioids (codeine, dextromethorphan, heroin)
  - Miosis (constriction of the pupil), respiratory depression, sedation

Drug Exposure in Child Maltreatment

- 1/3 – 2/3 of families involved with CPS have AODA issues

- Hayek 2009
  - 30% of pediatric patients with burn injuries due to child maltreatment also exposed to illicit drugs
- Yin 2010
  - 160 cases/year of “malicious” pharmaceutical exposure in children <7 y/o reported to US poison centers
- Oral 2011
  - 15% of allegedly maltreated children exposed to illicit drugs
Drug Screening Recommendations

• Before 2013: Screening based on risk factors
• 2013 – present: Screening of all young, physically abused children
• 2 urine drug screening panels available
  - ER drug panel
  - Comprehensive drug panel - RECOMMENDED

Comparison of Urine Drug Panels

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<tr>
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<th>Urine Drug Investigation</th>
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<tbody>
<tr>
<td>Substances Detected</td>
<td>6</td>
<td>&gt;140</td>
</tr>
<tr>
<td>Threshold</td>
<td>Workplace (high)</td>
<td>Workplace (low)</td>
</tr>
<tr>
<td>Amount of Urine</td>
<td>1 – 5 ml</td>
<td>1 – 6 ml</td>
</tr>
<tr>
<td>Time to Result</td>
<td>&lt;2 hours</td>
<td>3-5 days</td>
</tr>
<tr>
<td>Confirmation</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Methodology</td>
<td>Immunoassay</td>
<td>GC-MS or LC-tandem MS</td>
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<tr>
<td>Sensitivity and Specificity</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Charge</td>
<td>$900</td>
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Research Study

• Children ages 2 weeks < 5 years
  - Evaluated for PA by Child Advocacy between 2013-2017

Three groups:
• High concern for abuse
• Intermediate concern for abuse
• Low concern for abuse
Most common occult exposure = cocaine
Rosenberg – 460 children 1-60 months presenting to urban ED for routine complaints – 5.4% had cocaine metabolite in urine
Shannon – 1,120 children’s hospital patients with urine or blood specimens – 4.6% had cocaine or metabolite and 1.3% had ethanol, benzo or narcotic and cocaine
Lustbader – Using very sensitive testing, found 36.3% of infants presenting to ED for routine concerns were positive for cocaine

Most common exposures:
- Caffeine
  - Formula fed and not Rx, concerning for administration
  - May cause poor sleep, irritability, seizures
- Cotinine
  - Likely d/t secondhand smoke
  - Causes multiple short- and long-term health risks
Limitations
- Not all children were tested
- May have missed some drugs
- Unable to determine source/intent
- Did not examine outcomes or cost-benefit

Specimen Types
- Breath
- Blood
- Saliva
- Sweat
- Meconium
- Hair
- Urine

Blood Testing
- Detects alcohol or drug use within 2-12 hours
- Correlated with level of impairment
- Invasive, sample collection by trained personnel
Meconium Testing

- Detects drug exposure during the 2nd and 3rd trimester
- Cannot be used to determine timing or amount (self-report)
- Negative result ≠ drug-free pregnancy

Hair Testing

- Advantages:
  - Longer window of detection
    First 3 cm = 90 days
  - Non-invasive
  - Decreased risk of tampering
    Collection can be observed
    Easily stored/transported

- Disadvantages:
  - Not useful clinically d/t long window of detection
    Interpretation = Challenging
  - Positive:
    - Contact with drug smoke or the actual drug
    - Contact with sweat/sebum of a drug user
    - Accidental/intentional ingestion of the drug
    - Cannot differentiate who, where, when, why, or how/how much
  - Negative ≠ no exposure
  - Results may be affected by hair structure, growth rate, melanin content, hygiene, cosmetic treatment
  - May be misused in child protection cases
**Myths in Interpretation**

- Myth: Hair drug testing proves a child was exposed to meth in their home.
  - The child could have been exposed to:
    - Another environment in which meth was used/manufactured
    - A caregiver that used meth
    - In utero (< 1 yo)
  - The strongest evidence of exposure is meth in their home.
- What if hair is negative?

**Myths in Interpretation**

- Myth: Hair drug testing can determine whether a drug was ingested or just in the environment.
  - Washing – drug incorporation from the environment
  - “Cut-offs” = anecdotal, not evidence-based
  - “Environmental exposure will only generate a positive for the parent drug.” EXCEPT IF:
    - The exposure was from the sweat/sebum of a drug user
    - The drug contains a metabolite

**Urine Testing**

- Standardized
- Indicates systemic exposure
- Less invasive and longer window of detection than blood
- Most commonly used specimen in primary care
Qualitative Testing

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- **False +**
  - Test is positive for a drug that is not present
  - ER Drug Screen – structural cross-reactivity

- **False –**
  - Test is negative for a drug that is actually present
Negative Results

• Negative ≠ no exposure
• Substance not on the test panel
• Substance at levels too low to be detected
• Missed window of detection

Positive Results

• Must be interpreted in context of history
• Cannot differentiate appropriate use v. misuse or intent
• Young children more likely to be positive

Quantitative Testing

• Positive

  50 ng/mL cocaine

  OR

  • Large exposure days ago
  • Small exposure hours ago
Re-testing

• Previous exposure
  Provides no additional information
  • Positive = child still being exposed OR still positive from initial exposure
  • Negative = child not re-exposed OR child re-exposed but missed window of detection
  Should not be relied on for safety decisions

SAMHSA 2010

Passive Exposure

• Environmental
  Neglect
  • Illicit drug exposure during pregnancy or breastfeeding
  • Supervisory neglect
  • Drug-endangered environment
  Momentary lapse of supervision
  Breastmilk
  In utero

Farst 2012

Passive Exposure

• Environmental
  “Studies on room air concentrations of marijuana and cocaine indicate that low levels of passive exposure do not result in positive urine drug tests.”
  “Room air concentration required to detect drug exposure in the urine is high and results in noxious effects.”

Farst 2012
Passive Exposure

- Environmental
  - Neglect
  - Momentary lapse of supervision
- Breastmilk
  - Contraindicated for women with ongoing drug/alcohol use
  - Not contraindicated for women in methadone-maintenance programs
- In utero

Active Exposure

- Active exposure
  - Unintentional ingestion, inhalation, dermal absorption
  - Intentional administration

Conclusions

- Drugs are bad for kids.
- Not all drug tests are created equal.
- Know your test (or a medical professional who does)!
- Test results must be interpreted in the context of history.


References


Thank you to Dr. Lynn Sheets for additional slide content.