Designer Substances: Synthetic Cannabinoids and Cathinones - aka Spice/K2 and Bath Salts

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Clinical Scientist Healthcare Services
Aegis Sciences Corporation
Objectives

• Discuss the pharmacology of synthetic cannabinoids and synthetic cathinones

• Discuss the physiologic effects of these substances

• Review statistics/prevalence
Synthetic Cannabinoids (Spice)
“Synthetic Marijuana”

Cannabicyclohexanol

JWH-018

JWH-073

Tetrahydrocannabinol (THC)

HU-210
Synthetic Cannabinoids

• Spice, K2, Black Mamba, etc

• Recap:
  – Similar effects to marijuana
  – Does not test positive (screen or confirm) for carboxy-THC

• March 2011: DEA put a 1.5 year ban on these substances
  – DEA Schedule I
  – JWH-018, JWH-073, JWH-200, CP-47,497, cannabicyclohexanol
K2/Spice

- Structurally diverse class of compounds
- Synthetic and bind to cannabinoid receptors in the body (stronger affinity than THC)
- These compounds do not contain cannabis
- Psychoactive compounds have a higher potency than THC (at least 5 times greater)
- JWH-018: made for experimental purposes by Clemson University Researcher John W. Huffman, PhD in the 1990’s
SPICE
POTPOURRI
Best in town
1 gram 2 grams 3 grams AVAILABLE
NOT FIT FOR HUMAN OR ANIMAL CONSUMPTION
18 years + to purchase ID REQUIRED
Effects of K2/Spice

• Risk of overdose—due to variability in dose and # of chemicals
• Nausea/vomiting
• Depressed respiration
• Altered mental status
• Unconsciousness
• Tremors/seizures
• Variable duration
Effects of K2/Spice

- Increased heart rate (120-150)
- Anxiety attacks/agitation
- HIGH blood pressure
- Disorientation
- Hallucinations and paranoia
  - Suicidal thoughts and actions
Geographical Regions

- National Forensic Laboratory Information System (NFLIS)
  - 50% Midwest
  - 38% South
  - 9% Western US
  - 3% Northeast

Figure 1. Synthetic cannabinoid reports in NFLIS, by State, 2010
SynCan Prevalence

• American Association of Poison Control Centers
  • 6,890 calls in 2011 (2,915 in 2010)
  – Monitoring the Future Survey (2011)
    • 1 in every 9 high school seniors (11.4%) has used in prior 12 months
  – U.S. Military positive tests
    • 45 of 86 airmen in USAF
    • 164 of 242 in U.S. Army
    • 113 of 183 Navy/Marines

Past-Year Use of Illicit Drugs by High School Seniors (percent)

- Marijuana/Hashish: 36.4%
- Synthetic Marijuana: 11.4%
- MDMA (Ecstasy): 5.3%
- Hallucinogens: 5.2%
- Cocaine: 2.9%

SOURCE: University of Michigan, 2011 Monitoring the Future Study
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Toxicological Findings

- 5 metabolites each from JWH-018, JWH-073
  - Pentanoic Acid-JWH-018
  - 5-OH-Pentyl-JWH-018
  - 6-OH-Indole-JWH-018
  - 5-OH-Indole-JWH-018
  - 7-OH-Indole-JWH-018
  - Butanoic Acid-JWH-073
  - 4-OH-Butyl-JWH-073
  - 6-OH-Indole-JWH-073
  - 5-OH-Indole-JWH-073
  - 7-OH-Indole-JWH-073
Synthetic Cathinones (Bath Salts)
Bath Salts

- Synthetic cathinones
- Potent stimulant effect
  - Similar to MDMA (ecstasy), cocaine, meth
- DEA Schedule I – October 21, 2011
  - Mephedrone
  - MDPV (3,4-methylenedioxypyrovalerone)
  - Methylone
- Fake cocaine, White Blizzard, Ivory Wave, Vanilla Sky, plant food, “legal cocaine”
Bath Salts

• Common Ingredients:
  – Mephedrone, MDPV

• Others
  – Pyrovalerone
  – Butylone
  – Dimethylcathinone
  – Ethcathinone
  – Ethylone
  – 3- and 4-fluoromethcathinone
  – Methedrone
  – Methylone

Mephedrone

MDMA (Ecstasy)
Clinical Presentation

• Excellent oral absorption
  – Onset of effects within 1.5 hours
  – Peak effects at 3-4 hours; usually lasts ~ 6-8 hours

• Treating Intoxication
  – Often requires ICU care/monitoring
  – Other psychoactive substances used in cutting these which confounds clinical symptoms
  – Restraints sometimes necessary to prevent harm

Clinical Presentation

• Patients present with extreme sympathetic stimulation and profoundly altered mental status

• Treatment primarily supportive
  – IV benzodiazepines for sedation and/or controlling seizures
  – IV fluids, particularly if rhabdomyolysis is suspected
Effects

- Alertness, euphoria
- Chest pains
- Hypertension
- Sweating
- Increased heart rate
- Seizures

- Agitation
- Hallucinations
- Extreme paranoia
- Delusions
- Psychosis with repeated use
- Death
Supplied

• Different routes
  – Snorting
  – Smoking
  – Injection
  – Oral

• Sold in 50-500 mg packages
  – $25-50 per 50 mg
  – Typical doses 5-30 mg
  – Overdose common with instructions to escalate to 50 mg
Prevalence

• High prevalence among youth

• Poison Control calls
  – 303 in 2010
  – 3,497 for first 6 months of 2011

• NFLIS - 2010
  – 67% South
  – 25% Midwest
  – 16% Northeast
  – 2% West
Challenges with these Synthetic Compounds

- Timing of effects are unpredictable
  - Confounded by multiple compounds found in each package
  - Variability of dosages found (even for the same brands of compounds)
  - Period of detection unknown
    - One compound vs. multiple
    - Frequency of use could play a role in variability
    - Metabolic factors could also affect detection
    - Not detected using drug screens
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Woman Loses Arm After 'Bath Salts' Injection

34-year-old woman experiments at party, nearly loses her life

By Patrick Hickey Jr. | Monday, Jan 16, 2012 | Updated 12:59 AM CST

Man commits suicide after using "bath salt"

Bremen, Ind.
The family of Denny Kurzhal, 36, blames "bath salt" for causing the psychotic episode when he committed suicide.

Posted: 11:59 PM Jun 8, 2011
Reporter: Brandon Lewis

Police: Woman on bath salts injures child

Hallucinates, carries children across I-24

Web Editor - Jay Marchmon
Story Created: Mar 1, 2011 at 10:09 AM CST
(Story Updated: Mar 1, 2011 at 10:37 AM CST)

CALVERT CITY, Ky. - Kentucky State Police are investigating an incident from Monday night on Interstate 24 in Marshall County: a woman stopped her car and carried her children across the interstate while hallucinating from synthetic cocaine.

Illegal 'Bath Salts' Still Being Sold at Local Smoke Shops

Health officials say 'bath salts' are powerful synthetic stimulants.

VIDEO: Watch Cher Calvin's Report

It's now not legal, you know.
Questions?