A Snapshot of Synthetic Substances: Nursing Implications for Patients Suspected of Psychoactive Drug Use

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Learning Objectives

► Define what are synthetic substances and their mechanism of action.
  ◆ Specifically focusing on synthetic cannabinoids

► Interpret psychological and physiological clinical presentation of patients after use of synthetic substances.
Complexity of the Problem

Teen Dies In Coma After Smoking Synthetic Marijuana

The parents of 13-year-old Connor Eckhardt hope to warn others about the dangers of synthetic pot.

Last month, a 19-year-old teen in California slipped into a coma and passed away after smoking synthetic marijuana, and now his parents want to warn others in order to prevent similar deaths in the future.

On July 11, Connor Eckhardt smoked synthetic weed with his friends. Soon after smoking the drug, he fell into a coma with brain swelling. "In a moment of peer pressure, he gave into that thing that was OK, it was something new, and one fall later, he passed to sleep and never woke up," said Connor's father, Dave Eckhardt.

Family warns teens to steer clear of synthetic drug Spice as they mourn dead son

The synthetic cannabinoid is said to be behind the death of a teenager in Alaska, who used the drug minutes before his death. Manufacturers of Spice frequently change its composition, which is illegal, and the drug is marketed as a form of medicinal marijuana.

What have been your experiences?
Exemplar Case

- Within 15 minutes she told her boyfriend she had a “migraine” & went to lie down.
- After only a short period, she appeared to be in a “psychotic state”, urinating on herself, running herself into walls, hallucinating, & violent behavior.
- Police were called she was taken to local ED and placed into an induced coma & spent 4 days in the ICU

- The doctors determined she had a severe cerebral stroke with associated vasculitis.
  - ICP was 28 mm HG
  - Sent to OR for EVD to relieve pressure on her brain
- Jan. 2013, was removed from the ventilator and feeding tube removed (expected to pass w/in 30 minutes)
- Patient survived!
- Currently, is blind, bound to a wheelchair, with permanent brain damage.

~http://ireport.cnn.com/docs/DOC-895582
Psychoactive Substances

Different chemicals, but patient presentation similar

- Present to the ED primarily with manifestations of:
  - Severe agitation and paranoia
  - Tachycardia & palpitations
  - Negative toxicology screen
  - No other pathology to describe signs and symptoms

What are Synthetic Cannabinoids?

- Herbal “incense” products sprayed with synthetically produced cannabinoids
  - Chemicals (of unknown composition or amount) sprayed on plant materials or unknown content
  - Chemicals that mimic the actions or have a similar structure to delta-9-tetrahydrocannabinol (Δ9-THC)
  - Effects “supposed to be” similar to the psychoactive properties of marijuana or delta-9-tetrahydrocannabinol (Δ9-THC)
  - “Catchy” names and “attractive” labeling
Mechanism of Action: Endocannabinoid System

Mode of action

CB1 receptors mainly localized in the brain (hippocampus, cerebellum and cerebrum)

CB2 receptors mainly situated in the periphery (spleen, tonsils and immune cells)

Image courtesy of Elsevier and Technische Universität München

http://info.biotech-calendar.com/bid/86353/NH-Funded-Bioscience-Research-Shows-Cannabinoids-Slow-AIDS-Progress
Who are primary users?

- The use of synthetic cannabinoids dropped from the 2012 level of 11.3% among 12th graders.
- A majority of teen users of SCs also use regular THC.

Incidence of Use
Legal Implications

- Federal Analog Act (1986)
  - Comprehensive Drug Abuse Prevention & Control Act (1970)
  - 15 cannabimimetic agents (CB1 receptor agonist) became Schedule I substances
- 2013 Drug Enforcement Administration (DEA) temporarily banned 3 additional substances (UR-144, XLR-11, AKB48)
- Feb., 2014 DEA temporarily banned another 4 substances after 221 individuals became ill in Colorado over a month period in summer of 2013
  - Isolated substances (ADBICA & ADB-PINACA)
Toxicology

- Synthetic Cannabinoids not detected on regular toxicology screen
  - JWH-018/073 first to be tested in 2010
  - Forensic testing
  - Point of care testing now available
  - Primarily for JWH-018/073

Clinical Manifestations

**Psychological**
- Delusions
- Hallucinations
- Anxiety**
- Paranoia**
- Agitation
- Seizures
- Dystonia
- Tremors

**Physiological**
- Nausea
- Vomiting
- Palpitations**
- Tachycardia**
- Diaphoresis
- Dyspnea

**Most pronounced manifestations**
Significant Effects

- Stroke
- Renal failure
- Death

Case Study 1-paranoia

- June, 2011, 19-year-old Male, smoked “iAroma” purchased at a tobacco shop in the mall.
- He arrived home and after his friend left he phoned his brother and said, “I smoked that legal stuff and I’m freaking out.”
- 30-minutes later he got into his car and drove through town at speeds between 80-100 mph.
- When the road came to the end......he never braked.
Case Study 1 cont.

- His car went 80 feet through the air & landed in a house and he was pronounced dead at the scene.
- He had NEVER used illicit drugs or smoked synthetic cannabinoids before!

~http://www.tothemaximus.org/

Case Study 2 - psychosis

- 26 year old male, post-graduate student with no prior mental health history except for ADHD.
- Smoked “Black Diamond” and moments afterwards he became paranoid with delusions. He felt “his hands were going to harm him”
- He placed both hands on the stove (turned on) and as he stated he “attempted to burn them off to get the devil out of him”
- Upon arrival of emergency and fire personnel it took 6 fire fighters and a taser to get him to release his hands from the stove.

Management

- Very difficult to get a detailed history from patient
  - Important to try to determine time, route, & intent of use (recreational vs. suicidal)
  - Prior mental health history
  - Prior substance abuse history
- You may need to elicit the history from family or friends, however, you may not be able to obtain this information and will need to rely on physiological and psychological manifestations.
Management

- No antidote!
- Supportive Management
  - Airway, breathing, circulation
  - Monitor vital signs, ECG, labs to assess acid/base balance & renal function (urine toxicology screen maybe unhelpful)
- Benzodiazepines for severe anxiety—first line agent
- IV fluids if dehydration or hyperthermia present
- If hyperthermic (poorer outcomes—MODS) may need cooling blanket to decrease risk of rhabdomyolysis
- Decontamination—not effective
- Psychological….referral to therapy or mental health assessment

Management

- Patient & Parental education
  - Synthetic cannabinoids (like all synthetics) have many different names
    - Labeled as potpourri, incense, or tobacco
  - SCs are dangerous, much more so than THC
    - Each individual responds differently each time used
  - SCs are easy to find and purchase
    - Internet, gas stations, or head shops
  - May not show up on regular toxicology screening
Summary

- Despite widespread media coverage, many healthcare providers remain unfamiliar with synthetic drugs such as synthetic cannabinoids (Spice) or cathinones (bath salts).
- Research is needed to better understand the side effects and long-term consequences associated with the use of synthetics.
- Increase availability of toxicological identification of substances is needed along with blanket legislation to curtail creation and distribution of changing synthetic analogues.

Questions

- Thank you for your time and attention
- Spread the word and be alert!
  - “The newest compounds on the street are chemically different than the first generation compounds. They are potent, impairing, and addictive!!”
    - B. Logan
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  - margiestone@hotmail.com
References


- [http://www.samhsa.gov/data/DAWN.aspx](http://www.samhsa.gov/data/DAWN.aspx)

- NMS Labs. [www.nmslabs.com](http://www.nmslabs.com)


- Detailed reference list upon request