A Characterization of Synthetic Cannabinoid Exposures Reported to the National Poison Data System in 2010

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Study objective: Δ-9-Tetrahydrocannabinol homologs have been increasingly abused since their introduction in 2004. Such products were used as a "legal high" for those wishing to experience cannabinoid effects while evading basic drugs-of-abuse testing. We describe a series of exposures to products marketed as synthetic cannabinoids to better characterize the clinical effects in these patients.

Methods: All Δ-9-tetrahydrocannabinol homolog exposures reported to the National Poison Data System between January 1, 2010, and October 1, 2010, were extracted with National Poison Data System generic codes and product codes for Δ-9-tetrahydrocannabinol homologs. Only cases involving a single-agent exposure to Δ-9-tetrahydrocannabinol homologs as the major category were analyzed. Descriptive statistics were generated for demographic data, management site, products involved, symptoms, duration of effects, treatments, and severity of clinical effects.

Results: During the 9-month study period, there were 1,898 exposures to Δ-9-tetrahydrocannabinol homologs; 1,353 of these cases were single-agent exposures. The mean age was 22.5 years (SD 8.86 years). Most cases were reported in men (n=1,005; 74.3%). The majority of exposures were acute (88.2%; n=1,193). The most common clinical effect was tachycardia (37.7%; n=510). Seizures were reported in 52 patients (3.8%). The majority of clinical effects lasted for fewer than 8 hours (n=711; 78.4%) and resulted in 1,011 non–life-threatening clinical effects (92.9%). The most common therapeutic intervention was intravenous fluids (n=343; 25.3%). There was 1 death (0.1%).

Conclusion: The majority of cases were in young men intentionally abusing spice. Most exposures resulted in non–life-threatening effects not requiring treatment, although a minority of exposures resulted in more severe effects, including seizures. [Ann Emerg Med. 2012;60:435-438.]

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INTRODUCTION

Synthetic cannabinoid products, commonly referred to as "spice" or "K2," are increasingly being abused. Since 2004, when synthetic cannabinoid products first became available, they have become popular with those seeking a "legal high." Though these products usually contain the synthetic cannabinoid JWH-018 as the active ingredient, many different blends of cannabinomimetic agents continue to be identified.[1] To our knowledge, there are no commercially available routine urine drug screens that detect synthetic cannabinoids.[2] In November 2010, the US Drug Enforcement Administration temporarily made JWH-018, JWH-073, JWH-200, CP-47, CP-497, and cannabicyclohexanol schedule I substances.[3] Despite this new scheduling category, synthetic cannabinoids still continue to be sold at "head shops" and gas stations and on the Internet. Given that synthetic cannabinoids act at the CB1 and CB2 receptors, a number of sources have described the effects of these products as similar to that of marijuana.[3,4] However, many users report unexpected effects such as irritability, racing thoughts, palpitations, anxiety, paranoia, and psychosis.[5] Despite these drugs' widespread use, no systematic studies have characterized the manifestations of synthetic cannabinoid intoxication. Therefore, we conducted a retrospective review to describe the reported clinical effects associated with exposure to products marketed as synthetic cannabinoids as reported to US poison centers.

Editor's Capsule Summary

What is already known on this topic

There is increasing awareness of toxicity related to the recreational use of synthetic cannabinoids.

What question this study addressed

The current study reviewed cases involving exposure to synthetic cannabinoids reported to the National Poison Data System during a 9-month period to characterize clinical effects and outcomes.

What this study adds to our knowledge

The majority of clinical effects were self-limited and mild. However, nearly 4% of patients developed seizures, although this number is likely highly inflated because of selection bias.

How this is relevant to clinical practice

Management of synthetic cannabinoid exposures is primarily supportive.

MATERIALS AND METHODS

Data collected during calls to US poison centers are submitted to the National Poison Data System and are available for analysis. This was a retrospective review of US Δ-9-tetrahydrocannabinol homolog exposures reported to the National Poison Data System. Our local institutional review board approved this study and waived informed consent.

All National Poison Data System cases reporting human Δ-9-tetrahydrocannabinol homolog exposure between January 1, 2010, and October 31, 2010, were identified with the National Poison Data System generic codes 0077900, 0077980, 0083000, 0200617, and 0201099 and the Poisindex ID codes for Δ-9-tetrahydrocannabinol homolog products 6540838, 6891158, 7034616, 7034640, 7038486, 7038494, 7038502, 7038551, and 7040415. Inclusion of the Poisindex ID codes allowed for capture of cases coded under the specific Δ-9-tetrahydrocannabinol homolog product name rather than the generic codes. Only single-agent exposures with these codes as the major category of exposure were extracted.

Data Collection and Processing

Patient demographic data, location of exposure, route of exposure, reason for exposure, management site, the most common symptoms, duration of symptoms, the most common treatments, and outcomes were extracted from the National Poison Data System data set. Route of exposure, reason for exposure, management site, symptoms, duration of symptoms, and treatments are predefined fields within National Poison Data System data (http://www.aapcc.org). Only symptomatic patients were included; the severity of the clinical effects was assigned by the specialist in poison information managing the case when follow-up was complete. Detailed definitions for National Poison Data System data fields are available online at http://www.aapcc.org. Cases in which Δ-9-tetrahydrocannabinol homologs were coded as not responsible for the clinical effects, no symptoms recorded from exposure, or cases were unable to be followed were excluded from subsequent analysis. These cases were excluded to focus on clinically significant exposures and to minimize misclassification bias.

Table 1. Most common single-agent synthetic cannabinoid products.

Product Name	N=1,353 (%)
Δ-9-Tetrahydrocannabinol homolog	816 (60)
K2	452 (33)
Spice gold	31 (2)
JWH-018	23 (1.7)
Spice diamond	14 (1)
Spice arctic synergy	11 (0.8)
Spice silver	4 (0.3)
JWH-073	1 (0.07)
Spice Egypt	1 (0.07)

Primary Data Analysis

Demographic data were summarized with descriptive statistics. The National Poison Data System collects clinical effect duration as ranges of time. The ranges were recoded as fewer than 8 hours, 8 to 24 hours, and more than 24 hours. Data were analyzed with Mac JMP 9.0 (SAS, Cary, NC).

RESULTS

There were 1,898 exposures to synthetic cannabinoids products reported to the National Poison Data System between January 1, 2010, and October 1, 2010; 1,353 were single-agent exposures. The majority were coded as Δ-9-tetrahydrocannabinol homologs (n=816; 60%) (Table 1). The median age of reported exposure was 20 years (interquartile range 17, 25 years), and 74% (N=1,005) of the patients were men. The majority of exposures (N=1,193; 88.2%) were acute. Forty-four of the exposures were chronic (3.25%), 43 were acute on chronic (3%), and 73 were unknown (5%). The reason for exposure was coded as intentional abuse or misuse in 93.3% of the cases (N=1,262).

Most of the patients with major clinical effects were men (79.4%) who reported intentional abuse (91.1%). Only 7.3% of symptomatic exposures were coded by a poison center specialist as potentially life threatening. The remainder (92.9%) was associated with non–life-threatening effects. Tachycardia (N=541; 40%), hypertension (N=110; 8.1%), chest pain (N=64; 4.7%), syncope (N=29; 2.1%), hypotension (N=18; 1.3%), and bradycardia (N=17; 1.3%) were the most frequently reported cardiovascular effects (Table 2). Reported central nervous system effects included agitation/irritability (N=317; 23.4%), drowsiness/lethargy (N=183; 13.5%) confusion (N=164; 12%), hallucinations or delusions (N=127; 9.4%), dizziness (N=99; 7.3%), and respiratory depression