

Changing Characteristics of Synthetic Cannabinoid Toxicity: a Retrospective Study of U.S. National Poison Center Data - 2010 to 2015

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Background: In 2015, a surge in synthetic cannabinoid (SC) exposure was reported in the U.S. Anecdotal reports suggested that the clinical characteristics of SC intoxication in 2015 were different compared to that of earlier experiences. Currently there is limited epidemiologic data describing the trend of clinical effects and medical outcomes as novel SC compounds have been introduced.

Objectives: To evaluate the characteristics of clinical effects and outcomes from SC exposure in the U.S. from 2010 to 2015.

Methods: A retrospective review of SC exposures reported to U.S. poison centers from January 1, 2010 to December 31, 2015 was performed using data from the National Poison Data System. The primary outcome was the change in cardiovascular and CNS effects related to SC exposure. Secondary outcomes included therapeutic interventions, patient disposition, and clinical outcome. Chi-square test was used to detect differences in frequencies of clinical effects and Bonferroni correction was applied for multiple comparisons.

Results: A total of 23,822 SC cases were identified with peak number of cases in 2011 (n=6305) and 2015 (n=6745). 6,745 (28.3%) of these occurred in the year 2015 alone representing a 225% increase from 2014. Statistically significant ($p < 0.0001$) changes were found in the frequencies of bradycardia (0.81% vs. 5.78%), hypotension (1.74% vs. 8.55%), and tachycardia (40.98% vs. 26.89%) from 2011 to 2015. During the same period, coma (1.35% vs. 6.38%) and drowsiness/lethargy (18.83% vs. 30.48%) also increased. Clinical effects duration increased, specifically 8–24 hours and 1–3 day categories, by 13.6% and 8.9% respectively ($p < 0.001$). Major effect increased from 3.06% to 10.59% and a larger proportion of SC cases were admitted to critical care units (9.5% vs. 19.6%) between 2011 and 2015.

Discussion: Our results suggest that the spectrum of clinical characteristics of SC exposure changed significantly during the study period. This trend may be associated with the introduction of novel SC compounds and continue to evolve as new SCs are introduced. Increasing incidence of CNS and cardiovascular depression in patients with SC toxicity was identified.

Conclusion: Significant changes in the clinical characteristics and medical outcomes from SC exposure were identified from 2010 to 2015.