

## Introduction

- Synthetic cannabinoid receptor agonists (SCRAs) are heterogeneous compounds developed as probes of the endogenous cannabinoid system<sup>1</sup>
- SCRAs are potential therapeutic agents that clandestine laboratories synthesize and market as abusable designer drugs<sup>2</sup>
- We assessed the clinical toxicity associated with recent SCRA use in a large cohort of drug overdose patients<sup>3</sup>

## Objectives

- In order to characterize toxicity associated with use of SCRAs, we analyzed a large cohort of patients who presented to an urban university hospital ED after recent SCRA use
- We hypothesized significant associations with agitation and cardiotoxicity when compared to "traditional" marijuana

## Methods

- Study Design:** Subgroup analysis of a large drug overdose cohort study between 2009-13
- Patients:** Consecutive ED patients with exposure to SCRAs (SRCA subgroup) were compared with patients who smoked regular marijuana (MJ subgroup)
- Setting:** Two large urban teaching hospitals that prospectively collected OD data between 2009-13
- Data:** Clinical characteristics gathered as part of routine clinical care included demographics, exposure details, vital signs, mental status, and basic chemistries.

## Background SCRA Epidemiology (from Monitoring the Future Study, 2014)

### Trends in Prevalence of K2/Spice (Synthetic Cannabinoid Receptor Agonist): 8th, 10th, 12th Graders; 2014 (in percent)\*

Drug	Time Period	8th Graders	10th Graders	12th Graders
K2/Spice	Past Year	3.30	[5.40]	[5.80]

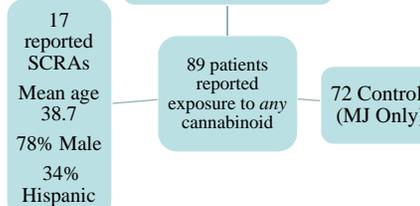
\* Data in brackets indicate statistically significant increase from the previous year

## Methods (cont'd)

- Study Outcomes:**
  - Altered mental status:
    - Agitation
    - GCS<15
  - Cardiotoxicity (as defined previously):<sup>4</sup>
    - Myocardial injury
      - Definition: elevated cardiac troponin I (cTnI)
    - Dysrhythmia
      - Definition: VT, VF, or TdP
- Power Calculation:**
  - Assuming 30% prevalence of the predictor and outcome, we calculated the need to enroll 84 patients to show 3.5-fold  $\Delta$  risk (80% power, 5% alpha)

## Results

3739 Screened from original cohort



- Factors Not Associated with SCRA:** Demographics (age, gender, race/ethnicity), exposure history (suicidality, misuse, intent), or vital signs.
- Laboratory variables associated with SCRA use:**
  - lower mean bicarbonate (p<0.05)
  - elevated serum glucose (p<0.05)
- Neurotoxicity:** Mental status varied between SCRA and MJ, with agitation significantly more likely in SCRA subgroup (OR 3.3, CI 1.1-9.6)
- Cardiotoxicity:**
  - Dysrhythmia significantly associated with SCRA (OR 9.8, CI 1.0-116)
  - No association with myocardial injury (p=NS)

Figure. Marketing of SCRAs



## Discussion

- SRCA overdose was found to be more clinically significant compared to MJ toxicity
- Future studies should assess optimal treatment modalities to prevent adverse clinical outcomes following SCRA overdoses
- Limitations:** Some outcomes (e.g. seizures) were not assessed in the primary cohort; Self reported data without GCMS confirmation may represent misclassification bias

## Conclusions

- SCRA exposure was significantly associated with more severe clinical toxicity than MJ
- SCRA toxicity included:
  - Metabolic abnormalities
  - Neurotoxicity
  - Cardiotoxicity

## Bibliography

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