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Clinical characteristics of ED patients reporting synthetic cannabinoid use☆

Synthetic cannabinoids (SCs) comprise a diverse group of drugs containing varying types and amounts of molecules with activity at cannabinoid receptors. Due to the erratic effects of SCs and difficulty in regulation, the US Centers for Disease Control has deemed SC abuse a public health concern [1]. In 2015, the CDC declared a "multistate outbreak" as poison control center calls related to SCs more than doubled from 2014 to 2015 [2]. Synthetic cannabinoid use may predispose to addiction and one case of withdrawal has been described, though long-term effects are still largely undetermined [3]. Effects range from mild sedation to rhabdomyolysis, myocardial infarction, kidney injury, seizures, stroke and death [4]. Patient morbidity and admission rates vary greatly in the studies published to date.

Kentucky ranks highly in substance abuse activity compared to other states. Witnessing an apparent rise in patients presenting to our level one urban trauma center emergency department (ED) reporting SC abuse, we performed a retrospective review of all patients in a two-year time frame.

Of the 431 visits, there were 311 unique patients (55 patients visited the ED more than once, one patient presented 14 times). The majority of patients were males (88.5%) and arrived by ambulance ($n = 377$, 87.5%). The most prevalent insurance source was Medicaid ($n = 262$, 60.8%), followed by uninsured ($n = 106$, 24.6%). The age range with highest SC use was 26–35 years, though all age ranges had increased frequency over the study period (Fig. 1). The drug effects of highest frequency were sedation (44.7%) and lethargy (25.7%). The most common co-ingestants were alcohol (18.6%), cocaine (5.7%), heroin (4.6%), amphetamines (2.9%) and marijuana (2.9%). Urine toxicology screens were obtained in 143 patients (33.2%), and marijuana was positive in 13 (9%). This contrasts with other studies showing about one third of patients testing positive for THC. Use of chemical restraints was documented in only 19 patients (4.4%). Physical restraints were used in eight patients (1.9%).

We found one case of rhabdomyolysis and two cases of acute kidney injury. One patient required intubation. Most patients were discharged home ($n = 381$, 89%). Twenty-four patients (5.6%) required hospital admission (3 to ICU), and no patients in this cohort died. These features suggest the SC used in our patient population was only mildly intoxicating.

Length of stay averaged 3.5 h. Length of stay was higher in women (16% vs. 9%, $p = 0.023$), those with agitation (43% vs. 29%, $p = 0.008$) and suicide ideation (8% vs 2%, $p = 0.006$), co-ingestants of opiates (6% vs. 2%, $p = 0.029$) and cocaine (10% vs. 4%, $p = 0.014$).

There was an overall trend of increased patients reporting SC use during the two-year study period (Fig. 1). The break point (change in slopes) was estimated to have occurred during November 2014. We hypothesized that providers would become more comfortable with SC patients during the study period and hold patients for less time and be less likely to admit. However, there was not a significant difference admission rate (6.67% vs. 5.39%, $p = 0.68$) or LOS over time. We found no association between alcohol use and increased LOS or admission.

To our knowledge this represents the largest review of a single center cohort of ED patients reporting SC use. Our ED saw a drastic increase in SC-related visits in this two-year period. Similar to other reports, our patients had a heterogeneous chief complaint and intoxication profile. Our results differ from prior studies in the severity of illness and need for hospitalization. Most of our patients were discharged home less than 4 from arrival.

Rowley et al. performed an analysis of the economic cost of synthetic cannabis use: the average charge of a visit was $4494.07, with a range from $228.05 to $155,555.10 [5]. Though we did not perform a review of charges, we did find that 60.8% of patients had Medicaid coverage (Medicaid patients typically make up 33% of our population). Using Rowley's average, charges on our Medicaid patients would have totaled more than $1.1 million.

As a retrospective review, our study was limited by standard biases inherent in this type of research. We diagnosed SC intoxication based on patient history and physician clinical impression. Though confirmatory lab testing can be performed, other authors have pointed out the reliability and validity of self-report [4]. SC patients in whom history was unobtainable due to mental status or clinical condition may have been missed.

This study further demonstrates the diverse presentation of emergency department patients intoxicated with synthetic cannabinoids. These unpredictable patients may arrive extremely sedated *or* agitated. Rarely do these patients require hospital admission, and most could be safely discharged home in less than 4 h.

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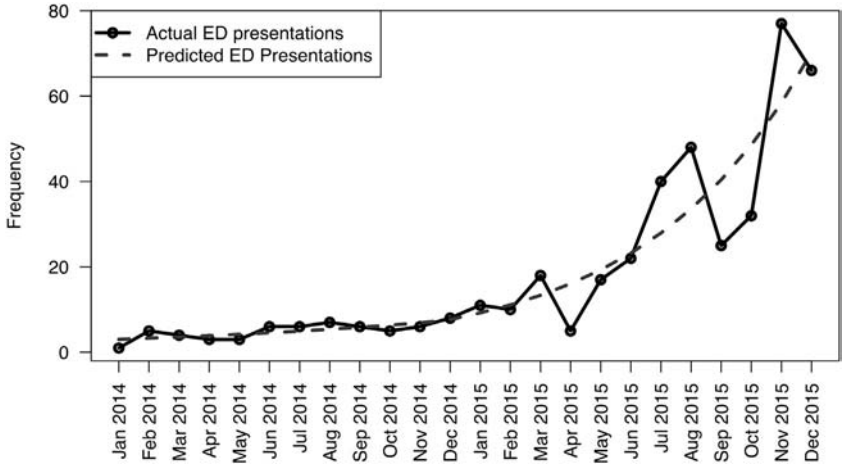

Fig. 1. Increase in SC ED presentations using *t*-test and Segmented Poisson Model. Caption: The slopes represent the change in log-transformed admissions for these periods. Comparing the two slopes using a *t*-test, they are significantly different ($p = 0.015$). Also, shown are ED presentations (the black line with points) vs. the segmented Poisson model's predicted values (hashed line).

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The "myth" of iodine allergy to radiocontrast in Emergency Medicine

Iodine, a trace element, is essential in the synthesis of thyroid hormones. Iodine is present in varying amounts in many foods such as milk, fish, bread and fruit [1].

In 2007, over 62 million computerized tomography (CT) scans were performed in the United States, and 16.2 million Emergency Department (ED) visits included a CT examination [2-3]. A likely significant amount of these scans involved the use of intravenous (IV) radiocontrast media. The question of allergies arises when administering iodinated radiographic contrast media because these medications are associated with a risk of hypersensitivity reaction in up to 1.05% of patients [4]. Unfortunately, when asked about allergies many patients are also prompted to disclose seafood, shellfish or iodine allergies. It is known that iodine is not an allergen and allergies to shellfish do not increase one's risk of an allergic reaction to iodinated contrast media [5-10]. Further, iodine allergy based on skin reactions to topical antiseptics is not believed to increase the risk of reaction to iodinated contrast media [11-12]. Despite these known facts, the myth still persists.

Over a decade ago, 37% of radiologists and 50% of interventional cardiologists replied in a survey that they would not administer iodinated contrast media or would recommend pretreatment in patients who reported a seafood allergy [13]. We sought to see how pervasive the myth remained among Emergency Medicine (EM) and Radiology providers.

A three part survey was created. The first portion included questions intended to evaluate respondents' perception of iodine allergy incidence and prevalence of dietary iodine in select foods. The second portion was intended to evaluate perceptions on the link between iodinated contrast media to iodine and shellfish allergies. The third portion asked for demographics of each provider including professional role, years of training, and primary practice site. The survey instrument was piloted among CT technologists at an academic facility in the Midwest before distributing the final survey to EM physicians and radiologists. Three separate academic sites were recruited for participation.

Table 1
Respondent demographics.

	EM (n = 39)	Radiology (n = 11)	Overall (n = 50)
Physician years of training, n (%)			
PGY 1–2	7 (17.9)	2 (18.2)	9 (18)
PGY 3–4	6 (15.4)	6 (54.5)	12 (24)
Attending	24 (61.5)	3 (27.3)	27 (54)
Midlevel	2 (5.1)	0	2 (4)
Practice site			
Site A	13 (29.7)	7 (63.6)	20 (40)
Site B	24 (64.7)	0	24 (48)
Site C	1 (2.7)	4 (36.4)	5 (10)
Other[a]	1 (2.7)	0	1 (2)

[a] Respondent listed his/her primary practice site as a community hospital not affiliated with one of the pre-selected sites.