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# Bad Weed: A Case of Prolonged Psychosis Secondary to Synthetic Cannabinoids

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## INTRODUCTION

Synthetic cannabinoid (SC) use has gained in popularity over the last decade in part due to ease of obtainability, perceived safety, and the ability to avoid detection on routine urine drug tests.[1] Once thought as a "legal high", users generally believe the effects and risks of SC to be similar to cannabis, if not safer. Although sparse, the medical literature has been increasing with reports of severe psychosis associated with SC use.[1-7] However, little is known about the duration of the effects. We report a unique case of prolonged psychosis after chronic use of SC.

## CASE REPORT

An 18-year-old male presented to the emergency department (ED) with his parents after exhibiting bizarre behavior. In the ED, he presented with delusional thinking (e.g., government agents spying on him, mother poisoning his food), hearing voices, and responding to internal stimuli. His parents reported that symptoms started approximately two months prior after the patient relapsed and began smoking "K2" (a SC). He was admitted to the inpatient psychiatry unit and started on risperidone 1 mg twice daily.

He had experienced a similar episode eight months prior resulting in a 12-day hospitalization, considered to be secondary to chronic SC and marijuana use. He was treated and discharged on olanzapine and lithium. However, lithium was discontinued secondary to elevated thyroid stimulating hormone and olanzapine was discontinued a few months later due to continued stability and concerns regarding weight gain. He had no previous psychiatric history aside from mild chronic anxiety. Family history included a sibling with substance use disorder and mother with anxiety disorder. There was no family history of any psychotic disorder (e.g., schizophrenia).

On his admission, physical examination and baseline laboratory results (complete blood count, metabolic panel, and thyroid stimulating hormone) were unremarkable, including a urine drug screen which was negative. Blood alcohol level was not done at that time. He subsequently admitted to smoking "K2" chronically over the last two years. On day two of hospitalization, risperidone was increased to 4 mg/day with the addition of benztropine for extrapyramidal side effects. Over the next five days, he markedly improved and discharge planning was in process. However, on day seven, his psychosis returned accompanied by severe paranoia and an intense fear of dying. Risperidone was increased to 5 mg/day. Over the next eight days, his symptoms waxed and waned with periods of improvement followed by bizarre behavior including agitation, running into walls, and head banging requiring physical restraints. During one episode, he experienced diaphoresis, muscle rigidity, elevated temperature (37.8°C) and tachycardia (pulse 145). Throughout these periods of agitation, he was administered haloperidol (which resulted in a dystonic reaction), fluphenazine, or chlorpromazine along with lorazepam. Subsequently, risperidone was increased to 6 mg/day. Both magnetic resonance imaging and electroencephalogram were performed to rule out any acute intracranial pathology or epileptic activity; however, both studies were negative.

On day 15, divalproex sodium was started. It was switched three days later to lithium 600 mg/day due to elevated liver function tests. Shortly after starting lithium, the patient achieved sustained improvement without evidence of psychosis or agitation. He was discharged on day 26 taking risperidone 6 mg/day and lithium carbonate 600 mg/day.

## DISCUSSION

Treatment of SC intoxication or toxicity can be challenging for clinicians due to the unknown effects of these agents. The most common active ingredient in SC is JWH-018, although products such as "K2", "Spice", and others may contain a blend of different SC (JWH-073, JWH-175 or similar).[8] The potency of SC is considered to be higher than tetrahydrocannabinol (THC) due to its full agonist effects on marijuana CB1 receptor compared to THC which is a weak partial agonist.[8,9]

Common symptoms of SC use include euphoria, anxiety, irritability, and tachycardia.[8] However, increasing reports of psychosis and paranoia are emerging in the literature.[1-7] A dose-response effect is theorized, meaning the heavier the use of SC, the more likely that psychotic effects will occur.[8]

Unfortunately, duration and treatment of psychosis secondary to SC remains unclear. Most case reports described psychosis as acute in onset, with symptoms resolving within 24 hours to one week requiring only supportive care.[1,3,5,6] However, in our patient, symptoms continued for almost one month. Only two case series were found describing psychosis lasting greater than two weeks in duration.[3,7] Van der Veer et al.[7] reported a case series of three patients all requiring

at least two-weeks of hospitalization following SC use. Their patients were treated with haloperidol or risperidone for their psychotic symptoms, and all patients had some psychotic symptoms present on discharge. Moreover, Hurst[3] reported psychotic symptoms lasting five months in three previously healthy males aged 21-25 after using SC. Treatment of their symptoms was not discussed.

There are no treatment recommendations for SC intoxication. Treatment of psychosis from SC commonly has been treated with haloperidol, olanzapine, or risperidone, while benzodiazepines are used regularly for supportive care for acute agitation and restlessness.[2,5-7] The majority of case reports or series of patients experiencing psychotic symptoms with SC are less than 30 years of age, which coincides with the usual age of onset of thought disorders such as schizophrenia.[2-5,7] SC may unmask symptoms of schizophrenia and this cannot be ruled out in our patient. Long term follow-up with our patient was needed to differentiate between a primary thought disorder versus substance induced psychotic disorder.

Our patient admitted to heavy SC use. Thus, we did not test specifically for the presence of SC. A few immunoassays have been developed to test for major metabolites of JWH-018.[10,11] However, testing in the urine is difficult due to the constantly changing composition of SC. Clinicians may consider urine testing for SC in patients presenting with psychosis though these tests are not routinely available at most medical centers. Samples generally have to be sent to an outside laboratory, resulting in delayed results, especially in the ED setting. Most often, clinicians will rely on patient or collateral information of SC use and utilize clinical judgment regarding SC consumption.

The long lasting presence of psychotic symptoms in our patient was concerning. This case highlighted the unknown risks, dangers, and treatment challenges in patients using SC. With the increasing popularity of SC among adolescents and young adults, further research is needed to determine behavioral, cognitive, psychological, and long-term effects of SC. Additional research and literature to describe the effects of SC can educate the public and health-care professionals about its dangers.

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