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Selected Topics: Toxicology

REPEATED THROMBOSIS AFTER SYNTHETIC CANNABINOID USE

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□ **Abstract—Background: Synthetic cannabinoids are swiftly gaining popularity and have earned a reputation of being relatively safer than other illicit drugs. However, there is a growing body of literature associating thromboembolic events with their use. Case Report: A 32-year-old woman presented on four separate occasions with a new thromboemoblic event after smoking synthetic cannabinoids. She had no medical history, and over the span of 9 months she developed two kidney infarcts, pulmonary emboli, and an ischemic stroke. Each of these events occurred within 24 hours of smoking synthetic cannabinoids. During periods of abstinence, she remained free of thrombotic events. Why Should an Emergency Physician Be Aware of This?: This report shows that an association between thrombosis and the use of synthetic cannabinoids is reproducible and involves both venous and arterial thrombosis, suggesting activation of coagulation or inflammatory pathways. As the popularity of this drug continues to grow, we can expect to see a growing number of these cases. Synthetic cannabinoid use should be included in the differential diagnosis of young patients with no risk factors who present with venous or arterial thrombosis. Published by Elsevier Inc.**

□ **Keywords—infarction; ischemic stroke; kidney thromboembolism; pulmonary embolism; spice; synthetic cannabinoids; thrombosis**

INTRODUCTION

Synthetic cannabinoids, commonly marketed under names such as Spice and K2, are rapidly gaining popularity with youth (1). Up until 2011, they were sold legally at local stores and have developed a reputation of being a safer alternative to other illicit drugs (2). Another reason for their popularity is that they are undetectable on standard drug tests. Even reference laboratories are unable to reliably identify these drugs because manufacturers are constantly changing their chemical structures (3). Users of these drugs are typically young men in their 20s to 30s (4). According to one study, annual prevalence was found to be 11.4% among high school seniors in 2011. Despite criminalization and interventions by the United States (US) Drug Enforcement Administration (DEA), the prevalence remained unchanged in 2012, at 11.3% (2). This placed synthetic cannabinoids as the second most widely used illicit drug in this age group. Although new synthetic cannabinoids are regularly being synthesized by manufacturers, they make up a chemically heterogeneous group of compounds that can be divided into seven major structural groups (5,6). Similar to the cannabinoids found in natural marijuana, they act as agonists at cannabinoid receptor type 1 (CB1) and cannabinoid receptor type 2 (CB2), producing similar but more potent effects (7). There is a growing body of literature associating their use with thromboembolic events, such as stroke and acute coronary syndrome, in young patients who have no traditional risk factors for these episodes (8–12). Previous reports have shown no more than one thromboembolic event after the use of synthetic cannabinoids. This is a case of a woman who, on four separate occasions, presented

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with a new thromboembolic event after smoking synthetic cannabinoids.

CASE REPORT

A 32-year-old woman with no significant medical history presented to the emergency department (ED) with a sudden onset of right flank pain. A computed tomography (CT) scan of the abdomen showed new bilateral wedge-shaped areas consistent with acute renal infarction (Figure 1). Her lactate dehydrogenase level was elevated, and urinalysis did not reveal an infection. A hypercoagulable workup, including factor V Leiden, homocysteine, protein C and S, antithrombin, prothrombin mutation, Janus kinase 2 mutation, and lupus anticoagulant was negative. Her electrocardiogram (ECG) on admission and cardiac monitoring throughout her hospital course did not reveal any dysrhythmias. A transthoracic echocardiogram and a transesophageal echocardiogram were both normal. Her lipid panel was within normal limits. She was not taking hormonal contraceptives or any other medications. There was no history or family history of blood clots or dysrhythmias. Her 10-panel urine drug screen was only positive for opiates, which she had received on arrival to the ED. The only significant history she reported was smoking synthetic cannabinoids heavily during the four days preceding the onset of her flank pain. Her workup was completed and she was anticoagulated with warfarin.

After discharge, she discontinued her use of synthetic cannabinoid. She stopped taking her warfarin against medical advice. She agreed to take daily aspirin because it did not require any additional laboratory monitoring. She remained abstinent from synthetic cannabinoids for 6 months before relapsing. After 3 days of heavy use, she developed left-sided flank pain. A CT scan of her abdomen showed a new wedge-shaped hypodensity in the left kidney consistent with infarction (Figure 1). Her 10-panel urine drug screen was positive for opiates, which she had received in the ED. She was maintained on deep venous thrombosis (DVT) prophylaxis with enoxaparin. Her pain resolved and she was discharged on aspirin after a 4-day hospitalization. After arriving home that day, she smoked synthetic cannabinoids and

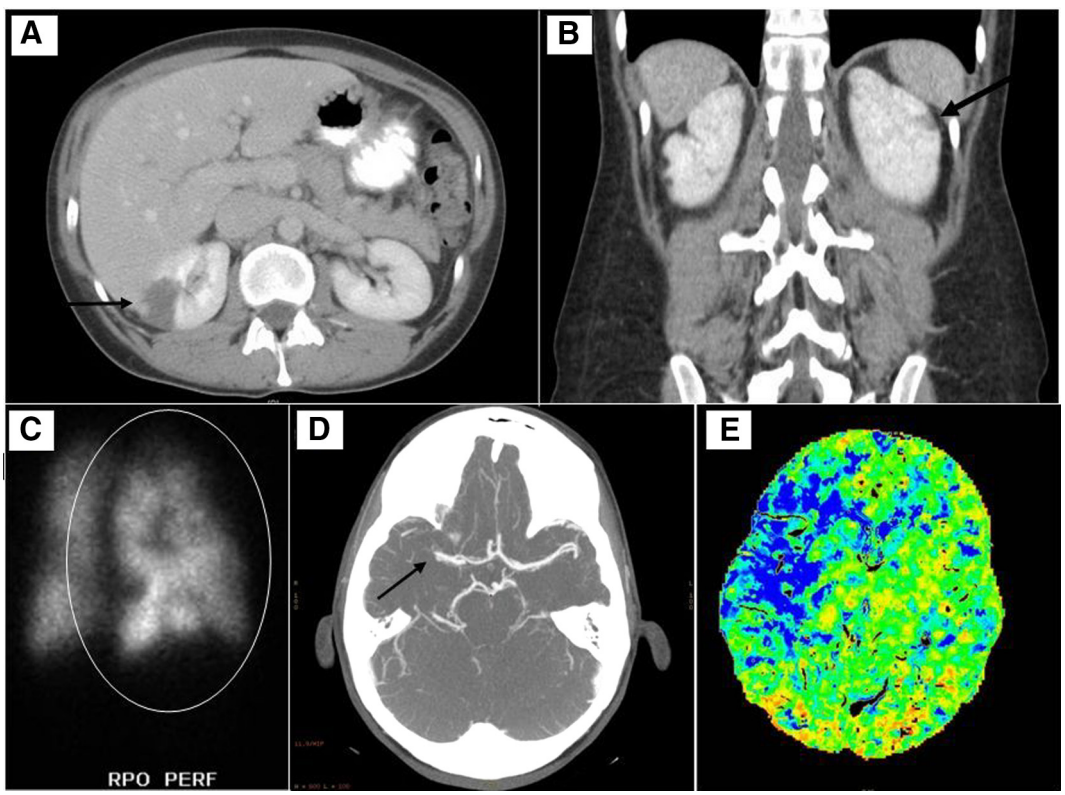

Figure 1. (A) An axial computed tomography scan showing a wedge-shaped infarct in the right kidney from the first thromboembolic event. (B) A coronal computed tomography scan showing a wedge-shaped infarct in the left kidney from the second thromboembolic event. (C) A ventilation-perfusion scan showing clear peripheral defects in the right lung from the third thromboembolic event. (D) An axial computed tomography scan showing occlusion of the right middle cerebral artery from the fourth thromboembolic event. (E) An axial computed tomography perfusion scan of the brain showing an elevated mean transit time (blue), consistent with ischemic penumbra in the territory of the right middle cerebral artery.