Case Report

Synthetic Cannabis and Acute Ischemic Stroke

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An association between marijuana use and stroke has been previously reported. However, the health risks of newer synthetic cannabinoid compounds are less well known. We describe 2 cases that introduce a previously unreported association between synthetic cannabis use and ischemic stroke in young adults. A 22-year-old woman presented with dysarthria, left hemiplegia, and left hemianesthesia within hours of first use of synthetic cannabis. She was healthy and without identified stroke risk factors other than oral contraceptive use and a patent foramen ovale without venous thromboses. A 26-year-old woman presented with nonfluent aphasia, left facial droop, and left hemianesthesia approximately 12 hours after first use of synthetic cannabis. Her other stroke risk factors included migraine with aura, oral contraceptive use, smoking, and a family history of superficial thrombophlebitis. Both women were found to have acute, large-territory infarctions of the right middle cerebral artery. Our 2 cases had risk factors for ischemic stroke but were otherwise young and healthy and the onset of their deficits occurred within hours after first-time exposure to synthetic cannabis. Synthetic cannabis use is an important consideration in the investigation of stroke in young adults. **Key Words:** Ischemic stroke—stroke in young adults—cannabis—drugs of abuse—acute stroke.

Introduction

Heavy cannabis use is associated with acute ischemic stroke (AIS).[1-3] We describe 2 cases of AIS after first-time use of synthetic cannabis. These agonists of cannabinoid receptor type 1 have emerged as recreational drugs used by adolescents and young adults and often evade detection by toxicology screens.[4,5]

Case Report

Our first patient was a 22-year-old right-handed woman taking atomoxetine and an estrogen-containing oral contraceptive. She developed palpitations, dyspnea, and angor animi while smoking "K2." A few hours later, she developed dysarthria and difficulty standing. Physical examination revealed drowsiness, inattention, dysarthria, left face and hemibody weakness, and hemianesthesia. Urine toxicology was positive for tetra-hydrocannabinol, benzodiazepines, and salicylates. Initial head computed tomography (CT) was negative, but magnetic resonance imaging revealed a right middle cerebral artery AIS. She did not receive thrombolysis because of late arrival. CT angiogram revealed a proximal right M1 occlusion with distal reconstitution (Fig 1). She had a patent foramen ovale

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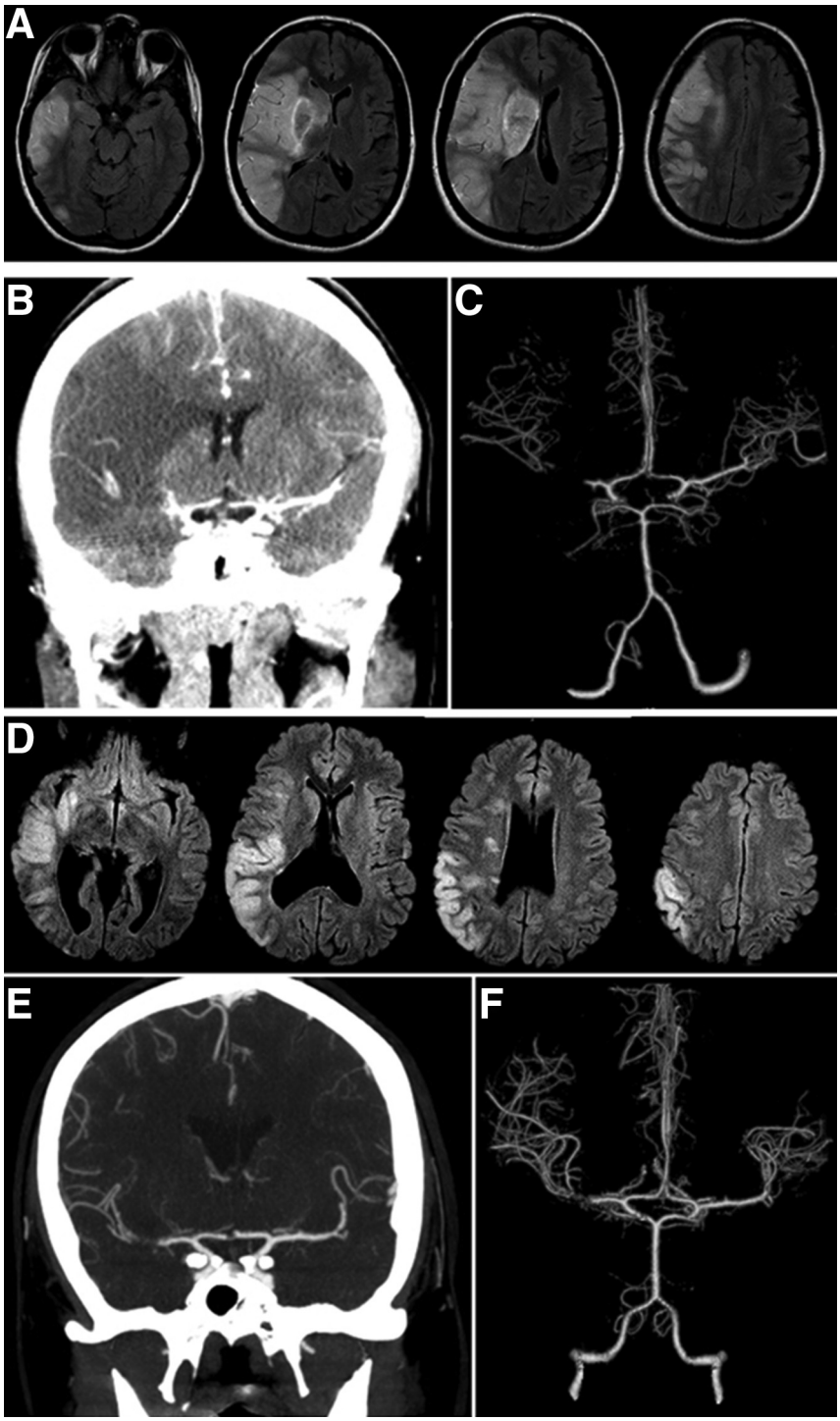

Figure 1. *Case 1: Magnetic resonance imaging FLAIR sequence (A) showing near-complete infarction of right MCA territory, with corresponding occlusion on CT angiography (B and C). Case 2: MRI FLAIR sequence (D) showing infarction of predominantly inferior division right MCA territory, with corresponding occlusion on CT angiography (E and F). Abbreviations: FLAIR, fluid-attenuated inversion recovery; MCA, middle cerebral artery; MRI, magnetic resonance imaging.*

but no deep vein thrombosis. Testing of serum vascular risk factors and hypercoagulability was negative. She started aspirin. In follow-up, she has limited ambulation and no use of her spastic left arm.

Our second patient was a 26-year-old left-handed woman with tobacco smoking, migraine with aura, perinatal intraventricular hemorrhage without residual deficits, and family history of superficial thrombophlebitis who was taking an estrogen-containing oral contraceptive. She smoked "Peak Extreme" during a typical migraine. The next morning, she developed left facial weakness, left-sided numbness, and dysfluency. Initial head CT was unremarkable and symptoms resolved. The next day, she developed left-sided weakness and speech difficulty for which she sought care after 24 hours. She did not receive thrombolysis because of

late arrival. On our examination, she demonstrated impaired fluency and comprehension, left visual neglect, left facial weakness, difficulty initiating movements, left pronator drift, and hemianesthesia. Urine toxicology was negative for tetra-hydrocannabinol. CT angiogram revealed near occlusion of the right M1 segment, and magnetic resonance imaging revealed extensive middle cerebral artery territory infarction (Fig 1). She was treated with warfarin. Testing of serum vascular risk factors and hypercoagulability was negative. In follow-up, her speech and comprehension have improved.

These cases illustrate a potential association between synthetic cannabis use and AIS. The increased potency of synthetic cannabinoids, cross-reactivity with other receptors, and multiple active metabolites may strongly promote a prothrombotic state in the setting of other minor risk factors for ischemic stroke.[4,6] We hope that this report will improve awareness of this association and aid in stroke prevention in young individuals.

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