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Commentary

Cannabis-based treatments as an alternative remedy for epilepsy

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According to the Mayo Clinic, epilepsy is "a central nervous system (neurological) disorder in which brain activity becomes abnormal, causing seizures or periods of unusual behavior, sensations, and sometimes loss of awareness," and epilepsy can affect anyone, male or female, regardless of their race or age.[1] The symptoms are not always the same and they differ by the type of seizures. However, symptoms tend to be similar for each individual from one episode to the next.[1] According to the University of Chicago Medicine, epileptic seizures may be provoked and unprovoked. Provoked seizures result from some immediately recognizable stimulus, while unprovoked seizures have no immediately recognizable cause.[2] Epilepsy for certain patients can be debilitating as they can have hundreds of seizures a day, and thus treatment for such patients is in demand.

Epilepsy treatment options can include medication, diet therapy, and surgery. Antiepileptic drugs (AEDs) tend to support inhibitory processes or inhibit excitatory processes,[3] and AEDs can cause adverse effects including cognitive impairments, idiosyncratic effects such as skin rashes, and chronic effects such as weight gain.[4] Unfortunately, many of those with debilitating epilepsy do not respond to antiseizure drugs. Approximately 1 million people in the United States continue to have seizures despite adequate treatment with antiseizure drugs, representing 40% of those with epilepsy, and 80% of the cost of epilepsy.[5]

Drug-resistant epilepsy is a serious concern, and in additional to surgical interventions, cannabis-based treatments are being viewed as potential remedy.

Much of the initial reports for cannabis use in seizure control is centered on the compound delta-9 tetrahydrocannabinol (Δ-9-THC). However, due to the psychoactive properties of the THC, its potential utility was somewhat limited and recent research has focused on non-psychoactive compounds such as cannabidiol (CBD).[6] The anti-seizure effects of CBD may come from mechanisms such as functional agonism or antagonism at several 7-transmembrane receptors, ion channels, and neurotransmitter transporters.[6] Recently, another compound that is also without psychoactive effects known as cannabidivarin (CBDV) has shown anti-seizure properties both *in vivo* and *in vitro*.[6]

Many reports exist on illicit cannabis use through the smoking of marijuana by patients as a self-treatment. For example, a 1975 paper describes a 24-year old patient with drug-resistant seizures that became seizure-free after beginning to smoke marijuana.[6] However, such uncontrolled treatment presents health risks based on smoke inhalation and a lack of control of dosage. Therefore, more recent work on cannabis for epileptic patients has focused on oral preparations as they can provide safer and far more controlled doses.[6] Additionally, many of those who seek cannabis-based treatments for their epileptic seizures would like to avoid the psychoactive feelings brought upon by the THC.

Interpretation of the data on cannabis use for the treatment of epilepsy has been quite difficult due to the uncontrolled nature of these observations.[6] For example, significant interest was sparked from the case of a young girl, named Charlotte with SCN1A-confirmed Dravet syndrome, who showed a great reduction in her seizures after using a CBD enriched extract.[6] However, recently four randomized controlled trials (RCTs) have been completed of pharmaceutical grade CBD.[7] One RCT on the use of the CBD drug Epidiolex® for the treatment of Dravet Syndrome showed a significant decrease in convulsive seizures per month from 12.9 to 5.9 in the CBD treatment group versus 14.9 to 14.1 in the placebo group.[7] However, in the case of non-convulsive seizures, no significant improvement was shown.[7] Another RCT on the use of the CBD drug Epidiolex® for the treatment of Lennox–Gastaut syndromes showed that after 14 weeks of treatment, median percentage reduction in drop seizure frequency per month from baseline was 43.9% in the CBD group and 21.8% in the placebo group ($p = 0.0135$).[7] Besides Epidiolex®, an open-label study has been conducted on

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the drug Tilray.[8] Tilray 2:100 is a mixed compound that contains 2 mg/mL THC and 100 mg/mL CBD.[8] The study noted a reduction in motor seizures of 71%, with a 50% responder rate of 63%.[8] These studies show strong evidence of cannabis-based treatments being viable options in the treatment of certain forms of epilepsy. However, there are some potential side effects to be noted with the use of these medications. For example, side effects of Epidiolex® include sleepiness, decreased appetite, diarrhea, liver enzyme increase, rash, sleep problems, and infections.[9]

Cannabis and cannabis-based treatments offer promising alternatives to AEDs. Since many patients suffer from the drug-resistant epilepsy, cannabis-based treatments have great value. Cannabis-based treatments offer a great remedy to the patients with DRE for their condition with limited side effects. This option may prevent some patients with DRE from needing to consider more invasive options such as surgical interventions. In case studies, open label studies, and RCTs, significant improvements in the frequency of seizures in patients with epilepsy are observed. It is imperative to continue further research involving cannabis as a potential primary treatment for epilepsy, particularly those with DRE, to help improve the quality of life for millions of people suffering from epilepsy.

Conflict of interest

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Ethical statement

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References

1. Mayoclinic.org. Epilepsy. Available from: https://www.mayoclinic.org/diseases-conditions/epilepsy/symptoms-causes/syc-20350093.
2. UChicagomedicine.org. Comprehensive Epilepsy Center. Available from: http://www.uchospitals.edu/specialties/neurosciences/epilepsy/what-is-epilepsy/.
3. Bromfield EB, Cavazos JE, Sirven JI. *An introduction to epilepsy*. American Epilepsy Society; 2006. Available from: https://www.ncbi.nlm.nih.gov/books/NBK2513/.
4. Perucca E, Meador KJ. Adverse effects of antiepileptic drugs. *Acta Neurol Scand Suppl* 2005;181:30–5.
5. Engel J. What can we do for people with drug-resistant epilepsy? The 2016 Wartenberg Lecture. *Neurology* 2016;87:2483–9.
6. Perucca E. Cannabinoids in the treatment of epilepsy: hard evidence at last? *J Epilep Res* 2017;7:61–76.
7. Gaston TE, Szaflarski JP. Cannabis for the treatment of epilepsy: an update. *Curr Neurol Neurosci Rep* 2018;18:73.
8. Thomas RH, Cunningham MO. Cannabis and epilepsy. *Pract Neurol* 2018;18:465–71.
9. ir.gwpharm.com. Press Release – EPIDIOLEX (cannabidiol) Oral Solution. Available from: http://ir.gwpharm.com/news-releases/news-release-details/epidiolexr-cannabidiol-oral-solution-first-fda-approved-plant.