

Epilepsy and Marijuana – A Review

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ABSTRACT

The medicinal use of components of *Cannabis sativa* (marijuana) has been studied around the world. Some of these components may have anti-convulsive properties, though the reports are controversial, and sometimes come from single case reports and clinical anecdotes. Because of ethical aspects, as some of the components of cannabis have psychotropic effects, this is a very important issue. New researches have demonstrated that some components of cannabis that don't have psychotropic action may play a role in controlling seizures. This paper reviews the relation between epilepsy and the components of cannabis sativa.

Key words: epilepsy, marijuana, *Cannabis sativa*, treatment.

RESUMO

Epilepsia e maconha – uma revisão

O uso medicinal de componentes de *cannabis sativa* (maconha) vem sendo objeto de pesquisa em diversas partes do mundo. Alguns destes componentes podem ter ação anticonvulsivante, embora os estudos sejam controversos, limitados, e, muitas vezes, de origem anedótica. Devido aos aspectos éticos (especialmente por seus componentes psicotrópicos e pela possibilidade de levar à dependência), o assunto deve ser profundamente discutido. Novas pesquisas vêm demonstrando a possibilidade para a utilização de componentes não-psicotrópicos para o controle de crises epilépticas. Este artigo apresenta uma revisão da literatura acerca do tema.

Unitermos: epilepsia, maconha, *Cannabis sativa*, tratamento.

RATIONALE

Marijuana is one of the most used 'recreational' drugs. Despite of its psychoactive effect, cannabis has been studied for medical appliance since 5000 years ago, due to its medical properties. The literature is controversial on the relation between marijuana and epilepsy. Some patients believe that marijuana use may have therapeutic action, while many studies have proved the contrary. This is a very important discussion, once it has not only medical implications, but also ethical aspects, due to the psychotropic action of the drug. Some researches have pointed to non-psychotropic components of marijuana as

future medicine therapy against epilepsy. Epilepsy affects about 1% of the human population. Most of the seizures are controlled by traditional or new anti-epileptic drugs, but a range of 30-40% of the patients do not have fully effective control of seizures⁽¹⁰⁾. This is a very distressing condition and the patients may try alternative treatments, which may include 'recreational' drugs, specially marijuana. Another reason for the use of this drug can be its psychotropic action, which can be responsible for addiction and several other undesirable collateral effects. Despite the fact that the literature is controversial, this paper reviews the relation between marijuana and epilepsy.

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MATERIAL AND METHODS

Systematic review of the literature.

DISCUSSION

1. The Pharmacological Aspects

Because of some clinical anecdotes and single case reports of improving the control of seizures in some patients, a complex endogenous cannabinoids system has been studied, since the identification of the main components of marijuana⁽¹⁵⁾. In central nervous system (CNS), the most important cannabinoid receptor is CB₁⁽⁷⁾. The stimulation of neuronal CB₁ receptor leads to a lesser degree of excitability, because it alters the balance of membrane potassium and calcium channels⁽⁷⁾. The endocannabinoid system is activated when the neurons are stimulated⁽¹⁵⁾. In this condition, endocannabinoids are released, bind to CB₁ receptors and modulate neuronal excitability⁽⁵⁾. This modulation can be both inhibitory or excitatory, depending on the kind of expression of pre-synaptic sites – GABAergic or glutamatergic, respectively^(3,11). Marijuana derives from the plant called *Cannabis sativa*. Among over 420 compounds, Δ^9 -trans-tetrahydrocannabinol (Δ^9 THC) appears to have the most important psychoactive effects¹³ and has been studied for the actions on CNS. Cannabidiol is another major constituent of marijuana. It does not bind to cannabinoid receptors and is not psychotropic⁽¹⁴⁾. The next item discusses the relation among marijuana, Δ^9 THC and cannabidiol with epilepsy.

2. Marijuana, Δ^9 THC, Cannabidiol and Epilepsy

Some researches in animals⁽⁹⁾, some single case reports and clinical anecdotes in humans have suggested that marijuana or Δ^9 THC may play a role in the control of seizures⁽¹⁹⁾, though other evidences point to the contrary^(8,12,16). Wada et al.⁽¹⁷⁾ demonstrated that Δ^9 THC may have a prophylactic activity in preventing amygdaloid kindled cats, though this drug seems to be ineffective in fully developed kindled amygdaloid seizures. Though Δ^9 THC may be active itself, it has been shown that other constituent of medicinal preparations of cannabis also have anticonvulsant properties⁽¹⁸⁾. This is a very important finding, when someone considers the psychoactive effect of Δ^9 THC. Because it does not present psychoactive action, cannabidiol has been studied for epilepsy therapy. Compared to placebo treatments, cannabidiol has been considered both able and unable to reduce seizure frequency and other studies are needed to clarify this relation^(2,4). Endogenous cannabinoid (anandamide) reduces neuronal excitability at a presynaptic site in rat hippocampal slices, and this mechanism might be involved in the prevention of epileptiform activity⁽¹⁾. Many patients with epilepsy believe that marijuana may be an effective

therapy and use it actively⁽⁶⁾. In the general population, the increased use of marijuana is influenced by gender (male), youth and unemployment. Conversely, in epileptic patients increased seizure frequency and longer duration of disease may play a role⁽⁶⁾. Possible explanations are (i) that chronic epilepsy is more related to unsuccessful conventional treatment, leading to alternative trials and (ii) that marijuana use may increase seizure frequency⁽⁶⁾.

CONCLUSION

The relation between marijuana and epilepsy is still controversial. Despite limited evidences of its efficacy, some patients with epilepsy believe that it can be an alternative therapy for their seizures. Marijuana can both have anti and pro-convulsive actions and it has psychoactive components. Some psychotropic substances may not be necessary for the efficacy of marijuana for controlling seizures. Future medicinal preparations of cannabis used for epilepsy may have other active constituent, separating psychoactivity from anticonvulsant effects⁽¹⁸⁾.

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