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GLAUCOMA

Glaucoma, an eye disease which afflicts more than four million Americans, is the leading cause of blindness in the United States. There are 178,000 new cases of glaucoma diagnosed each year, according to the National Society for Prevention of Blindness.

Glaucoma strikes people of all ages but is most often found among people over 65. The most common form is chronic or open-angle glaucoma. It is characterized by increased pressure within the eye (intraocular pressure, or IOP) which can damage the optic nerve if not controlled effectively. Other types include narrow-angle and secondary. Treatment of narrow-angle glaucoma is primarily surgical. In approximately 90% of open-angle and secondary glaucomas topical (eyedrop) preparations along with some oral medications effectively control the disease, but at least 10% of cases cannot be completely controlled by available prescriptive drugs. In some instances available glaucomic medications can cause side-effects, such as: headaches, kidney stones, burning of the eyes, blurred vision, cardiac arrhythmias, insomnia, and nervous anxiety. These side-effects can become so severe that the patient must discontinue use.

Marijuana has shown promise as a glaucoma treatment in many published studies. In controlled studies at UCLA, patients smoking marijuana experienced a 30% pressure drop on average. The reduction was dose-related and lasted 4 to 5 hours. Dr. Robert Hepler, the principal investigator in the UCLA study, concluded that cannabis may be more useful than conventional medications and may reduce pressure in ways that conventional medicines do not, making marijuana a potential additive to glaucoma patients' regimen of available medication.

Here in Rhode Island, the Medical Marijuana Act allows physicians to recommend medical marijuana for debilitating medical conditions, including glaucoma. For more information and the Medical Marijuana Program application form, please visit RIpatients.org/licensing.

PUBLISHED RESEARCH

Dronabinol and retinal hemodynamics in humans.
Plange N, Arend KO, Kaup M, Doehmen B, Adams H, Hendricks S, Cordes A, Huth J, Sponsel WE, Remky A. (2007) *American Journal of Ophthalmology*. Jan;143(1):173-4.
Purpose: To investigate the effects of oral cannabinoids on retinal hemodynamics assessed by video fluoresce in angiography in healthy subjects.
Methods: In a self-experiment, the cannabinoid dronabinol (delta-9-tetrahydrocannabinol [THC]) was administered orally to eight healthy medical doctors (7.5 mg Marinol; Unimed Pharmaceuticals, Chicago, Illinois, USA). At baseline and two hours after dronabinol intake, intraocular pressure (IOP) was measured and retinal hemodynamics were assessed by fluorescein angiography. The retinal arteriovenous passage time was determined on the basis of dye dilution curves by means of digital image analysis in a masked fashion.
Results: Dronabinol resulted in a significant IOP reduction from 13.2 +/- 1.9 mm Hg to 11.8 +/- 2.0 mm Hg (P = .038). The retinal arteriovenous passage time decreased from 1.77 +/- 0.35 seconds to 1.57 +/- 0.31 seconds (P = .028). Systemic blood pressure and heart rate were not statistically significantly altered.
Conclusions: Cannabinoids, already known for their ability to reduce IOP, may result in increased retinal hemodynamics. This may be beneficial in ocular circulatory disorders, including glaucoma.

Effect of Sublingual Application of Cannabinoids on Intraocular Pressure: A Pilot Study. Tomida I, Azuara-Blanco A, House H, Flint M, Pertwee RG, Robson PJ. (2006) *Journal of Glaucoma* 15(5):349-353.
Purpose: The purpose of this study was to assess the effect on intraocular pressure (IOP) and the safety and tolerability of oromucosal administration of a low dose of delta-9-tetrahydrocannabinol (Delta-9-THC) and cannabidiol (CBD).
Patients and Methods: A randomized, double-masked, placebo-controlled, 4 way crossover study was conducted at a single center, using cannabis-based medicinal extract of Delta-9-THC and CBD. Six patients with ocular hypertension or early primary open angle glaucoma received a single sublingual dose at 8 AM of 5 mg Delta-9-THC, 20 mg CBD, 40 mg CBD, or placebo. Main outcome measure was IOP. Secondary outcomes included visual acuity, vital signs, and psychotropic effects.
Results: Two hours after sublingual administration of 5 mg Delta-9-THC, the IOP was significantly lower than after placebo (23.5 mm Hg vs. 27.3 mm Hg, P=0.026). The IOP returned to baseline level after the 4-hour IOP measurement. CBD administration did not reduce the IOP at any time. However, the higher dose of CBD (40 mg) produced a transient elevation of IOP at 4 hours after administration, from 23.2 to 25.9 mm Hg (P=0.028). Vital signs and visual acuity were not significantly changed. One patient experienced a transient and mild paniclike reaction after Delta-9-THC administration.
Conclusions: A single 5 mg sublingual dose of Delta-9-THC reduced the IOP temporarily and was well tolerated by most patients. Sublingual administration of 20 mg CBD did not reduce IOP, whereas 40 mg CBD produced a transient increase IOP rise.