

# MARIJUANA AND THE HEART



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# BEANS, BEANS ARE GOOD FOR YOUR HEART..

- ➡ (The more you eat, the more you....)
- ➡ But what about marijuana?



## A DAD CALLED..

- The child has a corrected VSD and coarctation.
- The parents are in a custody battle.
- The father has had the child's hair tested for drugs, including marijuana.
- Cut off for positive is .1 pg/mg of hair (THC).
- The child had a level of 423 pg/mg.
- The dad wanted to know if this was bad for the child's heart?



# A LONG TERM PATIENT GOES TO COLLEGE

- Parents want me to warn him about the dangers of sex, drugs, and rock and roll.
- What do I tell him about marijuana?



## A LONGTERM PATIENT CALLS...

- ▶ Can I prescribe her a marijuana card for her anxiety?”

## MY RESPONSE TO THIS SPECIFIC PATIENT

- ▶ Pharmacies can only dispense medications “prescribed” by licensed medical practitioners. The federal government classifies marijuana as a Schedule I drug, which means licensed medical practitioners do not prescribe it. Instead, they recommend it.
- ▶ Each state where medical marijuana is legal has their own list of qualifying diagnosis.
- ▶ I referred the patient referenced above back to her primary care physician as she did have PTSD.

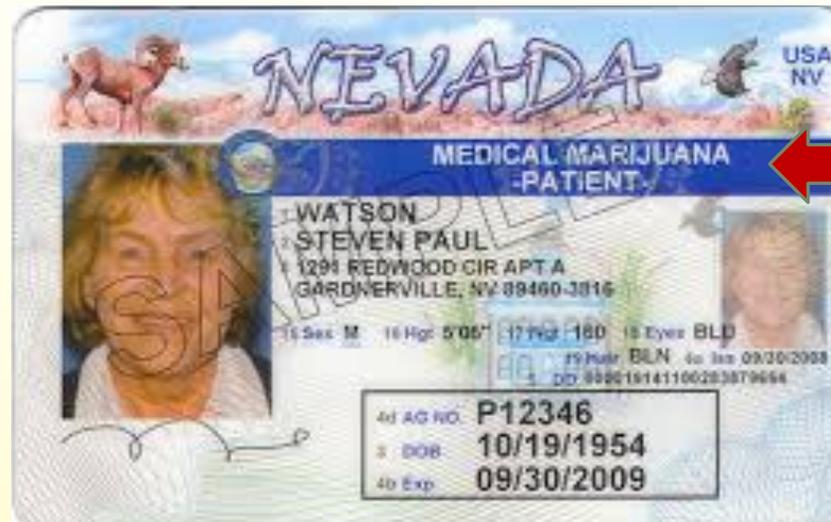
# NRS GOVERNING MEDICINAL MARIJUANA USE

- ▶ Per NRS 453A, only persons with a qualifying debilitating medical condition, with a valid Nevada Medical Marijuana Registry card are exempted from criminal laws of the state for engaging in the medical use of marijuana as justified to mitigate the symptoms or effects of the person's debilitating medical condition.

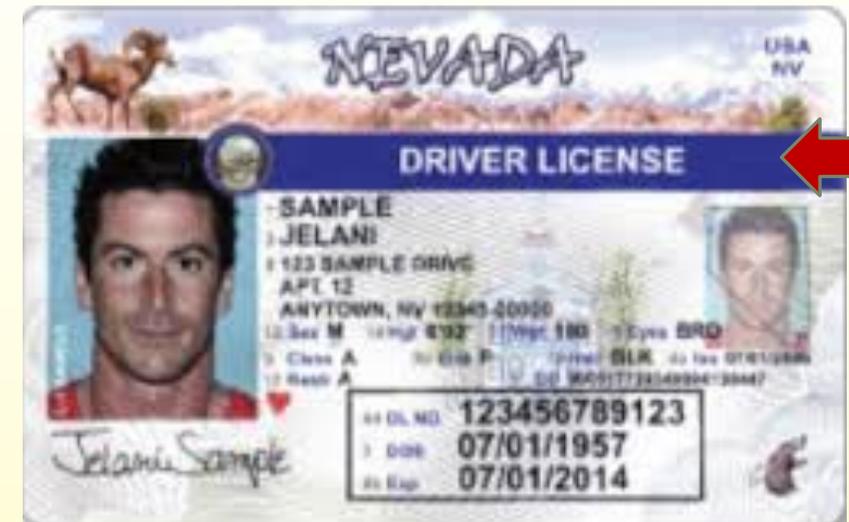
- ▶ Per NRS453A, you must have one or more of the follow qualifying medical conditions.
  - ▶ Acquired Immune Deficiency Syndrome (AIDS)
  - ▶ Post-Traumatic Stress Disorder (PTSD)
  - ▶ Cancer
  - ▶ Glaucoma
  - ▶ Cachexia
  - ▶ Sever pain
  - ▶ Sever nausea
  - ▶ Seizures, including without limitation, seizures caused by epilepsy
  - ▶ Persistent muscle spasms, including, but not limited to, spasms caused by multiple sclerosis

# MEDICAL MARIJUANA CARD VS DRIVERS LICENSE

## MEDICAL MARIJUANA



## DRIVERS LICENSE





# WHY OBTAIN A MEDICAL MARIJUANA CARD?

- **No taxes.** Medical marijuana patients do not have to pay the 10% retail tax levied for recreational users.
- **More lenient rules on growing own supply** than for recreational users.
- **Recreational use is limited to people of 21 years of age.**
- **Medical marijuana can be recommended to patients under the age of 21 with parental permission.**



# VOCABULARY



- **Cannabis:** This term refers to the 3 naturally occurring species of Hemp plant (*Cannabis sativa*, *Cannabis indica*, *Cannabis ruderalis*).
- **Marijuana:** Leaves, flowers, seeds stems that are smoked/consumed from the hemp plant.
- **Cannabinoids:** The chemical found in marijuana, the most used and studied are cannabidiol (CBD) and THC. Most articles will use "THC" and "cannabinoids" interchangeably.
- **Endocannabinoids** are endogenous mediators in our bodies. Two endocannabinoids are anandamide and palmitoylethanolamide.



# CBD Versus THC

- A friend has systolic hypertension for which she was using CBD oil to treat until it stopped working,
- A patient was being given CBD oil for her intractable seizures. The CBD oil is not working so the parent is going to start THC oil instead.
- THC is tetrahydrocannabinol. It has psychoactive effects.
- CBD is cannabidiol. It does not have psychoactive effects.
- Both come from the resin of the marijuana plant.



# CBD

- **CBD comes from specific marijuana plants with a low THC and high CBD content. It is usually labeled as coming from the “Hemp” plant.**
- **It can be bought online and in local drug stores, like CVS.**
- **It is also marketed under “Epidiolex.”**
- **It does not have the psychotropic qualities of THC.**



# ENDOCANNABINOID SYSTEM: THC AND CBD

- This is an endogenous signaling network involved in a wide range of processes, including endothelial function, metabolism, inflammation, and immunity.
- Two receptors, CBR1 and CBR2 have been identified.
- CBR1 is extensively expressed within the central, peripheral, sensory and autonomic nervous system and is where THC is active.
- Cardiovascular effects are mediated through activation of the sympathetic nervous system and inhibition of the parasympathetic system.



# ENDOCANNABIOD SYSTEM AND CBD

- CBD does not work directly through CB1 and CB2.
- The role of CBD is not completely understood.
- CBD has shown to have anti-inflammatory, anxiolytic, anti-nausea, anti-epileptic properties.
- Some of the properties may be that the CBD has been shown to decrease degradation of anandamide which is an endogenous endocannabinoid.



# CV EFFECTS OF CBD, A META ANALYSIS

- 25 Studies were reviewed and meta-analyzed.
- 6 species were represented.
- Result was that acute and chronic administration had no effect on BP or HR.
- However there was a BP and HR decrease at times of stress.
- The authors comment that there was limited data (Sultan).



# CV RESPONSE TO CBD, A BLIND CROSSOVER STUDY IN 9 PATIENTS

- Decrease in systolic and diastolic blood pressure.
- Increase in pulse at rest.
- No change in stroke volume.
- With stress, both mental and physical, the blood pressure response, both systolic and diastolic, was blunted especially in the pre and post test times.
- With stress the pulse was increased compared to no stress.
- The anxiolytic effect of the CBD was thought to result in findings in the above two studies (Jadoon et al).



# CV EFFECTS OF CBD

- After reviewing the literature it is hard to conclusively say what the effects are except that at times of stress there appears to be a blunted increase of systolic and diastolic blood pressure.
- Studies differ as to effect on heart rate.
- Most studies concluded that the anxiolytic effect was responsible for CV changes.
- This makes sense given the data that CBD does not directly effect sympathetic and parasympathetic systems.



# CARDIAC MORTALITY AFTER MEDICAL LEGALIZATION OF MARIJUANA

- ▶ This study looked at cardiac-related mortality in states before and after laws legalizing medical marijuana were passed (MCL)
- ▶ In men there was a 2.3% increase in CV mortality. In women there was an increase of 1.3% mortality.
- ▶ Not a lot of deaths for men (7) and for women (4)/100,000 people accounted for the change in mortality.
- ▶ This study looked at deaths only, and could not directly correlate increased marijuana usage to mortality (Abouk et al).



# MARIJUANA USE IN ACUTE CORONARY SYNDROMES

- ▶ This is a study looking at individuals 40 years old or younger, admitted with acute coronary syndromes to an Egyptian hospital.
- ▶ 138 male patients admitted with acute coronary syndromes. 23 patients had + only for cannabis, 28 patients had urine + for other substances, such as benzodiazepines. The last group were – for any substances. Patients + for co-ingestion or for tramadol, cocaine and amphetamines were excluded.



# MARIJUANA USE IN ACUTE CORONARY SYNDROMES

- STEMI was seen in groups 1, 2. None in group 3.
- Coronary arteries were abnormal in all of group 1, as was echocardiography was also abnormal.
- 47.8% had resting ischemia in group 1, and 11/8% in group 3.
- Conclusion was that smoking cannabis could be a risk factor for acute coronary syndromes (Draz et al).



## DATABASE STUDIES (3 STUDIES)

- Yankey et al examined a 2005 2005 US National Health and Nutrition Survey to a public use linked mortality file of the National Center for Health Statistics, CDC.
- 1213 eligible participants. 72.% percent presumed to be alive. Follow-up was approximately 20,00 person-years. Hazards ratio was 3.42 % for death from hypertension and 1.04% for each year of marijuana use.
- Self-report of marijuana use.



# CV RESPONSE TO CBD

- Most studies however suggest that the response to CBD is noted primarily during stress.
- Specifically one study examined the response of 3 doses of CBD (100 mg, 300 mg, and 900 mg) , clonazepam, and placebo to the stress of public speaking.
- This study showed clonazepam was more sedating and lowered systolic and diastolic pressure and pulse with the stress of speaking.
- Only the 300 mg dose of CBD effected the blood pressure and pulse (increase pulse, decreased blood pressure) at the time of speaking , not rest (Zuardi et al).



# RESULTS FROM NATIONWIDE INPATIENT SAMPLE IN US

- Desai, et al examined the 2010-2014 database mentioned above.
- 2,451,000 patients with AMI included. 35,771 patients with self report of marijuana use were found and 2,416,162 without marijuana use were reported.
- Their conclusion is that the lifetime risk of AMI is increased in marijuana users, but overall mortality did not reach significance.
- Marijuana use identified by ICD-9-CM codes.



# LIFETIME RISK OF CV DISEASE IN MARIJUANA USERS

- Reis et al looked at 5113 adults from 18-30 years at baseline who were followed for >25 years (enrollment from 1985-1986).
- Outcome was CVD through 2013.
- 84% reported history of marijuana use.
- No association found with CVD, or stroke or TIA.



## MARIJUANA USE AND CV DISEASE - LITERATURE

- Up to 81 case reports found in one review, noting the association of CV disease and marijuana use (Jouanjus). Highlighted have been patients of younger age.
- Hospital database studies linking marijuana use to MI did not all agree.
- Most studies relied on self-report of marijuana use or had low sample sizes.
- Additionally studies over time are limited by the different potency of marijuana.
- More data needed.



# CONCLUSION...

- The acute changes on systolic, diastolic blood pressure with marijuana have been documented, more so with THC, then CBD.
- Several case reports found in the literature reference patients who have acute MI.
- Some studies suggest a long term increase in number of patients who have MIs after long term use of marijuana.



# WHAT DO I TELL MY PATIENTS...

- Marijuana can cause a rise in systolic and diastolic blood pressures, and an increase in pulse.
- Orthostatic hypotension can occur.
- There are many case reports of MIs, even in younger patients.
- Large database derived studies suggest a higher incidence of acute myocardial vents in patients who self-report marijuana use. As self report is likely underestimated there may be even higher numbers of patients who have used marijuana then noted thus making the claim that marijuana increases the likelihood of acute myocardial events.
- CBD, and higher CBD plants safer then high THC strains.



# WHAT DO I TELL MY PATIENTS...

- ▶ The child with large amounts of THC in his hair sample is coming in for a reevaluation just in case.
- ▶ For the college student the data is not conclusive about acute myocardial events but the changes in systolic, diastolic blood pressure, orthostatic hypotension and tachycardia have been documented. Also what effects are seen may be more profound in 2018 because of increased potency of marijuana.
- ▶ Clearly better studies are needed.



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