

## Glaucoma & Marijuana

I support the use of medical marijuana to control pain in terminally ill patients. The use and dosing rationale is easily understood: consume it in a convenient form until you no longer feel pain. However, I disagree with the use of marijuana for the control of glaucoma.

Glaucoma is a disease of the eye, which if untreated, results in permanent blindness through gradual loss of vision. The disease progresses until no vision is left. If correctly diagnosed, usually by noting a rise in the pressure inside the eye or by the appearance of the optic nerve, glaucoma can be controlled. Control, not cure, is attained by medications or surgery. Glaucoma exists for the remainder of that person's life, requiring regular checkups to ensure that the treatment is still working.

Many drugs that we use in medicine are naturally derived, or at least the parent drug was naturally derived. The standardization of dosing of drugs arose with better understanding of various disease processes. The desire to standardize medications in turn led to the growth of the pharmaceutical industry. Proper dosing requires knowing what is termed the "dose-response".

The dose-response is a fairly simple concept: what amount (dose) must be given to obtain the desired effect (response). The critical variable in this concept that varies from drug to drug and person to person is how fast is the drug broken down and removed from the body (that is, metabolized). An example may help: two people are given the same alcoholic drink. One seems unaffected ("holds their alcohol") while the other becomes flushed, has slurred speech and becomes sleepy. The difference is the metabolism of the alcohol, which is related to the genetics and size of the person.

Until the drug is fully metabolized, the effect of the drug continues: the duration of the effect. This variation of metabolism and duration is why some medications are required to be taken four times per day when others only need to be taken once a day. With marijuana, the eye pressure lowering is maximal at about 2 hours after ingestion. The duration will vary, but conservatively it is no more than 4 to 6 hours. This suggests that a minimum frequency of use to control eye pressure would be 4 times per day. We now have an idea of frequency, but we have not know how to control the issue of quantity and quality, let alone the route of administration (smoking vs eating). Further note, we've also not discussed side effects, such as "how is the person affected by the drug that they're taking?" (consider the driving skills of people using alcohol or marijuana).

Pharmaceutical companies spend a lot of money figuring out the optimal dose-response for each drug they bring to market. The dose-response is determined from lengthy experiments in large groups of subjects. These experiments are corroborated by independent researchers and published in peer-reviewed journals. This peer-review system helps ensure integrity of the data. As physicians, we can then assume that these studied medications will safely work as described.

However, with marijuana there is no standardization. What would the dosing be? How much should be ingested, by what route, and how often? What quality of marijuana is being used and would the same quality be available each time it is purchased? These variables, in particular not knowing the dose-response for a given patient, prevents the rational use of medical marijuana for the proper control of a blinding disease like glaucoma.

To force the physician and patient to replicate dose-response experiments on an individual basis is neither safe nor practical, and would delude them into thinking they're controlling the patient's glaucoma.