Recreational Marijuana Use: Is it Safe for Your Patient?

Shereif Rezkalla, MD, FACP, FACC; Robert A. Kloner, MD, PhD, FACC

Marijuana is a very old drug with documented use reaching back to Chinese emperors and Egyptian pharaohs. Ancient civilizations described the medicinal value of marijuana, promoting it for its healing powers, anti-inflammatory properties, and as a treatment for many different disease states. In the several intervening millennia, the medical claims surrounding marijuana use have been validated in many cases, and therapeutic benefits have been described for a variety of medical conditions. Today medicinal marijuana plays an important role in the management of chronic neuropathic pain, glaucoma, multiple sclerosis, HIV, and other conditions associated with chronic pain. In light of clinical evidence in support of medical marijuana, a number of countries as well as 20 individual states and the District of Columbia in the United States have legalized marijuana for medicinal purposes. Interestingly, legalization was extended to include recreational use in the states of Colorado and Washington, with additional referendums pending in several other states including Alaska, Arizona, Maine, Missouri, Montana, Oregon, and Wyoming.

While the role of medical marijuana is indisputable in patients suffering from chronic, debilitating pain, the potential for widespread legalization of marijuana for recreational purposes raises important questions regarding safety. For example, do we really know enough about the cardiovascular effects of marijuana to feel comfortable about its use in patients with known cardiovascular disease or patients with cardiovascular risk factors? As early as 1972, Beaconsfield et al showed that marijuana smoking resulted in tachycardia. A decade later, the surgeon general of the United States issued a warning on the use of marijuana, describing it as a major public health problem, based on findings that marijuana consumption leads to a variety of cognitive, behavioral, and other systemic problems including respiratory, reproductive, and immunological disturbances. Here, we will focus on the cardiovascular effects of marijuana and the implications for recreational use.

We recently reviewed reports in the literature that described a temporal association between marijuana use and serious cardiovascular events (Table). Several instances of temporal association between marijuana use and myocardial infarction were reported in the literature. In cases where marijuana use was linked to myocardial infarction, patients tended to be younger and have no other risk factors for infarction. The 2006 CARDIA study showed that marijuana use is associated with hypertension, dyslipidemia, and higher caloric intake, all of which may increase the incidence of coronary artery disease. In light of the probable effects of marijuana on increasing platelet coagulability and its frequent combined use with smoking tobacco or other illicit drugs, it is not surprising to note these reports of myocardial infarctions. In a review of 3882 patient interviews, Mittleman et al found a significant 4.8-fold increase in the incidence of myocardial infarction over baseline in the first hour after marijuana use. Similarly, a 4.2-fold increase in mortality rate was observed in marijuana users compared with nonusers following myocardial infarction.

There is some suggestion that heavy marijuana use may lead to no-reflow phenomenon in both the heart and brain, implying an effect on small vessels and arterioles. In addition to myocardial infarction, marijuana use has also been temporally related to cardiac arrhythmia, cardiomyopathy, and arteritis. Similarly, several reports of cerebrovascular events have been described in association with marijuana inhalation ranging from transient ischemic events to strokes. The most striking feature of these events is incidence in very young patients with no other risk factors. No-reflow or cerebral artery spasm has been implicated, but the exact mechanism is not well established. Regardless of the mechanism, the evidence in the literature suggested to us

The opinions expressed in this article are not necessarily those of the editors or of the American Heart Association.

From the Department of Cardiology, Marshfield Clinic, Marshfield, WI (S.R.); Division of Cardiovascular Medicine, Keck School of Medicine, University of Southern California, Los Angeles, CA (R.A.K.).

Correspondence to: Shereif Rezkalla, MD, FACP, FACC, Department of Cardiology, Marshfield Clinic — Marshfield Center, 1000 N. Oak Ave., 2D2, Marshfield, WI 54449. E-mail: rezkalla.shereif@marshfieldclinic.org

J Am Heart Assoc. 2014;3:e000904 doi: 10.1161/JAHA.114.000904.

© 2014 The Authors. Published on behalf of the American Heart Association, Inc., by Wiley Blackwell. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.
that a mandate to report the cardiovascular effects to state health authorities, such as that described in the current issue of JAH... and other cardiovascular events and marijuana use are more than just coincidence.8 From 2006 to 2010, about 2% of cannabis-related reports to Addictovigilance centers focused on achieving reliable surveillance of abuse and pharmacodependence cases.20 This report suggests that the plethora of single case reports describing temporal association between acute coronary syndromes and other cardiovascular events and marijuana use are more than just coincidence.8 From 2006 to 2010, about 2% of cannabis-related reports to Addictovigilance centers were of cardiovascular complications. In addition, the incidence of cardiovascular complications appears to be on the rise, increasing from 1.1% of all cannabis-related incidents in 2006 to 3.6% in 2010. Perhaps most disturbing is the mortality rate of 25% in cases of cannabis-related cardiovascular complications. While the concomitant use of other products, such as tobacco and alcohol, may have contributed to some of these events, approximately half of the patients who presented with cardiac events had a record of exposure only to marijuana.20

As the authors point out, this type of study has limitations.20 For example, we really do not know what the denominator is, and it is likely that cardiovascular events related to cannabis use were under-reported due to an unwillingness to disclose information regarding illicit drug use in the emergency department and to attend the emergency department when under the influence. Nevertheless, this paper does suggest a signal linking cannabis use to cardiovascular events and is deserving of our attention, underscoring the need for more research in this field.

As described above, there is considerable evidence to suggest a therapeutic benefit of inhaled marijuana for the management of a number of chronic, debilitating conditions. However, clinical evidence also suggests the potential for serious cardiovascular risks associated with marijuana use, including myocardial infarction, serious cardiac arrhythmias, stroke, and even death.7 This has been shown repeatedly in case reports, retrospective studies, and registries and is once again demonstrated by data captured by the French Addictovigilance Network.20 We strongly suggest a national system for mandatory reporting of medical complications related to marijuana use in those states that have approved the recreational use of marijuana. In addition, there is a need to better understand the true effect of marijuana, both acute and chronic, in basic science models of the normal and diseased heart.

In summary, there is clear clinical evidence to suggest a therapeutic benefit of inhaled marijuana for the management of a number of chronic, debilitating conditions. However, clinical evidence also suggests the potential for serious cardiovascular risks associated with marijuana use, including myocardial infarction, serious cardiac arrhythmias, stroke, and even death.7 This has been shown repeatedly in case reports, retrospective studies, and registries and is once again demonstrated by data captured by the French Addictovigilance Network.20 We strongly suggest a national system for mandatory reporting of medical complications related to marijuana use. It is the responsibility of the medical community to determine the safety of the drug before it is widely legalized for recreational use. It is also important to educate health care providers and the public of the potential risk of developing a cardiovascular event associated with the use of marijuana.
Acknowledgments

The authors wish to thank Rachel Vonck Stankowski, PhD and Marie Fleisner of the Marshfield Clinic Research Foundation Office of Scientific Writing and Publication for their outstanding assistance in the preparation of this editorial.

Disclosures

None.

References

1. Lamarine RJ. Marijuana: modern medical chimera. J Drug Educ. 2012;42:1–11.
2. Borgeit LM, Franson KL, Nussbaum AM, Wang GS. The pharmacologic and clinical effects of medical cannabis. Pharmacotherapy. 2013;33:195–209.
3. Grant I, Atkinson JH, Gouaux B, Wilsey B. Medical marijuana: clearing away the smoke. Open Neurol J. 2012;6:18–25. doi: 10.2174/1874205X01206010018.
4. Leung L. Cannabis and its derivatives: review of medical use. J Am Board Fam Med. 2011;24:452–462.
5. Marijuana on the Ballot. Ballotpedia. Last updated January 1, 2014. Available at: ballotpedia.org/Marijuana_on_the_ballot. Accessed March 11, 2014.
6. Beaconsfield P, Ginsburg J, Rainsbury R. Marihuana smoking. Cardiovascular effects in man and possible mechanisms. N Engl J Med. 1972;287:209–212.
7. Centers for Disease Control (CDC). The Surgeon General’s warning on marijuana. MMWR Morb Mortal Wkly Rep. 1982;31:428–429.
8. Thomas G, Kloner RA, Rezkalla S. Adverse cardiovascular, cerebrovascular, and peripheral vascular effects of marijuana inhalation: what cardiologists need to know. Am J Cardiol. 2014;113:187–190.
9. Lindsay AC, Foale RA, Warren O, Henry JA. Cannabis as a precipitant of cardiovascular emergencies. Int J Cardiol. 2005;104:230–232.
10. Rodondi N, Fletcher MJ, Liu K, Hulley SB, Sidney S; Coronary Artery Risk Development in Young Adults (CARDIA) Study. Marijuana use, diet, body mass index, and cardiovascular risk factors (from the CARDIA study. Am J Cardiol. 2006;98:478–484.
11. Dahdouh Z, Roule V, Lognoné T, Sabatier R, Grollier G. Cannabis and coronary thrombosis: what is the role of platelets? Platelets. 2012;23:243–245.
12. Mittleman MA, Lewis RA, Maclure M, Sherwood JB, Muller JE. Triggering myocardial infarction by marijuana. Circulation. 2001;103:2805–2809.
13. Mukamal KJ, Maclure M, Muller JE, Mittleman MA. An exploratory prospective study of marijuana use and mortality following acute myocardial infarction. Am Heart J. 2008;155:465–470.
14. Rezkalla SH, Sharma P, Kloner RA. Coronary no-flow and ventricular tachycardia associated with habitual marijuana use. Ann Emerg Med. 2003;42:365–369.
15. Karabulut A, Cakmak M. ST segment elevation myocardial infarction due to slow coronary flow occurring after cannabis consumption. Kardiol Pol. 2010;68:1266–1268.
16. Fernández-Fernández FJ, Caimpos-Romero T, Mesías Prego A, Sesma P. Ectopic atrial rhythm associated with cannabis use. Minerva Cardioangiol. 2011;59:119–120.
17. Ting JY. Reversible cardiomyopathy associated with acute inhaled marijuana use in a young adult. Clin Toxicol (Phila). 2007;45:432–434.
18. Noël B, Ruf I, Panizzon RG. Cannabis arteritis. J Am Acad Dermatol. 2008;58: S65–S67.
19. Geller R, Loftis L, Brink DS. Cerebellar infarction in adolescent males associated with acute marijuana use. Pediatrics. 2004;113:e365–e370.
20. Jouanjus E, Lapyre-Mestre M, Micallet J; French Association of the Regional Abuse and Dependence Monitoring Centres (CEIP-A) Working Group on Cannabis Complications. Cannabis use: signal of increasing risk of serious cardiovascular disorders. J Am Heart Assoc. 2014;3:e000638 doi: 10.1161/JAHA.114.000638.

Key Words: Editorials • cardiovascular diseases • chemically induced drug effects • marijuana abuse • substance-related disorders