ISSN: 2475-6296

Review Article

Journal of Clinical & Experimental Immunology

Stroke and Adverse Effects on The Immune and Cardiovascular Systems: The Danger of the Rise and Use of Psychedelic Drugs for Depression and PTSD

Burton M Altura[1-6] and Bella T Altura[1,3-6]

[1]*Deartment of Physiology & Pharmacology*

[2]*Department of Medicine*

[3]*The Center for Cardiovascular and Muscle Research*

[4]*The School for Graduate Studies in Molecular and Cellular Science, The State University of New York Downstate Medical Center, Brooklyn, New York*

[5]*Bio-Defense Systems, Inc, Rockville Centre, New York*

[6]*The Magnesium for Health Foundation, Patterson, CA*

***Corresponding author:**
Professor B. M. Altura, Box 31, Downstate Medical Center, 450 Clarkson Ave., Brooklyn, NY

Submitted: 16 Feb 2021; **Accepted:** 24 Feb 2021; **Published:** 03 March 2021

Citation: *Burton M Altura and Bella T Altura (2021), Stroke and Adverse Effects on The Immune and Cardiovascular Systems: The Danger of the Rise and Use of Psychedelic Drugs for Depression and PTSD. J Clin Exp Immunol, 6(2): 296-299.*

Introduction

Depression and post-traumatic stress disorder (PTSD), in the past two decades, has been a growing problem among adults and our youth. For hundreds, if not thousands of years, plant-based psychedelic drugs, such as psilocybin and peyote, have been utilized for medical purposes by numerous native tribal people As early as 1950, lysergic acid diethylamide (LSD), a synthetic mood-altering drug, a report was published that this drug and other psychedelics could be useful in the treatment of psychological and psychiatric problems [1]. Albert Hofmann, the Sandoz scientist who first synthesized LSD in 1938, years later, said that the mind-altering effects of psychedelic drugs are totally unpredictable [2]. Since these early days, numerous mood-altering drugs have been synthesized for potential treatment of depression and PTSD. In the 1990's tens of thousands of human subjects were subjected to "psychedelic therapy", particularly in the US Army, and CIA (Project MK ULTRA, 1957-1964 performed on un-consenting subjects), Switzerland, and Germany [3-9]. Many of these studies employed psilocybin, LSD, PCP, and ketamine. A meta-analysis of 19-such studies, suggested that upwards of 75% of patients given psychedelics demonstrated positive improvements in psychological, psychiatric and depressive states. More recently, several psychedelic drugs seemed to be somewhat beneficial in depressive, compulsive disorders, PTSD, alcohol dependence, and anxiety [10-16]. Even though these studies look quite promising, and enticing, very few if any of the authors point out the potential dangers of these drugs, which range from increased suicides, high blood pressure, cardiomyopathy, vasculitis, irreversible lung damage, kidney damage and failure, thromboses, brain stem damage, electrolyte changes in glial cells, severe headaches, psychoses, heart attacks, to death [17- 44]. In addition, we have shown in freely moving rats these drugs alter hippocampal-pyramidal cell-controlled behavioral patterns [33, 35, unpublished findings]. Cultured glial cells such as astrocytes and oligodendrocytes, in our laboratories, have demonstrated severe alterations in electrolyte balance and in metabolites of the sphingolipid pathways when placed in contact with many of the psychedelics [45]. A lurking danger, is that USA states like Oregon, have in the past few days, legalized the use of all schedule 1 drugs. In our opinion, this will give rise to numerous suicides and deaths, by a variety of means, as outlined above and below.

Danger of Hallucinogenic Properties of Psychedelics

A major problem with use of psychedelics is the vast hallucinogenic property these drugs possess [5, 6, 36-38]. Due to the euphoric qualities of these drugs, this has led to the illicit production of numerous, very potent synthetic psychedelics, such as ecstasy and methyl-meth-amphetamine (MMA) [37]. 'on the street" at very cheap prices. In addition, our Southern borders in the USA are being flooded with these illicit synthetics from China and the Mexican drug cartels. In our opinion, the new, proposed relaxed immigration laws of President Biden will cost many American lives, particularly among our youth.

Psychedelic Drugs Can Induce Strokes

A major danger with use of these psychedelics is that all of them, so far can induce both hemorrhagic and ischemic strokes in human subjects [24, 29, 36, 39-44]. Almost 40 years ago, we reported in Science, that LSD, psilocybin, mescaline, PCP, alcohol, cocaine, meth-amphetamine and peyote cause concentration -dependent vasospasms on cerebral arteries and basilar arteries in dogs and

subhuman primates [17, 22, 39-44]. Using living anesthetized rodents, and very high powered TV-image microscopic - intensification (up to 6,500x- normal), we reported

that all of the psychedelic drugs, including newer synthetics, induce powerful spasms of cerebral and medullary vasospasms, followed by rupture of the postcapillary venules and often bleeding into the brain parenchymal tissues [22,39-44]. By now, several reports have accumulated in the literature to support the fact that all of these psychedelics can cause strokes in human beings [22, 39-44].

Adverse Effects of Psychedelic Drugs on The Immune System and How the Brain is Wired

Psychedelics like psilocybin, LSD, and ecstasy have been shown to alter gene expression of several immunological genes [45-47]. Even a single dose of psilocybin can have profound long -lasting effects on personality and mood [46]. After only one day of a psilocybin injection, in pigs, 19 genes in the prefrontal cortex were altered [46]. These psychedelic drugs have been shown to exert profound changes in brain structure, neurons and synapses, changes that clearly alter the response of the brain to immunological host-defense factors [and how the brain is wired] [48].

Increased Number of Cardiovascular Deaths Among Youth Associated with Increased Abuse of Psychedelics Often Combined with Other Drugs of Abuse

Over the past decade, according to recent CDC mortality statistics, there is a growing number of cardiovascular deaths in the USA among young people (i.e., 16-55 years of age) [49]. Although this turn of events has been attributed to obesity, type 2 diabetes, bad diets, and suicide, the new statistics from the CDC shows many of these young victims were abusing psychedelics often combined with other substances of abuse [50]. Many of the suicides among the young

people have been associated with intake and abuse of psychedelic drugs. Surprisingly, none of the recent clinical trials with psychedelics mention any of the risks for cardiovascular deterioration or potential suicides, although the MK ULTRA CIA studies of 65 years ago documents these events in their un-consenting subjects.

Conclusions and Future Thoughts

Recently, an editorial has appeared in Nature touting the potential use of psychedelics in the treatment of depression and PTSD [51]. No mention is made, however, of the potential, dangerous side effects of these drugs. Readers can be led astray into thinking these are “great” potential drugs for treatment of depression and PTSD. Not knowing about the dangers of these drugs will probably lead patients and our youth to desire trying these dangerous drugs. No provision is made in the editorial/review for indicating that cardiovascular, immunological, and cerebral vascular actions of the drugs, that they “must” be carefully monitored” for the dangerous side effects outlined herein. We have found, at least experimentally, that a combination of use of high-powered 31P-nuclear magnetic resonance spectroscopy combined with optical spectroscopy could be very useful in monitoring the psychedelics for harmful side effects [52].

Acknowledgments

The authors are most grateful to The National Institutes of Health (i.e., National Heart Lung and Blood Institute; The National Institute on Drug Abuse; The National Institute on Alcohol Abuse and Alcoholism; The National Institute on Mental Health). Some of the studies carried out by the authors were performed while they were on the faculties of The New York University School of Medicine and The Albert Einstein College of Medicine where Dr. B. M. Altura was Professor of Anesthesiology and Critical Care Medicine. Many of the drug assays were performed by our expert lab technician, Anthony Carella, at The Laboratories in The New York City Medical Examiner facilities where the authors had laboratories for a short period of time.

References

1. Busch AK, Johnson WC (1950) LSD 25 as an aid in psychotherapy: preliminary report of a new drug, Diseases of the Nervous System 11: 241-243.
2. Hofmann A (1958) Psilocybin, a psychotropic substance from the Mexican mushroom Psilicybe Mexicana Heim. Experientia 14: 107-109.
3. Cole JO, Katz MM (1964) The psychomimetic drugs: an overview. JAMA 187: 758-761.
4. Grishspoon L, Bakalar JB (1979) Psychedelic Drugs Reconsidered. Basic books, New York.
5. Hermie L, et al (1992) Mescaline-induced psychopathological, neuropsychological, and neurometabolic effects in normal subjects experimental psychosis as a tool for psychiatric research. Biological Psychiatry 32: 976-991.
6. Mangini N (1998) Treatment of alcoholism using psychedelic drugs: a review of the program of research. J Psychoactive Drugs 30: 381-418.
7. Passie T (1996) Hanscart Leuner-pioneer of hallucinogen research and psycholytic therapy. Maps Newsletter 7: 46-49.
8. Stoll W (1947) Lysergsaure-diathyl-amid, ein Phantastikum aus der Mutterkorngruppe. Schweiz Archives of Neurol 10: 1-2.
9. Bronson KR (1996) Chronic administration of serotonergic antidepressants attenuates the subjective effects of LSD in humans. Neuropsychopharmacol 14: 425-436.
10. Abramson A (1959) the Use of LSD in Psychotherapy. Josiah Macy Foundation, New York.
11. Deakin JF Graeff PG 91991) %HT and mechanisms of serotonergic antidepressants attenuates the subjective effects of LSD in humans. Neuropsychopharmacol 14: 425-436.
12. Lee MA, Shlain B (1992) Acid Dreams: The Complete Social History of LSD< The CIA, The Sixties and Beyond. In: Rev Evergreen Grove Weidenfeld, New York.
13. Stressman RJ, QualisCR (1994) Dose-response study of N, N -dimethyltryptamine in humans. I..Neuroendocrine, autonomic and cardiovascular effects. Arch Gen Psychiatry 51: 85-97.
14. Vollenweider Fx, et al (1997) Positron emission tomography and fluorodeoxyglucose studies of metabolic hyperfrontality and psychopathology in the psilocybin model of psychosis. Neuropsychopharmacol 16: 357-372.
15. Wollenwiedeider FX (1998) Psilocybin induces schizophrenia-like psychosis in humans via a serotonin-2 agonist action. NeuroReport 9: 3897-3902.

16. Bogenschultz MP (2015) Psilocybin -assisted treatment for alcohol dependence: a proof -of-concept. J Psychopharmacol 29: 230-235.
17. Altura BT, Altura Bm (1981) Phencyclidine, lysergic acid diethylamide and mescaline: cerebral artery spasms and hallucinogenic activity. Science 212: 1051-1053.
18. Altura BM, Altura BT, Carella A, Chatterjee M, Halevy S, et al. (1982) Alcohol produces spasms of human umbilical blood vessels: relationship to fetal alcohol syndrome. Eur J Pharmacol 86: 311-312.
19. Altura BM, Altura BT (1982) Ethanol produces coronary vasospasm: Evidence for a direct action of ethanol on vascular smooth muscle., Br J Pharmacol 78: 260-262.
20. Altura BM, Altura BT (1983) Pharmacologic inhibition of cerebral vasospasm and ischemia, hallucinogen ingestion, and hypomagnesemia: Barbiturates, calcium antagonists, and magnesium. Am J Emerg Med 1: 180-190.
21. Altura BT, Quirion R, Pert CB, Altura BM (1983) Phencyclidine (angel dust) analogs and sigma-opiate benzomorphans cause cerebral arterial spasm. PNAS USA 80: 865-869.
22. Altura BM, Altura BT, Gebrewold A (1983) Alcohol-induced spasms of cerebral blood vessels: relation to cerebral vascular accidents and sudden death. Science 220: 331-333.
23. Altura BT, Altura BM (1984) Effects of barbiturates, phencyclidine, ketamine and analogs on cerebral circulation and cerebrovascular muscle. Microcirc, Endothelium and Lymphatics 1: 169-184.
24. Altura BM, Altura BT (1984) Alcohol, the cerebral circulation and stroke. Alcohol 1: 325-331.
25. Altura BT, Pert CB, Qurion R, Altura BM (1984) Identification of benzomorphan k-opiate receptors in cerebral arteries which subserve relaxation. BrJ Pharmacol 82: 459-466.
26. Huang Q-F, Gebrewold A, Altura BT, Altura BM (1990) Cocaine-induced cerebral vascular damage can be ameliorated by Mg2+ in rat brain. Neurosci Lett 102: 113-116.
27. Altura Bm, Gupta RK (1992) Cocaine-induces intracellular free Mg deficits, ischemia, and stroke as observed by in-vivo 31P-NMR of the rat brain. Biochim Biophys Acta 1111: 271-274.
28. Zhang A, Altura BT, Altura BM (1993) Ethanol-induced contractions of cerebral arteries in diverse mammals and its mechanism of action. Eur J Pharmacol 248: 229-236.
29. Brust CM (1995) Stroke and substance abuse. In: Stroke: Pathology, Diagnosis, and Management. Churchill-Livingstone, London 1995: 979-1000.
30. Barbour RL, Gebrewold A, Altura BM (1993) Optical spectroscopy and cerebral vascular effects of alcohol in the intact brain: Effects on tissue deoxyhemoglobin, blood content and reduced cytochrome oxidase. Alcoholism: Clin and Exp Res 17: 319-324.
31. Altura BM, Zhang A, Cheng TP-O, Altura BT (1993) Cocaine induces rapid loss of intracellular free Mg2+ in cerebral vascular smooth muscle cells. Eur J Pharmacol 246: 299-301.
32. He G-Q, Zhang A, Altura BT, Altura BM (1994) Cocaine-induced cerebrovasospasm and its mechanism of action. J Pharmacol Exp Ther 268: 1532-1539.
33. Ludvig N, Altura BT, Fox S, Altura BM (1995) The suppressor effect of ethanol, delivered via intrahippocampal microdialysis, on the firing of local pyramidal cells in freely behaving rats. Alcohol 12: 417-421.
34. Babu A, Cheng TP-O, Zhang A, Altura BT, Altura BM (1996) Low concentrations of ethanol deplete astrocytes of intracellular free magnesium. Brain Res Bull 50: 59-62.
35. Ludvig N, Fox SF, Kubie PI, Altura BM, Altura BT (1998) Application of the combined single-cell recording/intracerebral microdialysis in freely moving rats. Alcoholism: Clin and Exp Res 22: 41-50.
36. Brust CM (2002) Stroke and substance abuse. In: Uncommon Causes of Stroke, Bogousslavsky. J Caplan l, eds. Cambridge University Press, New York 2002: 132-138.
37. Brunton L (2017) Goodman and Gilman's The Pharmacological Basis of Therapeutics, 13th ed. McGraw-Hill Professional Publishers, New York.
38. Maisto SA (2018) Drug use and Abuse. Wadsworth Publishing, New York.
39. Altura BM (2018) Stroke: A real dangerfrom the therapeutic use of psychedelic drugs and the role of magnesium depletion. EC Pharmacol and Toxicol S1: 18-23.
40. Altura BM (2018) Increased risk of stroke using marijuana – cannabis products: Evidence for dangerous effects on brain circulation and the unrecognized role of magnesium. Drugs and Alcohol Addiction 1: 001-006.
41. Altura BM, Gebrewold A, Carella A, Shah NC, Shah GJ, et al. (2019) Stroke, headaches and hallucinations: real dangers of the recreational use of amphetamines and ecstasy-like drugs: Unrecognized roles of hypomagnesemia. EC Pharmacol and Toxicol 7: 646-652.
42. Altura BM, Gebrewold A, Carella A, Barbour RL, Wu F, et al. (2019) Optical spectroscopy and prevention of deleterious brain damaging cerebral vascular effects of cocaine by magnesium ions: Effects on brain mitochondrial oxidase, deoxyhemoglobin, ceramide and sphingomyelin levels and their potential application to human substance abuse. Int J Cardiol and Res 6: 137-143.
43. Altura BM, Carella A, Gebrewold A, Shah NC, Shah GJ, et al. (2019) Why there is an increase d number of deaths from heroin mixed with fentanyl in the USA: Potential roles of unrecognized hypomagnesemia and elevated levels of ceramide and platelet-activating factor particularly in brain stem area and potential relationship to euphoria and hallucinations. Acta Sci Pharmac Sci 3: 55-62.
44. Altura BM, Gebrewold A, Carella A, Shah NC, Shah GJ, et al. (2020) Stroke: a real danger of the use of "crystal meth" and "MMA": The unrecognized triggering of hypomagnesemia and release of ceramides, nitric oxide and platelet-activating facto as well as upregulation of NF-kB and proto-oncogenes and the potential role of epigenetics. Int J Mol Biol: Open Access 5: 14-19.
45. Altura BM, Babu A, Gebrewold A, Carella A, Altura BT (2020) Psychedelic drugs alter electrolyte balance and metabolites in the sphingolipid pathways of cultured astrocytes and oligodendrocytes... Submitted.
46. Donovan LL, Vistrup J, Ros NF, Jaberi E, Linnert C, et al, (2021) Effects of a single dose of psilocybin on behavior, brain 5-HT 2A receptor occupancy and gene expression in the pig. Eur Neoroppsychopharmacol 42: 1-11.
47. Dolan EW (2021) Psilocybin produces an immunology-related genetic response in the prefrontal cortex of pig brains.

PsyPost Jan 13.
48. Ly C, Greb A, Camerom LP, Wong JM, Barragan EV, et al. (2018) Psychedelics promote structural and functional neural plasticity. Current Biol 23: 3170-3182.
49. Mc Ka Y B (2019) Heart disease roaring back. Wall Street Journal 273: 1.
50. Altura BM, Altura BT (2020) Why there has been an increase in cardiovascular disease mortality in young people over the past decade in the USA: Unrecognized roles of alcoholism, drug abuse, illegal migrants and hypomagnesemia. Int J Biomed Sci Res 6.
51. Tullis P (2020) The rise of psychedelic psychiatry. Nature 28: 506-508.
52. Altura BM, Gebrewold A, Carella A, Altura BT (2020) why functional non-invasive near-infrared spectroscopy coupled with 31P- nuclear magnetic resonance spectroscopy should be used to predict, diagnose and manage substance abuse-induced stroke and deaths: A personal perspective. HSOA J Addiction & Addictive Dis.