



NEWSLETTER

INTERNATIONAL ELECTROMEDICINE INSTITUTE

Volume 1, Number 4

July/August, 1984

COCAINE DETOXIFICATION WITH CRANIAL ELECTROTHERAPY STIMULATION (CES): A PRELIMINARY APPRAISAL

By Alan Brovar, M.D.

The recent increase in the popularity of cocaine use has led to an unparalleled increase in the number of persons presenting themselves for treatment of cocaine dependence¹. While participation in the Anonymous Fellowships offers a reliable program² for long-term recovery², a major clinical problem persists: how to retain the cocaine dependent person in treatment long enough to initiate the recovery process.

Following the abrupt discontinuation of high-dose cocaine use, the addict experiences lethargy, dysphoria, hypersomnia (with a rebound increase in REM sleep) and intense cravings for cocaine. These severe symptoms threaten the addict's commitment to attain sobriety and often leads to premature discharge from treatment³.

Many alternative solutions for this problem have been attempted. The most common approach utilizes intensive psycho-social support⁴. A variety of medications⁴ such as the⁵ anti-depressant desipramine⁵ and neurotransmitter precursors such as⁶ tryptophane and tyrosine⁶ can be added to this basic support system to reinforce the addict's commitment for treatment. Cranial electrotherapy stimulation (CES) may provide a further adjunctive approach

to helping the addict attain and maintain a drug-free way of life.

CES was introduced by the Russian investigator Gilyarovsky in 1958, utilizing the somewhat misleading term, electrosleep. References to the term in the U.S. literature began some ten years later. More than half of the U.S. studies evaluating CES have been published since 1975. In general, these studies have confirmed the clinical usefulness of CES in the treatment of anxiety and insomnia.

CES is generally provided by a portable, battery powered device that generates a low amperage, pulsing current. This current is transmitted to the patient through a set of electrodes which are placed on the head or ears, creating a tingling sensation. Sleep, per se, is not necessarily produces.

The method of action of CES is unclear. Current theories included postulate a central effect, perhaps enhancing hemispheric synchronization or the production of endogenous opiate-like substances; a rhythmic effect of periphegal stimulation; or suggestion.

Double blind studies of the efficacy of CES^{9,10,11} are somewhat contradictory. A transient, positive response in the treatment of insomnia and anxiety states¹² is suggested by the literature

Long term effectiveness in the treatment of these conditions is far from clear.^{13,14}

Affective disorders may be improved, worsened or remain the same. CES has no useful role in the treatment of schizophrenia. The role of CES in the treatment of chemical dependency is of great interest since anxiety and insomnia are frequently present in the early stages of recovery and are a¹⁵ common precursor to relapse.

This preliminary report describes the use of CES in a population of hospitalized cocaine dependent persons, and clinically evaluates the efficacy of CES as it relates to retention in the treatment program and subsequent rates of re-admission and relapse.

METHOD

Subjects: Twenty-five consecutive admissions to a drug abuse treatment hospital participated in the study. Each patient qualified for the DSM III diagnosis of Cocaine Abuse.¹⁶ Randomization was achieved by alternately assigning patients to either the Experimental group (13 patients) or the Control group (12 patients), according to the order of admission. Those patients designated as Experimental received an explanation of the CES treatment protocol as a part of the routine psychiatric evaluation conducted by the author and were free to refuse any further participation. Five patients accepted; eight patients refused. Control patients did not

receive the explanation or the offer to participate.

All 25 patients involved in the study had equal access to the hospital treatment program. This included a somewhat protected living environment, the services of a supportive staff with special knowledge of cocaine dependence, adequate nutrition, exercise programs and personal hygiene. The patients were also offered group treatment, family therapy and a program of Hatha Yoga specially designed by the author. The hospital staff were unaware of the subjects' assignment to groups or the nature of the study.

CES Treatment: The patients who accepted the CES were treated twice a day for twenty minutes for hospital days one through five (10 treatments in all). CES treatment was delivered by the Alpha-Stim 350 provided by Synergy Health Systems, Santa Monica, California. According to the manufacturer's literature, this device delivers a series of low intensity sinusoidal electrical impulses, via two electrodes placed on the ear lobes. The Alpha-Stim was set at 0.5 cycles per second, with the current variable from 100 to 300 microamperes. After the electrodes were in place, the author slowly increased the amperage until the patient reported a tingling sensation, then reduced the current one setting for the remainder of the treatment session. The timer automatically terminated the treatment in twenty minutes. Subjects did not offer any complaint of untoward side effects and none dropped out of the study. No placebo treatment was offered to the Refusers or the Control group.

Hospitalization experience: The hospital records of all 25 patients were studied with regard to the nature of their in-patient stay. Data obtained included the number of days in the Detoxification Unit, notice of successful completion of detoxification (and readiness for the rehabilitation program), the number of hospital days in the rehabilitation program and notice of successful completion of the program and discharge. Discharges against medical advice and other forms of premature termination of treatment were also noted.

Follow-up: Follow-up data was obtained from a telephone survey

conducted by the author six to eight months following discharge from the hospital. Patients were located from telephone numbers obtained during the hospital admission process. An attempt was made to contact each of the patients who had successfully completed the program.

They were asked to describe any subsequent hospitalizations (dates and locations) and any episodes of return to the use of cocaine, how many such relapses had occurred as well as how many days each relapse lasted.

RESULTS

This clinical study must be regarded as an exploratory pilot rather than a summative experiment. Statistical analysis of the results will not be reported.

Of the original 25 subjects, 5 agreed to accept the CES treatments, 8 refused and 12 were not offered the opportunity and served as an informal control group. Of those who accepted the CES treatments, all five (100%) completed detoxification; of the 8 who refused, six, or 75% completed detoxification; of the 12 controls, 9, or 75% completed detoxification. All five of those who accepted CES completed the rehabilitation program, five (63%) of the refusers completed the rehabilitation program, and eight, or 67%, of the control group completed the program. These results are tabulated in Table One.

A follow-up survey of the 18 patients who had completed both detoxification and the rehabilitation program was conducted six to eight months after discharge. This portion of the study determined the number of relapses to the use of cocaine and the number of re-admissions to a hospital program for the treatment of cocaine dependence during the period of the study. This data is reported in Table Two. Of the original CES Acceptors, all five were available for follow-up. Of the Refusers, four of five could be contacted. Seven out of the original 12 controls who successfully completed the hospital program were reachable.

Of the five Acceptors, three reported relapses back into cocaine use during the six month period, each of these relapsed one time. Of the Refusers, five out of the original eight completed the program. Of these, one was not available; two reported relapses during the six

month period, one of them accounting for three relapse incidents. Of the Controls, seven out of the original twelve were reachable, and an eighth had died from cocaine overdose. Of the seven, four reported relapse incidents, one admitting to two relapse incidents, and, although unavoidable for the survey, the overdose death was counted as a relapse.

These patients were also questioned about readmissions to the original program or to a similar program. Of the five Acceptors, none reported readmissions. Of the four reachable Refusers, both subjects reporting relapse incidents obtained admission to drug programs. The Control who reported two relapses was one of the two who had returned to treatment (not to the same facility).

DISCUSSION

Cranial Electrotherapy stimulation is a promising modality for the treatment of chemical dependency. Smith and O'Neill reported their successful in-patient treatment of 36 alcoholics. After 15 daily CES treatments, these patients showed significant improvement on depression and anxiety measures, while controls did not improve. Gomez and Mikhail reported successful withdrawal of methadone addicts using CES alone. Schmitt and co-workers describe a positive CES treatment effect on the symptoms of organic brain syndrome in alcoholic patients.

The present non-blind clinical study suggests that CES facilitated patient retention in a hospital detoxification and rehabilitation program for cocaine dependent persons. This effect was not maintained over the six to eight months following the series of treatments. At follow-up treatment, Acceptors, Refusers and Controls resembled each other in terms of relapse rate and re-admissions. These results suggest that CES treatment deserves further consideration and investigation with this population.

There are, however, a number of confusing variables which cannot be parcelled out in these results. The attitudinal difference between the Acceptors and the Refusers emerges as an interesting variable. Ethical considerations made it impossible for the author to assign patients to experimental or control groups, thus

building into the design an element of volunteerism. Two differences may be said to separate the Accepters and the Refusers. First, of course, is the personal commitment of the patients themselves to completely change from a life centered around chemical dependency. Second is the simple fact that many persons are, quite simply, afraid of electric shock, however mild they may be. Thus it is possible that a number of the Refusers did so not because of lack of commitment but because of fear of electrical stimulus. There appears to be no easy solution of the ethical issue requiring patient consent for the use of an electric treatment in a program. Thus, no experiment of this nature can be freed of the variable of volunteerism. These, and other methodological problems have been described by von Richtofen.¹⁹

Other shortcomings of the present study can be described. Those experimental subjects accepting CES treatment received extra time and attention from the author. They also evidenced a high level of motivation to accept any and all help that might aid them in their treatment and recovery. So, while the program completion data is accurate as it stands, it cannot be said that CES treatment alone accounts for group differences.

The data concerning relapse and readmission are weakened by several factors. They are principally faulted by the fact that self-reports among drug abusing populations are notoriously unreliable. Additionally, the attempt was made to corroborate the data with independent observations. The fact that a fair number of relapses and readmissions were reported to the author does lend considerable credence to the data. Finally, acceptance of the twelve step program or commitment to an overall drug-free way of life would also affect recovery and was not taken into account in this study.

The author has undertaken a research program to more definitively answer some of these questions. Work in progress includes a study of the role of Cocaine Anonymous and drug-free commitment in recovery, as well as a long-term study of cocaine-dependent outpatients who are being treated with neurotransmitter precursors, CES, and group treatment

emphasizing a peculiar form of Hatha Yoga.

SUMMARY

A course of cranial electrotherapy stimulation (CES) was offered to a group of cocaine-dependent individuals during their detoxification and rehabilitation program in a hospital setting. Compared to a similar group of patients who did not receive CES, the treated patients more frequently completed the program successfully. However, this apparent usefulness of CES during the hospital phase did not help these patients maintain their recovery six months following treatment, as compared to patients who did not receive CES.

ACKNOWLEDGEMENTS

The author gratefully acknowledges Barbara Wellington, MA for her editorial assistance, Russell Hunter, Ph.D. for his statistical analysis of the data and Synergy Health Systems for providing the author with an Alpha-Stim 350.

BIBLIOGRAPHY

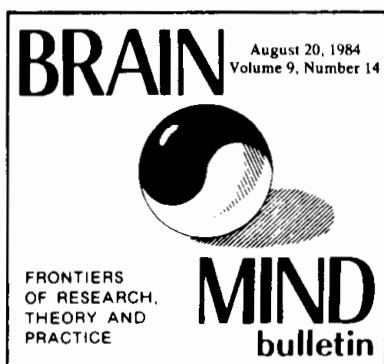
1. Fishburne P.M., Abelson H, Cisin I: National Survey on Drug Abuse: Main Findings, Rockville, MD, National Institute on Drug Abuse, 1979.
2. Van Dyke, C: "Cocaine," in Substance Abuse: Clinical Problems and Perspectives, Edited by Lowinson JH, Baltimore, Williams & Wilkins, 1981.
3. Khantzian EJ, McKenna GJ: "Acute Toxic and Withdrawal Reactions Associated with Drug Abuse," *Ann. Intern. Med.*, 90:301-372, 1979.
4. Khantzian EJ: "Cocaine Dependence and Methylphenidate Treatment", *Am J Psychiatry*, 140:784-785, 1983.
5. Baxter, LR: "Desipramine in the Treatment of Cocaine Use," *Am J Psychiatry*, 140:1525-1526, 1983.
6. Gelenberg AJ: "Tyrosine for Treatment of Depression", *Am J Psychiatry*, 137:622-623, 1980.
7. Schmitt R, et al: "CES Treatment of Cognitive Brain Dysfunction in Chemical Dependence," *J Clin Psychiatry*, 45:60-63, 1984.
8. Surawicz FG, Ludwig, AM: "Miscellaneous Organic Therapies," in Comprehensive Textbook of Psychiatry, 3rd Ed., Ed. by Kaplan, HI, et al, Baltimore, Williams & Wilkins, 1980.
9. Felghner JP, et al: "Electrosleep Therapy, A Controlled Double Blind Study," *J Nerv Ment Dis*, 151:121-125, 1973.
10. Hearst, CD, et al: "Electrosleep Therapy: A Double Blind Trial," *Arch Gen Psychiatry*, 30:463-466, 1974.
11. Rosenthal SH: "Electrosleep Therapy: "A Double Blind Clinical Trial," *Biol Psychiatry*, 13:148-154, 1976.
12. Gibson, TH, O'Hair, DE: "Cranial Application of Low Level TENS Treatment Vs. Relaxation Instructions in Anxious Patients," *Intl Electromedicine Inst Newsletter*, !:2, March/April, 1984
13. "Diagnostic and Therapeutic Technology Assessment: Cranial Electrostimulation," *JAMA*, 251:1094, 1984.
14. Von Richtofen CL, Mellon CS: "Electrosleep Therapy: A Controlled Study of its Effects in Anxiety Neurosis," *Can J Psychiatry*, 25:213-219, 1980.
15. Smith RB: "Cranial Electrotherapy Stimulation," in Neural Stimulation, ed. by Myklebust J, et al, Boca Raton, CRC Press, 1982.
16. American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, 3rd edition, APA, Washington, D.C., 1980.
17. Smith RB, O'Neill L: "Electrosleep in the Management of Alcoholism," *Biol. Psychiatry*, 10:675-680, 1975.
18. Gomez E, Mikhail AR: "Treatment of Methadone Withdrawal with Electrosleep" *Br J Psychiatry*, 134:111-113, 1978.
19. Richtofen CL, Mellon CS: "Cerebral Electrotherapy: Methodological Problems in Assessing its Effectiveness," *Psychological Bulletin*, 86:1264-1271, 1979.

TABLE ONE: PROGRAM COMPLETION AND CES (N=25)

<u>CATEGORY</u>	<u>ACCEPTERS</u>	<u>REFUSERS</u>	<u>CONTROLS</u>
Number	5	8	12
Completed Detoxification	5 (100%)	6 (75%)	9 (75%)
Completed Detox and Rehabilitation	5 (100%)	5 (63%)	8 (67%)

TABLE TWO: RELAPSE, RE-ADMISSION AND CES (N=16)

<u>CATEGORY</u>	<u>ACCEPTERS</u>	<u>REFUSERS</u>	<u>CONTROLS</u>
Completers Available For Study	5	4	7
Number of Persons In Group With No Relapses	2 (40%)	2 (50%)	3 (43%)
<u>Total No. of</u> Relapses in Group	3	4	6
Number of Persons With No Readmissions	5 (100%)	2 (50%)	5 (71%)
<u>Total Number of</u> Readmissions in Group	0	2	2



Brain electric therapy helpful to cocaine addicts

Stimulation of the brain with low-level electrical current may one day become an accepted therapy for cocaine addiction.

Los Angeles psychiatrist Alan Brovar recently found that cocaine addicts given electromedical treatment completed detoxification and rehabilitation programs more successfully than controls. Those receiving treatment had fewer relapses and were less likely to seek readmission.

Of the 12 patients in experimental groups, five received low-level electrical brain stimulation twice a day for 20 minutes on an Alpha-Stim 350 machine.

Used to help insomniacs fall asleep, the machine produces a tiny electrical current (one half cycle per second). Such low-level stimulation may release endorphins, the

brain's natural painkillers, Brovar said. "It may also produce hemispheric synchronization in the brain, making addicts more willing to accept recovery-oriented concepts."

Its sedative effect, he said, induces a state of relaxed alertness that decreases physical craving for the drug within several weeks. "Decreasing psychological dependency is much harder. Along with electromedical treatment, we offer nutritional counseling, an exercise program and therapy groups. Together, they help addicts overcome behavioral dependency."

All five people who received low-level stimulation completed the detoxification program. Seventy five per cent of the others — including those in the control group and

those who refused treatment — also finished. The five receiving therapy completed the rehabilitation program, compared to 65 per cent of the others.

In a six-month followup study, Brovar found that people in all three groups had suffered relapses, but the experimental group had fewer relapses and no readmissions to drug programs. Six people from the other groups were readmitted to inpatient programs.

"Cocaine addicts have a higher dropout rate than any other addicted group," Brovar said. "Electromedical treatment helps them stay in therapy longer."

Brovar: Westside Family Counseling Center, 2665 30th St., Santa Monica, Calif. 90405, (213) 473-7702.