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Brief Report

Effect of Vasopressin on Memory Following Electroconvulsive Therapy

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INTRODUCTION

Memory loss is the most prominent side effect of ECT and constitutes a significant factor influencing negative public opinion regarding the treatment. Both anterograde and retrograde amnesias have been documented (Squire, 1977). The anterograde amnesia is characterized by deficiencies of both verbal and nonverbal memory which are most striking following bilateral ECT (Cohen *et al.*, 1968). Until recently, therapeutic possibilities for alleviating or preventing ECT-induced memory loss had been limited. Animal studies with vasopressin, an octapeptide synthesized in the anterior hypothalamus, have now convincingly demonstrated positive effects on learning (de Wied *et al.*, 1976). Vasopressin fragments and their synthetic analogs such as 1-desamino-8-*D*-arginine vasopressin (DDAVP) exert similar positive effects on both consolidation and retrieval of learned information (Bohus *et al.*, 1972). Human studies with vasopressin have reported positive effects on attention, learning, and memory in normal volunteers (Legros *et al.*, 1978) and amnesic patients (Oliveros *et al.*, 1978). Weingartner *et al.* (1981) reported that DDAVP markedly enhanced learning and memory in normal volunteers and cognitively impaired adults. DDAVP also partially reversed the retrograde amnesia following ECT in two depressed patients (Weingartner *et al.*, (1981). The present study tested the effect of a single administration of

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DDAVP on immediate recall of learned verbal and nonverbal information by patients receiving a course of ECT.

METHOD

Nine consenting patients at the Valkenburg Psychiatric Hospital (Department of Psychiatry, University of Cape Town) were included in the study. All fulfilled Research Diagnostic Criteria for Major Depressive Disorder and had, on clinical grounds, been scheduled for a course of ECT. ECT was administered twice weekly using bilateral electrode placement and following thiopentone sodium anesthesia and succinylcholine administration. Patients were randomly assigned to a double-blind crossover design in which DDAVP (25 μg) or placebo was administered intranasally 2-3 hr after the fourth or fifth ECT. Following the next ECT, patients were crossed over to the converse treatment. The Wechsler Memory Scale (WMS) (Psychological Corporation, New York) was administered 30 min after DDAVP (or placebo) administration. In all cases, Form I of the WMS was used at the first testing session and Form II at the second. In order to familiarize the subjects with the testing procedure and to obviate artifactual learning effects, a specially prepared practice form of the WMS was administered after the ECT immediately preceding the first leg of the trial and following single-blind intranasal placebo administration. The Hamilton Depression Scale (Hamilton, 1967) was scored at each of the testing sessions.

RESULTS

Scores attained by each of the nine subjects on categories IV-VII of the WMS (Logical Memory, Digits, Visual Reproduction, and Associate Learning) are presented in Table I. Scores following DDAVP and placebo administration are shown for each category and there is no evidence for improvement of performance by DDAVP. To facilitate presentation, data from WMS categories I-III (Personal Information, Orientation, and Mental Control) are not included in Table I. Mean placebo scores for WMS categories I-III were: I = 2.3 ± 1.4; II = 3.1 ± 1.6; III = 4.0 ± 3.5. Performance on WMS categories I-III was not improved by DDAVP. Hamilton scores (Table I) were also not significantly different on the two testing occasions. There was no difference in performance on Form I or II of the WMS and no significant change in Hamilton scores from the first to the second testing occasion.

DISCUSSION

In the present study the effects of vasopressin on memory following ECT have been studied in a double-blind controlled fashion. The results do

Table I. Wechsler Memory Scale Categories and Hamilton Depression Scale – Scores on DDAVP and Placebo[a]

Patients		Wechsler memory scale categories[b]								Hamilton	
		IV Logical memory		V Digits (total)		VI Visual repro.		VII Associate learning			
Age	Sex	DDAVP	Placebo	DDAVP	Placebo	DDAVP	Placebo	DDAVP	Placebo	DDAVP	Placebo
28	M	10	13	10	10	13	12	11	14	6	9
59	F	4	3	11	11	9	6	5	5	3	3
25	M	7	10	13	14	13	12	8	6	2	2
63	F	6	6	12	13	5	3	8	8	1	0
63	F	1	5	5	6	0	0	5	4	15	8
81	F	0	5	9	10	6	8	3	10	11	8
46	F	5	4	9	8	1	1	5	10	5	4
65	F	3	2	5	5	0	0	6	3	3	7
42	F	4	3	4	4	3	0	0	2	10	18
Mean		4.4	5.6	8.6	9.0	5.5	4.6	5.6	6.8	6.2	6.5
SD		± 2.8	± 3.3	± 3.0	± 3.2	± 4.8	± 4.7	± 2.3	± 3.6	± 4.4	± 4.9

[a] Paired *t* tests were used for DDAVP-Placebo comparisons. No differences were significant.
[b] To facilitate presentation, data for WMS categories I-III are not included. See Results.

not indicate an effect of a 25-μg dose of DDAVP to improve learning performance in patients tested 2-3 hr after their fourth or fifth ECT. However, single, relatively low DDAVP dosage was used and future studies should encompass higher dosages and a more chronic administration schedule (Weingartner *et al.*, 1981). Testing was done 2-3 hr after ECT when the acute organo-mental manifestations of ECT may still be present. This may have masked more subtle effects of vasopressin on learning. The low scores on all seven WMS categories, and particularly on WMS categories I-III (Personal Information, Orientation, and Mental Control), support this possibility. Hamilton scores indicate (see Table I) that significant depression was no longer present in most of the subjects, so that it is unlikely that the impaired performance was due to depression. Finally, immediate rather than delayed recall of learned information was tested while delayed recall appears more strikingly influenced by ECT (Squire and Slater, 1976). The findings are, therefore, presented as a guideline for future studies rather than as a basis for conclusive inferences regarding effects of DDAVP in ECT-induced amnesia.

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Brief Report

Lithium Intraerythrocyte Levels in Tardive Dyskinesia: A Preliminary Report[1]

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Tardive dyskinesia (TD) is the most serious side effect of neuroleptic drugs (Wolfe *et al.*, 1982), and although it has been described since 1957 by Schonecker, many basic issues regarding its diagnosis, epidemiology, and predisposition have not been resolved.

Several recent reports have indicated that plasma levels of neuroleptics are different in TD from non-TD controls. Smith *et al.* (1982) found plasma levels of neuroleptics to negatively correlate in TD patients. On the other hand, Jeste *et al.* (1982) found TD patients to have a significantly higher ratio of serum concentration of neuroleptic medication than a matched control group.

There have been no systematic studies of plasma, lithium, red cell (RBC), and RBC/plasma lithium ratios in TD patients, although these values have been used to determine the responsiveness to lithium in affective disorder patients for over a decade. Erechefsky *et al.* (1979), in a single case report, indicated that TD improved in their patient by increasing the lithium ratio from 30% to 40%, while maintaining a fairly constant plasma level.

In this paper, we undertook the study of manic-depressive patients with TD and without TD, to determine any differences in plasma lithium, RBC, and lithium ratio.

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