

PRELIMINARY COMMUNICATION

## Cognitive functions in tardive dyskinesia

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**SYNOPSIS** Cognitive functions of psychiatric patients with and without tardive dyskinesia were evaluated using the Wechsler Adult Intelligence Scale, Wechsler Memory Scale and Rey Auditory Verbal Learning Test. Schizophrenic patients with and without tardive dyskinesia did not differ in their performance on the administered psychological tests. However, affective disorder patients with tardive dyskinesia showed significantly more impairment on the Wechsler Memory Scale and Rey Auditory Verbal Learning Test than affective disorder patients without tardive dyskinesia. These findings suggest that affective disorder patients who develop tardive dyskinesia may have some predisposing brain damage or that tardive dyskinesia in these patients represents both a motor and a dementing disorder.

### INTRODUCTION

Tardive dyskinesia, an extrapyramidal syndrome associated with the long-term administration of neuroleptic drugs, is believed to be basically a movement disorder without associated cognitive impairment (Crane, 1973). Recent research, however, suggests that patients with this condition present, in addition to the motor disturbance, a reduction in new learning abilities (Famuyiwa *et al.* 1979). Although tardive dyskinesia may occur in any patient who has received neuroleptic therapy, regardless of psychiatric diagnosis, we have found that affective disorder patients appear to be more vulnerable to the development of this condition (Wolf *et al.* 1982*a, b, c*). Several workers (Kane *et al.* 1980; Wegner *et al.* 1979) have suggested that the presence of electroencephalographic abnormalities in patients with affective disorders predisposes them to the development of tardive dyskinesia. Thus, the present study was designed to determine whether impairment in cognitive functions might also be associated with an increased vulnerability to tardive dyskinesia.

### METHODOLOGY

#### Subjects

Four groups of patients were studied: schizophrenic patients with and without tardive dyskinesia (TD), and bipolar patients with and without tardive dyskinesia. The first group consisted of 9 male chronic schizophrenic patients with prominent signs of tardive dyskinesia as shown by mean Simpson Rating Scale scores of  $74 \pm 9.4$ . Their mean years ( $\pm$ S.D.) for age, education and the length of psychiatric illness were  $54.1 \pm 8.2$ ,  $11.8 \pm 3.8$  and  $21.6 \pm 9.3$ , respectively. A control group was formed of 7 subjects without tardive dyskinesia matched for psychiatric diagnosis, sex, age, years of education, the length of psychiatric illness and drug treatment.

The third group consisted of 6 bipolar male patients with repeated episodes of mania requiring the use of neuroleptics in addition to lithium therapy with prominent signs of tardive dyskinesia as shown by mean Simpson Rating Scale scores of  $81.7 \pm 15$ . Their mean years ( $\pm$ S.D.) for age, education and the length of psychiatric illness were  $48.8 \pm 14.1$ ,  $10.7 \pm 3.2$  and  $11.1 \pm 8.1$ , respectively. A control group was also constituted of 6 subjects without tardive dyskinesia, matched for diagnosis (also bipolar patients with repeated episodes of mania requiring use of both lithium and neuroleptics),

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sex, age, years of education, the length of psychiatric illness and drug treatment.

### General design

Subjects had received an extended psychiatric and neurological assessment. All available records were carefully reviewed, with special emphasis on the duration of psychiatric illness, drug histories, and educational level. Patients were diagnosed according to the Research Diagnostic Criteria (Spitzer *et al.* 1975). Subjects were also evaluated for tardive dyskinesia, using the diagnostic criteria of Jeste *et al.* (1981). The severity of the tardive dyskinesia was assessed by the Simpson Rating Scale (Simpson *et al.* 1979). Patients had completed serial Simpson Rating Scales and Brief Psychiatric Rating Scales (Overall & Gorham, 1962) for a period of at least 3 weeks while receiving the minimum maintenance dosage of neuroleptic as required by their clinical condition. Bipolar patients also received lithium therapy.

Patients from the above-mentioned 4 groups were referred to the Psychology Service for assessment of cognitive functions. Each patient completed the Wechsler Adult Intelligence Scale (WAIS) (Wechsler, 1955), the Wechsler Memory Scale (Wechsler, 1945), and the Rey Auditory Verbal Learning Test (RAVT) (Lezak, 1976). These tests were administered by a psychologist who was blind to psychiatric diagnosis. Bipolar patients received psychological evaluation during periods of remission in between manic and depressive episodes, as determined by repeated psychiatric examinations and the absence of significant clinical findings in the depressive cluster of the Brief Psychiatric Rating Scale.

### Data analysis

All group comparisons were made with the non-parametric Mann-Whitney *U* statistic. All of the given probabilities are for two-tailed tests of significance.

## RESULTS

As can be seen from Table 1, the schizophrenic patients with and without tardive dyskinesia did not differ significantly in their performances on the various tests administered. Table 2 indicates that the affective disorder patients with and without tardive dyskinesia had similar WAIS IQ

Table 1. *Cognitive functions in schizophrenic patients with and without tardive dyskinesia*

Measure	Schizophrenics without TD (median and range)	Schizophrenics with TD (median and range)	<i>U</i> *
Verbal IQ	86.0 (69-102)	88.0 (76-113)	24.5
Performance IQ	71.0 (54-93)	87.0 (63-108)	18.0
Full Scale IQ (FSIQ)	80.0 (66-98)	84.0 (72-108)	19.5
Memory Quotient (MQ)	73.0 (57-100)	77.0 (64-98)	28.0
FSIQ-MQ	4.0 (-16-11)	10.0 (-5-25)	18.5
RAVT Total	27.0 (6-47)	31.0 (22-38)	26.5

\* Mann-Whitney *U* statistics. No differences were statistically significant.

Table 2. *Cognitive functions in affective disorder patients with and without tardive dyskinesia*

Measure	Affective disorders without TD (median and range)	Affective disorders with TD (median and range)	<i>U</i>
Verbal IQ	101.0 (80-120)	98.0 (86-104)	12.0
Performance IQ	89.5 (74-102)	82.5 (76-85)	9.5
Full Scale IQ (FSIQ)	97.5 (76-117)	89.0 (83-93)	7.5
Memory Quotient (MQ)	103.5 (81-122)	80.5 (62-93)	2.5**
FSIQ-MQ	-5.0 (-20-5)	8.0 (-1-25)	4.0*
RAVT Total	34.5 (26-44)	23.0 (12-31)	2.5**

Mann-Whitney *U* statistics: \*  $P < 0.05$ ; \*\*  $P < 0.02$ ; other differences were not statistically significant.

scores, but differed significantly in their Memory Quotients and RAVT totals.

It can also be seen from Fig. 1 that the memory quotients of the affective disorder patients with tardive dyskinesia were significantly below their respective Full Scale IQ, indicating a deficit in immediate memory, in contrast to the findings obtained in the affective disorder patients without tardive dyskinesia. It should also be noted that the affective disorder patients with tardive dyskinesia not only had lower total RAVT scores, but also recalled fewer words in every trial of the RAVT, as compared with the affective disorder patients without tardive dyskinesia (Fig. 2).

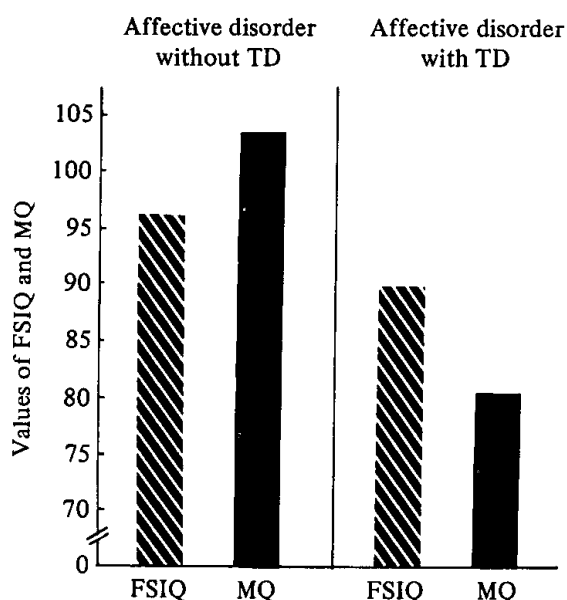


FIG. 1. Medians for Full Scale IQ (FSIQ) and Memory Quotient (MQ) in affective disorders with and without TD.

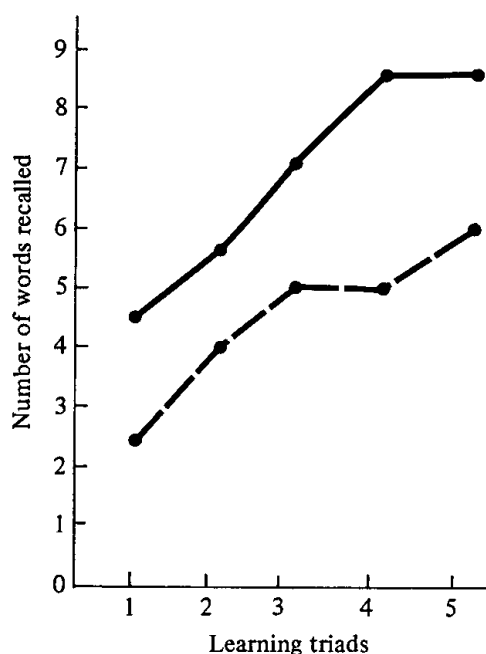


FIG. 2. Rey Auditory Verbal Learning Test (RAVT). Median words recalled at each trial. ●—●, affective disorder without TD; ●--●, affective disorder with TD.

## DISCUSSION

Our results, which must be viewed within the limitations imposed by the small number of subjects, suggest that chronic schizophrenics with and without tardive dyskinesia do not differ significantly in their performance on the WAIS, Wechsler Memory Scale or RAVT. These results are similar in part to the findings of Famuyiwa *et al.* (1979), who reported that schizophrenics

with and without tardive dyskinesia did not differ in their performance on the Withers and Hinton Clinical Tests of Sensorium, although subjects with tardive dyskinesia showed a greater impairment on a paired associate learning test.

In contrast to our findings with the schizophrenic subjects, these results indicate that patients with affective disorders and tardive dyskinesia showed significant deficits on the Wechsler Memory Scale and RAVT in comparison with such patients without tardive dyskinesia. These results do not reflect cognitive deficits which could be attributable to depressive symptomatology, as patients were evaluated during periods of remission between either manic or depressive episodes.

Our findings in the affective disorder patients with tardive dyskinesia, of relative intact IQ scores but significant impairment in tasks of immediate memory and new learning abilities, are similar to those obtained in investigations of patients with Huntington's Chorea (Butters *et al.* 1978) and Korsakoff's syndrome (Ryan & Butters, 1980), suggesting that tardive dyskinesia in this group of patients may represent both a motor and a dementing disorder.

Alternatively, these findings might indicate that the subgroup of affective disorder patients with tardive dyskinesia had some degree of brain dysfunction which could have contributed to their increased vulnerability to tardive dyskinesia; this has been suggested by various other investigators (Kane *et al.* 1980; Davis *et al.* 1976; Rosenbaun *et al.* 1977). Furthermore, there is evidence of an association between EEG abnormalities and tardive dyskinesia in patients with affective disorders (Wegner *et al.* 1979). Prospective studies involving newly diagnosed affective disorder patients who undergo initial neuropsychological evaluation and serial psychometric testings are in progress to determine whether any pre-existing neuropsychological deficits may be correlated with the later development of tardive dyskinesia.

This study was supported in part by the Illinois Department of Mental Health, Research and Development grant no. 8324-01.

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