

## Letter

### Association Between Abnormal REM Sleep and Negative Symptoms in Schizophrenia

To the Editors:

Although shortened rapid eye movement (REM) sleep latency, increased REM density, and decreased slow-wave sleep (SWS) are considered characteristic features of endogenous depression (Kupfer et al., 1978), several studies have reported similar findings in schizophrenic patients (reviewed in Zarcone et al., 1987). The latter observed that on the basis of REM abnormality, medication-free schizophrenic patients were indistinguishable from patients with major depression. The precise implications of these sleep findings in schizophrenia are unclear. The present study was conducted to evaluate the frequency and nature of abnormalities in the sleep electroencephalogram (EEG) in a group of medication-free schizophrenic patients and to investigate the association of such abnormalities with positive, negative, and depressive symptoms in schizophrenia.

#### Methods

The sample consisted of 10 consecutively hospitalized inpatients who met *DSM-III-R* (American Psychiatric Association, 1987) criteria and Research Diagnostic Criteria (Spitzer et al., 1978) for schizophrenia (five male and five female; mean age = 28.1 years; mean duration of illness = 6.9 years). All patients had been medication free for at least 2 weeks. EEG sleep was monitored for 2 consecutive nights, with data from the second night being used for analysis. In addition to standard sleep variables, a discriminant function (DF) score (Feinberg et al., 1982) was calculated. DF scores represent a linear combination of REM density and REM latency, with DF scores < 1.0 indicating signifi-

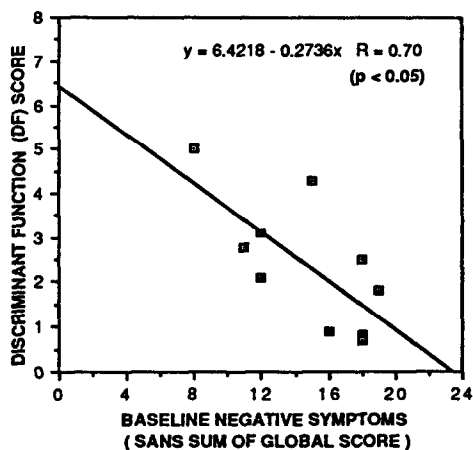
cant REM abnormality and being consistent with the sleep of endogenous depressives; normal controls and nonendogenous patients have DF scores > 1.0. Patients were rated on the Brief Psychiatric Rating Scale (BPRS) (Overall and Gorham, 1962), Scale for the Assessment of Negative Symptoms (SANS) (Andreasen, 1983), and the 17-item Hamilton Rating Scale for Depression (HRSD) (Hamilton, 1960). Comparisons of demographics and rating scale scores between patients with and without REM abnormalities (DF scores < 1.0 and > 1.0, respectively) were made by the two-tailed Student's *t* test. Pearson product-moment correlation analysis between symptom ratings on the one hand and measures of REM abnormality (DF score) and SWS (Time of Stage 4 Sleep) on the other were also conducted.

#### Results

Four of the 10 patients showed significant REM abnormalities with DF scores < 1.0. Patients with and without REM abnormalities did not differ in age, sex distribution, total duration of illness, or duration of current psychotic exacerbation. The two groups also did not differ in global severity, positive symptoms, or depressive symptoms. The two groups differed significantly in negative symptoms: patients with REM abnormalities (DF score < 1.0) had significantly greater negative symptoms ( $t = 6.99$ ,  $df = 8$ ,  $p < 0.001$ ). Patients with REM abnormalities (DF scores < 1.0) were also noted to have significantly less SWS and Stage 4 non-REM sleep specifically, in conformity with the usually observed association between these sleep findings.

Pearson correlations between the various clinical and sleep variables revealed no significant association between positive symptoms, depressive symptoms, and global severity on the one hand and any of the sleep variables on the other. There was a significant negative correlation between the baseline DF score and negative symptoms (Fig. 1). A similar negative correlation was noted between minutes of Stage 4 non-REM sleep and negative symptoms ( $r = -0.64$ ,  $df = 8$ ,  $p < 0.05$ ).

**Fig. 1. Correlational analysis between baseline negative symptoms and discriminant function score (REM abnormality)**



While these findings are clearly of a preliminary nature, they suggest that a significant number of schizophrenic patients may have reduced REM latency and decreased SWS—findings that have often been considered to typify sleep in endogenous depression. Furthermore, these sleep findings did not appear to be related to depressive symptoms in schizophrenia, but were significantly correlated with the severity of negative symptoms. This association of decreased REM latency and increased REM density with negative symptoms in schizophrenic patients suggests that the sleep findings and negative symptoms may have similar underlying mechanisms. Cholinergic mechanisms are important in sleep regulation, particularly with regard to the onset or timing of the first REM period (Sitaram et al., 1977). Based on the similarity

in the behavioral profile produced by cholinergic overdrive and the negative schizophrenic syndrome (Greden et al., 1987), response of negative symptoms to anticholinergic treatment (Tandon et al., 1988), neuroendocrine and other data (Tandon and Greden, 1988, in press), cholinergic hyperactivity has also been proposed as a possible mechanism in the production of negative schizophrenic symptoms. While alternative mechanisms need to be considered, the association between REM abnormalities and negative symptoms observed in our study is consistent with the implication of increased muscarinic activity in the pathophysiology of both negative symptoms and altered REM sleep in patients suffering from schizophrenia.

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