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Motor dysfunction in schizotypal personality disorder

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Abstract

Past research has revealed that schizophrenia is associated with voluntary movement abnormalities, as well as higher rates of involuntary movements. On instrumental motor tasks, patients manifest reduced motor stability, excessive force and more contralateral motor overflow (movement in the non-responding hand). In the present study, an instrumental motor task (manual response forced-choice task) was administered to a group of adults with schizotypal personality disorder (SPD) in order to determine whether they show motor deficits similar to those observed in schizophrenia. As predicted, the schizotypal subjects were excessive and more variable in motor force, compared to healthy controls and other personality-disordered subjects. Additionally, the force and variability of the motor responses were positively correlated with ratings of both positive and negative SPD symptoms. Finally, motor overflow and negative symptoms were associated with higher salivary cortisol levels. The pattern of findings is consistent with previous reports linking motor abnormalities and heightened cortisol with schizotypal personality disorder.

Keywords: Cortisol; Motor dysfunction; Positive and negative symptoms; Schizotypal

1. Introduction

Some relatives of schizophrenia patients manifest a personality syndrome (e.g. schizotypal personality disorder; SPD) that resembles the symptoms of schizophrenia (e.g. Maier et al., 1994; Torgersen, 1994; Kendler and Walsh, 1995). Moreover, factor analytic studies indicate that these personality features parallel the positive, negative and disorganized symptom dimensions of schizophrenia (Raine et al., 1994; Vollema and van den Bosch, 1995; Bergman et al., 1996).

It has also been shown that there are biological, cognitive and phenonmonological similarities between schizophrenia and SPD (e.g. Siever et al., 1993, 1994). For instance, Lees-Roitman et al. (1997) recently reported that schizotypal subjects display attentional impairments that are similar in pattern to those seen in schizophrenia. Also, similar to schizophrenia patients, individuals with symptoms of SPD display reaction time cross-over deficits (Drewer and Shean, 1993; Sarkin et al., 1998), reductions in prepulse inhibition (Cadenhead et al. 1993), facial recognition deficits (Mikhailova et al., 1996), reduced P300 amplitudes over the left temporal lobe (Sailsbury et al., 1996), retarded habituation in skin conductance orienting (Raine et al., 1997) and more perseverative errors on the Wisconsin Card Sort Test (Raine et al., 1992).

Spontaneous movement abnormalities have

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been documented in numerous studies of schizophrenia patients, both medicated and neuroleptic-naïve [for a review, see Walker (1994)]. A recent investigation found that individuals with schizotypal personality manifested more spontaneous dyskinetic-like movements than subjects with schizoid personality or healthy controls (Cassidy et al., 1998). Similarly, Walker et al. (in press) found that adolescents with SPD showed an elevated rate of spontaneous involuntary movements when compared with normal adolescents and those with other personality disorders.

Walker et al. (in press) also found that salivary cortisol levels were positively correlated with the rate of involuntary movements. It is noteworthy that schizophrenic patients show abnormalities in daily cortisol levels and a reduction in the normative later-day decline (Van-Cauter et al., 1991; Kaneko et al., 1992). That is, cortisol levels naturally decline during the afternoon, but schizophrenic patients have been found to show less of the expected decline over the course of the day. Therefore, one would expect group differences in cortisol to be maximized during the later afternoon.

In order to measure motor dysfunctions more precisely, some investigators have developed instrumental procedures that index motor pressure and stability. Using an instrumental motor task, Caligiuri and Lohr (1994) examined voluntary control of a steady-state force and found that neuroleptic-naïve schizophrenia patients showed more manual force instability than comparison subjects. These authors also found that force instability was correlated with positive, but not negative, symptom ratings. Similarly, Vrtunski et al. (1989) administered a bimanual, choice reaction-time task and found that schizophrenia patients, compared to normals and psychiatric controls, displayed a greater force instability, increased peak force, and more contralateral motor overflow (increased force in the non-responding hand). The latter measure, motor overflow, is suggestive of involuntary movement. Schizophrenia patients on and off medication did not differ on any of the motor indices. These and related findings suggest that the brain regions that give rise to schizophrenia and spectrum disorders may also play a role in motor regulation. Further, because motor dysfunction is known to precede the clinical onset of schizophrenia by many years (Walker et al., 1994), motor assessments may be promising, along with other indicators (Neumann and Walker, 1996), for identifying individuals at risk.

Compared to clinical ratings based on observations, instrumental motor assessment procedures appear to offer a more precise and objective approach to the delineation of motor abnormalities. To date, instrumental procedures have not been used in studies of subjects at genetic or behavioral risk for schizophrenia. In the study described here, a motor task similar to that employed by Vrtunski et al. (1989) was administered to SPD subjects to determine whether they showed a performance profile similar to that observed in schizophrenia. The computerized task used in this study assesses multiple aspects of motor function, including reaction time (RT), movement time (MT), force, force instability and contralateral motor overflow (involuntary movement—IM). A key feature is its capacity to differentiate reaction time (RT) from movement time (MT), with the former being determined by both cognitive and motor factors, and the latter being predominantly determined by motor factors (bradykinesia). It yields indices that have been shown to differentiate various syndromes of motor dysfunction. For example, patients with Parkinson's disease, a DA depletion disorder, show a pronounced increase in MT, but not RT or IM (Ebmeier et al., 1992), whereas schizophrenia patients manifest increased RT and IM, but not MT (Caligiuri et al., 1993).

We tested the hypotheses that SPD subjects, when compared to normals and subjects with other personality disorders, will manifest a greater variability in motor force, higher response force and more contralateral motor overflow. The asociations of motor indices with symptom ratings and cortisol release were also examined.

2. Methods

2.1. Subjects

Fifty-four, right-handed, adult subjects, solicited through a newspaper ad, participated in the