Available online at www.sciencedirect.com
SCIENCE DIRECT®
Journal of Psychiatric Research 39 (2005) 101–108
JOURNAL OF PSYCHIATRIC RESEARCH
www.elsevier.com/locate/jpsychires

Effects of haloperidol and risperidone on psychomotor performance relevant to driving ability in schizophrenic patients compared to healthy controls

Michael Soyka[a,*], Catja Winter[a], Sabine Kagerer[a], Manfred Brunnauer[b], Gerd Laux[b], Hans-Jürgen Möller[a]

[a] *Psychiatric Hospital, Ludwig-Maximilians-University of Munich, Naussbaumstrasse 7, D-80336 Munich, Germany*
[b] *Mental State Hospital Gabersee, D-83512 Wasserburg, Germany*

Received 7 October 2003; received in revised form 20 April 2004; accepted 22 April 2004

Abstract

The effects of antipsychotic treatment on the psychomotor performance and driving ability of schizophrenic patients is subject of investigation. The present study was designed to evaluate the effects of an atypical neuroleptic (risperidone) in comparison to a conventional dopamine antagonist neuroleptic (haloperidol) on several dimensions of psychomotor performance (visual perception, attention, reaction time, and sensorimotor performance) considered to be of relevance in evaluating driving fitness. Psychomotor performance was assessed by means of the ART 90 (act-and-react test), a computerized test battery which is frequently used in diagnosis of psychomotor performance. The 40 participating patients were examined at discharge following psychopathological stabilisation; 20 received haloperidol medication, 20 received the atypical neuroleptic risperidone. Nineteen healthy individuals were studied as a control group. Our findings indicate a remarkably reduced psychomotor performance in both groups of schizophrenic patients compared to healthy controls. We did find a significant but low correlation between age and some items of the RST3 and between age and the tracking performance on the PVT. The younger patients showed a better test performance than older patients. The BPRS-score was significantly correlated with only two items of the RST3. However, patients under treatment with risperidone showed significantly better results compared to patients treated with haloperidol. Only one (5%) subject passed all subtests without major failures and could be regarded as competent to drive. Among patients with risperidone, seven patients (35%) passed all test parameters without major failures. Clinical implications of these findings are discussed.

Keywords: Psychomotor performance; Driving ability; Schizophrenia; Haloperidol; Risperidone

1. Introduction

Cognitive dysfunction is of great relevance for treatment and prognosis in schizophrenia and is already seen in early forms or prodromal states of schizophrenia (Bilder et al., 2000; Ho et al., 2003; Nieuwenstein et al., 2001; Brekke et al., 2001; Van der Gaag et al., 2002; Aksaray et al., 2002; Pollice et al., 2002; Evans et al., 2003). It may be present prior even to the onset of positive symptoms and persists during periods of remission (Hambrecht et al., 2002; Velligan and Miller, 1999). While its progression is a matter of controversy (Albus et al., 2002) the role of cognitive deficits for social functioning has been demonstrated in a large number of studies (Dickerson et al., 1999; Meltzer et al., 1996; Moritz et al., 2001; Addington and Addington, 2000; Kasper and Resinger, 2003). Improvement in cognitive functioning leads to improved skills in social problem-solving, psycho-social functioning and quality of life (Green et al., 1996). Impaired cognitive function is not restricted to any subgroup of patients and is seen in variable intensity among almost all schizophrenic patients (Goldberg and Ragland, 1990). However, it is

* Corresponding author. Tel.: +49-89-5160-2777; fax: +49-89-5160-5617.
E-mail address: michael.soyka@psy.med.uni-muenchen.de (M. Soyka).

0022-3956/$ - see front matter © 2004 Elsevier Ltd. All rights reserved.
doi:10.1016/j.jpsychires.2004.04.006

difficult to distinguish syndrome-related dysfunction from cognitive impairment resulting from the side-effects of antipsychotic medications. Clinical data suggest that treatment with novel antipsychotic medications like risperidone, amisulpride, olanzapine or quetiapine may have a positive effect on cognition and psychomotor performance (Green et al., 1997; Gallhofer et al., 1996; Ramaekers et al., 1999; Harvey and Keefe, 2001; Bilder et al., 2002). Measuring differential effects of antipsychotics on cognitive functioning is one of the most interesting research areas in current psychopharmacology.

The present study was designed to compare schizophrenic patients receiving the atypical neuroleptic risperidone with patients receiving a conventional dopamine antagonist neuroleptic (haloperidol) and healthy controls in relation to psychomotor performance and driving ability. This is of clinical relevance: Palmer et al. (2002) reported that 43% of middle-aged and elderly outpatients with schizophrenia are currently drivers. We used several psychomotor tests developed by the Austrian Road Safety Board for the examination of car, bus, and taxi drivers in accordance with German guidelines for road and traffic safety (Lewrenz, 2000). Bukasa et al. (2003) investigated the relation between the performance tests of the Austrian Road Safety Board and driving errors in real traffic. The statistical analyses revealed numerous significant relations between single test variables and 11 different error categories of driving behaviour (p.e. distance to others, speed, tracking, attention to pedestrians and other drivers, communication to pedestrians). In sum, on more or less complex levels of analyses, the study yielded empirical evidence for the validity of the traffic-specific performance tests.

There are few studies of schizophrenic patients on the influence of antipsychotic medication on cognition and psychomotor performance, especially with respect to driving ability. Laux (1998) and Grabe et al. (1999) found that only 10% of neuroleptic-treated patients did not show any impairment in fitness to drive during the last two weeks of their hospitalisation. The findings of Grabe et al. (1999) further indicate that clozapine treated patients compared to patients treated with different typical neuroleptics performed better on a test measuring resistance to stress and the capacity to integrate information. In a previous clinical study we reported similar results comparing patients under haloperidol compared to different atypical neuroleptics (Kagerer et al., 2003). Very preliminary data of a comparative study of haloperidol and risperidone indicated a possible beneficial effect of the atypical on psychomotor performance and driving ability (Soyka et al., 2001).

2. Subjects and methods

We conducted a non-randomised, comparative clinical study at the Psychiatric Hospital of the University of Munich with 40 (27 male, 13 female) patients who met the ICD-10 and DSM-IV criteria for schizophrenia or a schizoaffective disorder. Study patients were clinically stabilized, had a steady-state of neuroleptic medication and were ready for discharge. The 20 patients (13 m, 7 f) treated with risperidone received an average dosage of 4.6 mg/day (4–8 mg). The 20 patients (14 m, 6 f) treated with haloperidol received a dosage of 10, 4 mg/day (5–30 mg). Although a monotherapy was favoured, 11 received an additional medication (biperiden) when clinically indicated. There was no significant difference in age, sex, education and BPRS (brief psychiatric rating scale, Overall and Gorham, 1962) scores between the haloperidol and risperidone group (see Table 1). Patients were excluded if they had a disabling physical disorder, organic brain disorder, acute substance abuse, or any serious concurrent medical condition. In addition, patients with extrapyramidal-motoric symptoms were excluded, too. As severe extrapyramidal-motoric symptoms are an exclusion criterion for driving ability patients with these symptoms were not included in the study. All patients had a valid driver's licence and/or were experienced car drivers. In addition, all control subjects had a driving licence, too. All subjects participated voluntarily in the study and gave informed consent. A description of the sample is presented in Table 1.

Relevant psychomotor skills for driving fitness where assessed by the act-and-react test system (ART 90), a

Table 1
Sample characteristics of the groups

	Risperidone ($n = 20$)	Haloperidol ($n = 20$)	Control ($n = 19$)
Age (mean, range)	32.8 ± 6.98	33.1 ± 7.59	30.1 ± 8.02
Sex	13 M/7 F	14 M/6 F	10 M/10 F
Medication/dosage (mean, range)	4.2 mg (4–8 mg) ± 1.14 mg	10.4 mg (5–30 mg) ± 6.24 mg	
Current hospitalization (weeks)	6.8 ± 7.9	6.2 ± 3.8	
BPRS at examination (mean)	28 ± 9.4	27.4 ± 10.2	
Mean level of education scale 1–5 (9–18 years)	4.2	4.1	4.1