Prevalence of Obsessive-Compulsive Disorder in Schizophrenia and Significance of Motor Symptoms

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To investigate the differences between schizophrenic subjects with and without obsessive-compulsive disorder (OCD), the authors systematically assessed 76 schizophrenic subjects for OCD. Subjects with and without OCD were then compared with regard to motor symptoms, including catatonia, and several measures of psychopathology. Treatment strategies were evaluated retrospectively. The 12 subjects with OCD (15.8%) had more motor symptoms, including catatonia, than non-OCD schizophrenic subjects. Some differences were found with regard to psychopathological symptoms. Treatment strategies also differed in the two groups. The high prevalence of motor symptoms in these subjects supports the hypothesis of a basal ganglia–frontal lobe connection linking OCD with schizophrenia.

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The connection between obsessive-compulsive disorder (OCD) and schizophrenia has been of interest to clinicians and researchers since early in this century.[1–4] Authors report that between 1% and 16% of patients with OCD developed schizophrenia.[5–8] Earlier authors found that OCD occurred in fewer than 1% ($N = 1{,}000$)[2] to 3.5% ($N = 848$)[9] of schizophrenic subjects. However, recent studies have reported prevalence rates for OCD in schizophrenia ranging from 7.8%[10] to 25%.[11] Obsessive-compulsive symptoms have been found in up to 60% of schizophrenic patients.[12] The presence of OCD in schizophrenia is reported to predict cognitive impairment, a severe course, and poor outcome.[12–16]

Despite growing knowledge about OCD and schizophrenia, little is known about the links between them. Traditional authors noted frequent occurrence of stereotypies, mannerisms, negativism, echophenomena, catalepsy, dyskinesias, grimacing, and other catatonic symptoms in schizophrenic patients with OCD[2,3,4,17] and also introduced the concept of manneristic catatonia, which described a subtype of schizophrenia with catatonic and obsessive-compulsive symptoms.[18] As well, there is one recent report of facial stereotypies in schizophrenic patients with OCD.[19]

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There are also numerous studies on the motor symptoms associated with OCD and extensive reports on obsessive-compulsive features in patients with movement disorders.[20–30]

This intriguing link between OCD, schizophrenia, and motor symptoms led us to conduct a study in which we identified schizophrenic subjects with and without OCD by means of standardized instruments and then compared the two groups for motor symptoms and for a broad spectrum of clinical parameters. Our hypothesis was that schizophrenic subjects with OCD represent a clinically distinct subset of schizophrenic subjects that can be differentiated on the basis of motor symptoms.

METHODS

Subjects and Diagnosis

Seventy-six subjects were recruited from successive admissions to the General Psychiatry Division, Zentrum für Psychiatrie, University of Bochum, Germany. The hospital is a tertiary care center serving an area of 200,000 people. Admissions cover the spectrum of all psychiatric disorders. All patients are initially admitted to the General Psychiatry Division. After remission of their acute symptoms, they are transferred to specialized inpatient units.

Informed consent was obtained from all subjects after full explanation of the study procedure. The diagnosis of schizophrenia was determined according to DSM-III-R.[31] The diagnosis of OCD was determined with the Structured Clinical Interview (SCID) module pertaining to OCD.[32] Twelve subjects who fulfilled criteria for OCD were subsequently administered the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS)[33] to obtain more detailed information on their OCD. Obsessions were defined as intrusive, persistent, and unwanted ideas, not related to the patient's delusions.[10] Compulsions were defined as repetitive behaviors (e.g., hand-washing, checking) or mental acts (e.g., counting) performed in a ritualistic way. The Y-BOCS and the SCID were administered independently by two clinicians. The other scales were administered by five pairs of raters. All raters were experienced clinicians trained in the use of the SCID and the rating scales. Information on the Y-BOCS provided by the patients themselves during the assessment was substantiated by observations of third parties (nurses, treating therapists, family members) and by chart review. Demographic variables and information about clinical course were obtained on admission to the hospital.

Instruments

On admission to the study, patients in both groups were evaluated with a number of rating scales: the Brief Psychiatric Rating Scale (BPRS),[34] the Scales for the Assessment of Positive and Negative Symptoms (SAPS and SANS),[35] the Simpson-Angus Rating Scale (SARS) for the assessment of extrapyramidal symptoms,[36] the Abnormal Involuntary Movements Scale (AIMS),[37] the Hillside Akathisia Scale (HAS),[38] and the Catatonia Rating Scale (CRS).[39,40] The CRS comprises 16 catatonic motor symptoms and 5 catatonic behaviors. Ratings range from 0 (absent) to 4 (severe). The threshold for diagnosis of catatonia is 4 symptoms rated at least 2 (moderate).

Treatment

Medications were chosen by the attending psychiatrists. Drug information was extracted retrospectively by chart review. Doses of neuroleptics during the index admission, total neuroleptic dose during the week prior to admission, and cumulative lifetime neuroleptic exposure were all converted into chlorpromazine (CPZ) equivalents[41] in order to assess differences between the two groups. Treatment with novel antipsychotics, tricyclic antidepressants, selective serotonin reuptake inhibitors (SSRIs), benzodiazepines, and anticholinergic drugs was also assessed for both groups.

Statistical Analysis

Statistical analyses, performed by using Statistical Package for the Social Sciences (SPSS) software, included chi-square analysis for categorical data and Fisher's two-tailed exact test when cell sizes were less than 5. Parametric analyses were performed on continuous variables. The unpaired *t*-test was used for continuous variables, and the Wilcoxon ranked-sum test was used for ordinal data. An analysis of covariance was performed on acute neuroleptic dose, total dose over the week before admission, and cumulative lifetime dose, as well as for treatment with SSRIs, to control for possible medication effect on the motor scales. A hierarchical analysis of covariance was performed on dichotomous treatment variables for the same purpose.

RESULTS

OCD Prevalence and Y-BOCS Scores

The prevalence of OCD in the sample was 15.8% ($N = 12$). Total Y-BOCS scores ranged from 17 to 36. Among these subjects, the most frequent obsessions were of contamination or aggression and somatic obsessions. The most common compulsions were cleaning / washing, checking, repeating, and counting.

Demographic and Illness-Related Information

Twenty-two patients in the total sample were female and 54 were male. The mean age was 35.4 (SD = 8.3)

years. The mean number of hospitalizations was 5.6. Fifty-eight patients (76%) were single, 11 patients (15%) were employed full time, 19 (25%) were employed part time, and 46 (60%) were unemployed. Thirty-eight patients (50%) received social benefits, and 56 (74%) lived in supervised housing. Mean age of onset of schizophrenia was 20.5 years. No differences were found between the two groups on any of these measures. In 10 of the 12 subjects with OCD, obsessive-compulsive symptoms had been present from childhood and had worsened during adolescence. In the remaining 2 patients, OCD and schizophrenia had begun simultaneously (at a mean age of 20.5 years).

HAS, AIMS, CRS, SARS

Schizophrenic subjects with OCD had more subjective and objective akathisia and were categorized on the clinical global impression item of the HAS as "markedly akathisic," in contrast to the non-OCD schizophrenic subjects, who were rated as "borderline akathisic." Fifty-eight percent of subjects with OCD fulfilled the Schooler and Kane criteria[42] for abnormal involuntary movements, as opposed to only 28% of subjects without OCD. Similarly, 83% of subjects with OCD fulfilled CRS criteria for catatonia, as opposed to only 8% of the non-OCD schizophrenic subjects. On the SARS, schizophrenic subjects with OCD were rated as having mild pseudoparkinsonism, but group differences in total SARS scores fell short of significance (Table 1). When all of the scores were controlled for neuroleptic effect, significant main effects for OCD remained robust (main effects for OCD: HAS, $F = 16.1$, $P = 0.000$; AIMS, $F = 18.3$, $P = 0.000$; CRS, $F = 39.3$, $P = 0.000$; SARS, $F = 3.8$, $P = 0.53$).

BPRS, SANS, SAPS

On the BPRS, subjects with OCD had a significantly higher total score than subjects without OCD. They also had significantly more anxiety, guilt feelings, and mannerisms/posturing, but less suspiciousness, than subjects without OCD. On the BPRS subscales, OCD schizophrenic subjects rated higher on the activation subscale than non-OCD schizophrenic subjects (Table 2).

As indicated in Table 3, there were only two items on the SANS on which schizophrenic subjects with OCD significantly differed from those without OCD. No differences were found on the SANS global scale score or on the subscores. On the SAPS, subjects with OCD scored significantly lower on the items and subscales for delusion and hallucinations. They scored significantly higher on the items and subscale for bizarre behavior and on the items "circumstantiality" and "pressure of speech" (Table 3).

Medication

All subjects received more than one type of medication. Table 4 indicates that schizophrenic subjects with OCD had less neuroleptic exposure, as shown by all three measurements of CPZ equivalents, and they were treated more frequently with novel antipsychotics and benzodiazepines than their non-OCD counterparts.

TABLE 1. Significant items, subscale scores, and total motor scale scores in schizophrenic subjects with and without OCD ($N = 76$)

Item, Subscale, or Scale	Mean ± SD: OCD ($n = 12$)	Mean ± SD: Non-OCD ($n = 64$)	χ^2	t	df	P
HAS						
Subjective part	11.0 ± 6.3	6.1 ± 5.4		−2.8	73	0.006
Objective part	8.0 ± 4.0	3.4 ± 3.2		−4.32	73	0.000
Global impression	4.6 ± 2.1	2.3 ± 1.6		−4.39	73	0.000
Total score	19.0 ± 9.6	9.6 ± 8.4		−3.49	73	0.001
AIMS						
Abnormal movements of facial expression	1.6 ± 1.2	0.5 ± 0.8		−3.95	1	0.000
Met Schooler and Kane criteria[a], *n* (%)	7 (58)	18 (28)	4.17		1	0.040
SARS						
Glabella tap	2.6 ± 1.8	1.0 ± 1.8		−3.39	74	0.001
Total score	7.5 ± 8.8	4.4 ± 4.0		−1.96	74	0.08[b]
CRS						
Reached cutoff score for catatonia[c], *n* (%)	10 (83)	5 (7.8)	36.3		1	0.000
Mean number of catatonic symptoms	9.1 ± 4.6	1.8 ± 2.9		−7.3	74	0.000
Total score	29.2 ± 12.6	7.8 ± 8.9		−7.2	74	0.000

Note: OCD = obsessive-compulsive disorder; HAS = Hillside Akathisia Scale; AIMS = Abnormal Involuntary Movements Scale; SARS = Simpson-Angus Rating Scale; CRS = Catatonia Rating Scale.

[a] At least 2 symptoms rated moderate or 3 symptoms rated minimal.

[b] Not significant.

[c] At least 4 symptoms rated 2 (moderate).

Average dosages of medication other than typical neuroleptics for schizophrenic subjects with and without OCD (OCD-S, Non-OCD-S) included the following: anticholinergics (biperiden), iv 2.5–5 mg/day for acute dystonia and 4–12 mg po/day for parkinsonian-like symptoms (both groups); clozapine, 50–300mg/day (OCD-S) and 150–400 (Non-OCD-S); risperidone, 2–4 mg/day (OCD-S) and 2–6 mg/day (Non-OCD-S); lorazepam, 4–10 mg/day (OCD-S) and 0.5–4 mg (Non-OCD-S); fluoxetine, 40–80 mg/day (OCD-S) and 20 mg/day (Non-OCD-S); paroxetine, 40 mg/day (OCD-S); fluvoxamine, 300 mg/day (OCD-S); clomipramine, 200 mg/day (OCD-S); and doxepine, 11–200 mg/day (OCD-S). All patients received polypharmacy.

DISCUSSION

Prevalence

Based on the prevalence rate of each condition in the community, the expected co-occurrence of schizophrenia with OCD can be calculated as 2%.[43,44] The prevalence rate of 15.8% of OCD in our sample is 7 times the chance rate and provides support for earlier reports that a significant subset of schizophrenic patients meets criteria for OCD. Similar rates, ranging between 12.8% and 15%,[13,45] have been reported previously. We agree with Eisen et al.[10] that a systematic assessment procedure such as the one we used is necessary to reduce the diagnostic confounds in differentiating severe obsessions from psychotic thought disorder and to separate the rituals found in OCD from the coping strategies seen in schizophrenia, which are simple, uniform, and less complex. Furthermore, in clinical practice, prominent positive and/or negative symptoms may mask obsessive-compulsive symptoms. In fact, the relative paucity of literature on OCD in schizophrenia suggests that their co-occurrence is underidentified rather than overdiagnosed.

Motor Symptoms

A major finding in the present study was the high frequency of motor symptoms in the schizophrenic subjects with OCD. This finding supports our central hypothesis. All subjects had been exposed to neuroleptics and other psychotropic medications, but our analysis was corrected for medication exposure and confirmed that the presence of OCD in schizophrenia was strongly associated with motor symptoms. Although the prevalence of extrapyramidal symptoms was not different in the two groups, schizophrenic subjects with OCD had significantly more severe akathisia and more abnormal involuntary movements than their non-OCD counterparts. The pathogenesis of akathisia and abnormal involuntary movements is not clear, and neuroleptic exposure seems to be only one of the factors contributing to their manifestation.[46–54] From our findings, it seems likely that schizophrenic patients with OCD are particularly vulnerable to developing both medication-induced neurological motor side effects and medication-unrelated motor symptoms. The high frequency of catatonia in the schizophrenic subjects with OCD confirms clinical observations by authors from the pre-neuroleptic era.[3,4]

The finding that motor symptoms are a defining feature of schizophrenia with OCD strengthens an emerging connection between OCD, schizophrenia, and motor disorders. There is much direct and indirect evidence pointing to involvement of the frontal lobe and the basal ganglia in the pathophysiology of both schizophrenia and OCD.[55–60]

OCD has significant associations with a variety of motor symptoms, including stereotypies, grimacing, twitching, catatonia, and tics.[21,22,30] There is also evidence in the literature that obsessional slowness, which is characterized by loss of motor fluency, hesitancy of limb movements, speech and gait abnormalities, cogwheel rigidity, complex repetitive movements, and tics and is seen in a subset of patients with OCD, may actually represent a different subtype of OCD.[61–63] The clinical description of the symptoms of obsessional

TABLE 2. Significant BPRS individual items, subscales, and total scores in schizophrenia subjects with and without OCD ($N = 76$)

Item, Subscale, or Total	Mean ± SD		t	df	P
	OCD ($n = 12$)	Non-OCD ($n = 64$)			
Individual item scores					
Anxiety	4.3 ± 1.8	2.9 ± 1.7	−2.67	74	0.009
Guilt feelings	2.3 ± 1.3	1.4 ± 0.89	−2.92	74	0.005
Mannerism/posturing	5.8 ± 1.8	1.4 ± 1.0	−12.22	74	0.000
Suspiciousness	1.9 ± 1.2	3.5 ± 2.2	2.36	74	0.002
Subscale scores					
Activation	12.5 ± 5.4	6.4 ± 3.5	−5.09	74	0.000
Total score	57.4 ± 9.2	49.3 ± 12.4	−2.16	74	0.016

Note: BPRS = Brief Psychiatric Rating Scale; OCD = obsessive-compulsive disorder.

slowness overlaps with symptoms of catatonia; however, their relationship has not been explored yet. Conversely, several extrapyramidal motor disorders, most frequently Huntington's disease, tic disorders, distortion dystonia, Tourette's syndrome, and Parkinson's disease,[22–30] are known to manifest symptoms of OCD.[29] It has been suggested that the links between these disorders and OCD include anatomical and biochemical lesions affecting primarily the basal ganglia and their connections with cerebral regions controlling the frontal lobe and other higher cortical centers.[24,64]

The involvement of the basal ganglia in catatonia is not fully explored;[65,66] however, the symptomatological spectrum of catatonia shows resemblance to the symptoms of extrapyramidal movement disorders.[65] There is also evidence from neuroimaging studies pointing to structural abnormalities in the basal ganglia[67] and of a basal ganglia regional glucose metabolism asymmetry during catatonic episodes.[68] Furthermore, it has been suggested that the efficacy of benzodiazepines in the treatment of catatonia is mediated by potentiation of GABAergic transmission in the basal ganglia.[69] Thus, it

TABLE 3. Significant single items, subscores, and total scale scores on the SANS and the SAPS in schizophrenia subjects with and without OCD (*N* = 76)

Item, Subscale, or Total	Mean ± SD		*t*	df	*P*
	OCD (*n* = 12)	Non-OCD (*n* = 64)			
SANS					
Lack of vocal inflection	3.2 ± 1.2	2.3 ± 1.4	−2.14	74	0.031
Poverty of speech	1.0 ± 1.5	2.2 ± 1.6	2.36	74	0.021
Total SANS score	65.0 ± 21.0	60.0 ± 22.0	−6.90	74	0.091[a]
SAPS					
Persecutory delusions	0.4 ± 0.8	1.4 ± 1.7	1.93	74	0.004
Somatic delusions	0.1 ± 0.3	1.0 ± 1.7	1.76	74	0.000
Delusions of mind reading	0.2 ± 0.6	0.9 ± 1.5	1.59	74	0.008
Global rating of delusions	0.8 ± 1.4	2.2 ± 1.7	2.53	74	0.010
Repetitive/stereotyped behavior	3.4 ± 1.8	0.8 ± 1.4	−5.78	74	0.000
Global rating of bizarre behavior	2.9 ± 1.7	1.1 ± 1.4	−3.99	74	0.000
Circumstantiality	3.8 ± 1.2	2.0 ± 1.4	−4.20	74	0.000
Pressure of speech	2.2 ± 2.1	0.3 ± 0.8	−5.83	74	0.000
Total SAPS score	30.0 ± 23.0	35.0 ± 25.0	−6.90	74	0.091[a]

Note: OCD = obsessive-compulsive disorder; SANS = Scale for the Assessment of Negative Symptoms; SAPS = Scale for the Assessment of Positive Symptoms.
[a]Not significant.

TABLE 4. Medication in schizophrenic subjects with and without OCD (*N* = 76)

Current Medication	OCD (*n* = 12)		Non-OCD (*n* = 64)		χ^2	df	*P*
	n	%	*n*	%			
Conventional antipsychotics	3	25	46	72	9.7	1	0.001
Novel antipsychotics	9	75	21	33	7.5	1	0.006
SSRIs	10	80	4	6	40.0	1	0.000
Fluoxetine	4	40	4	6			
Paroxetine	1	10					
Fluvoxamine	4	40					
Clomipramine	1	10					
Benzodiazepines							
Lorazepam	10	83	15	23	16.4	1	0.000
Tricyclic antidepressants							
Doxepin	3	25	10	16	0.62	1	NS
Anticholinergic medication							
Biperiden	8	67	26	41	2.8	1	NS
	Mean ± SD		Mean ± SD		*t*	df	*P*
CPZ Eq.							
Current	130 ± 109		445 ± 532		4.29	74	0.000
Week prior to admission	842 ± 749		2,999 ± 3,638		4.28	74	0.000
Lifetime	70,422 ± 80,180		228,316 ± 573,734		2.10	74	0.004

Note: OCD = obsessive-compulsive disorder; CPZ Eq. = chlorpromazine equivalents for treatment with conventional neuroleptics.

appears that at least some catatonic symptoms are linked to a dysfunction or abnormality in the basal ganglia. Further studies should identify those catatonic symptoms that are caused by basal ganglia dysfunction.

Positive and Negative Symptoms, General Psychopathology

In the present study, schizophrenic subjects with OCD could not be reliably distinguished from non-OCD schizophrenic subjects on measures of positive and negative symptoms or on general psychopathological symptoms. They do rate higher on the items assessing motor symptoms on all three scales; this is not surprising and substantiates the results on the motor scales.

We found no differences between the two groups on total SAPS and SANS scores. While this is in keeping with the findings of Berman et al.,[12] it is in contrast to those of Fenton and McGlashan,[13] who reported that schizophrenic subjects with OCD exhibited more negative symptoms.

The higher total score on the BPRS for schizophrenic subjects with OCD is at first suggestive of more general psychopathology, but it is in fact largely due to their high ratings on the abnormal motor items and the anxiety items. We found less suspiciousness in the schizophrenic patients with OCD, which may be a consequence of fewer paranoid delusions.

Diagnostic Relevance

The finding that schizophrenic subjects with OCD exhibit more motor abnormalities than schizophrenic subjects without OCD raises questions of the appropriate classification of this group of patients. One may argue that the comorbid condition may arise as the severe end of the OCD continuum.[15] The finding that OCD occurs in several motor disorders has highlighted the linkage between the two and prompted this suggestion.[29] Accordingly, OCD without motor abnormalities can be placed at one end of the OCD spectrum, followed by OCD with simple motor symptoms (e.g., tics) and OCD with complex motor disorders (e.g., disorders of the basal ganglia and/or catatonia) at the other end.

Similarly, symptoms involving motion, thought, and perception in OCD may also be placed on a continuum, on which the severe end may merge with schizophrenia.[29] For example, symptom progression of motor symptoms will range from tics found in OCD to grimacing and jerky movements seen in schizophrenia. Slow movements in OCD, when exaggerated, become parakinetic and rigid as seen in schizophrenia. Similarly, compulsions and circumstantial movements in OCD may progress into stereotyped movements, rituals, and mannerisms.[65] Symptom progression in thought may lead from obsessions to stereotyped thinking and delusions. Thus it is also plausible, in our view, that schizophrenia with OCD may represent the severe end of an OCD spectrum.

Furthermore, there are catamnestic studies in support of the spectrum hypothesis, extending over 1 to 34 years and indicating that childhood OCD may be a precursor of adult psychosis.[5–8] Although the reported transition of childhood OCD to adult schizophrenia has been contested,[70] it is supported by the fact that the majority of our patients developed OCD in childhood and prior to the onset of schizophrenia. However, to date it is not clear whether schizophrenia with OCD will emerge as a distinct disorder or will ultimately be recognized as a schizophrenia subtype, a comorbid condition, or the severe end of the OCD continuum.[15] Alternative explanations of the co-occurrence of the two disorders could be that both are true comorbid conditions or that schizophrenia with OCD may represent a subtype of schizophrenia.

Clinical Implications

Clinicians should assess their schizophrenic patients for OCD if they exhibit tics, other abnormal involuntary movements, catatonic symptoms, or akathisia regardless of neuroleptic treatment. Treatment with SSRIs added to a neuroleptic regimen in these patients is controversial; some authors report it to be of benefit,[15,71–74] but others report a possible worsening of psychotic symptoms.[75] Although our study was not designed as a treatment study, we found that 8 of the 10 schizophrenic subjects with OCD who were treated with SSRIs showed an improvement of OCD symptoms after an average of 6 weeks, but 2 had no change in symptoms of OCD. Psychotic symptoms worsened in 2 subjects on SSRIs.

Considering the high frequency of motor symptoms in this population, we would suggest that conventional neuroleptics be used with caution. Novel antipsychotics were well tolerated by our schizophrenic subjects with OCD, and in 2 subjects, OCD improved on monotherapy with clozapine. We should note that other authors have reported an induction of OCD with clozapine treatment.[72] It was our clinical impression that benzodiazepines were particularly effective in treating both catatonic symptoms and akathisia in these subjects.

Limitations

In general, the lack of universally accepted guidelines to assess OCD in schizophrenia, such as clearly defined criteria to differentiate between obsessions and delusions, has made it difficult to determine prevalence rates. Establishing and using improved criteria is clearly worthwhile because despite the variety of assessment

procedures used, all studies have found that OCD in schizophrenia is a clinically relevant condition.

For this study, we assessed obsessive-compulsive symptoms shortly after admission, rather than at several different times during admission. However, we observed that the clinical picture of OCD fluctuated over the hospital course in some patients, and it would therefore be of great interest to systematically assess the longitudinal stability and continuity of OCD in patients with schizophrenia.

To increase the validity of subjects' own statements, clinical assessment of OCD by the raters was augmented by observations from third parties. Our concern was that schizophrenic subjects might suffer impairment in self-observation and might disregard some of their symptoms. Although we did not apply reliability or validity measures to this strategy, it has been successfully used in other studies.[40,76]

CONCLUSION

We hope that our findings will justify and promote additional studies to further clarify the relationship between OCD, schizophrenia, catatonia, and movement disorders of the extrapyramidal system.

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