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Comparative Analysis of Cognitive Function in Schizophrenia with and without Obsessive Compulsive Disorder

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Objective We investigated the neurocognitive deficits in schizophrenic patients with and without obsessive-compulsive disorder (OCD).

Methods We grouped 27 patients as either obsessive-compulsive or non-obsessive-compulsive based on the presence of OCD. The two groups completed the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS), Positive and Negative Symptom Scale (PANSS), and Hamilton Depression Scale. The intelligence quotient (IQ) was tested using the Korean Wechsler Adult Intelligence Scale. The memory quotient (MQ) was tested using the Korean-Auditory Verbal Learning and Korean-Complex Figure Test. The executive intelligence quotient (EIQ) was determined using the Kims executive intelligence test (EXIT).

Results Ten of the 27 patients had OCD. The compulsion score of Y-BOCS was positively correlated with positive symptoms, negative symptoms, and the total scores of PANSS. The OCD-schizophrenia patients had higher IQs. No difference was found in MQ. Although the EIQ did not differ between the two groups, the OCD-schizophrenia patients performed better at the Stroop-interference and verbal fluency tests, which was highly dependent on executive function.

Conclusion Our findings suggest that OCD may have a protective effect on some cognitive function, at least in relatively early stage of illness. Moreover, based on clinical, neurocognitive features, schizophrenia with OCD could be considered as a distinct subtype of schizophrenia. **Psychiatry Invest 2009;6:286-293**

Key Words Schizophrenia, Obsessive compulsive disorder, Cognitive function.

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Introduction

While there is general agreement that schizophrenia is heterogeneous in its clinical presentation, there is also a widespread tendency to treat it as a single, unitary disorder. Additional non-schizophrenic psychopathologies in schizophrenia patients, such as depression, obsessive-compulsive disorder (OCD) and panic disorder are often ignored. Hierarchical assumptions underlying this diagnostic system have largely kept these syndromes hidden from view and hampered the study of their clinical validity.[1] However there has recently been renewed interest in comorbidity of schizophrenia and OCD, due to reports recognizing higher than expected comorbidity rates, the emergence or exacerbation of OCD after atypical antipsychotics,[2-5] and OCD as a predictor of poor prognosis.[6]

Schizophrenia and OCD share many similarities. Both are lifelong conditions with fluctuations in the severity of symptoms sharing a similar distribution for age at onset. The lifetime risks are about 1% for schizophrenia and 2-3% for OCD. Schizophre-

nia and OCD affect men and women equally.[7] Tibbo and Warneke[8] reported that both disorders share similar anatomical structures and parallel cortical-subcortical pathways, raising the possibility that a common functional aberration can lead to the co-expression of seemingly different symptoms.

Despite of these similarities, contemporary investigators contend that there may be a specific pattern of neurobiological dysfunction in patients afflicted with comorbid schizophrenia and OCD. However a number of questions must be answered to determine if this putative schizo-obsessive subtype represents a true diagnostic entity: Did investigators accurately distinguish an obsession with poor insight from a delusion? Did individuals who exhibit comorbid schizophrenia and OCD constitute a more severely psychotic patient population?

Numerous methods allow the identification of schizophrenia with OCD as a distinct type of schizophrenia. These methods include comparison of clinical features, neurophysiology and neuroimaging and neuropsychological testing.[2,8-10] Among these methods, Berman[10] suggested that cognitive impairments could be used to correctly classify the majority of schizophrenic patients into either an obsessive compulsive (OC) or non-obsessive compulsive (non-OC) group (over 80%). And in other reports, varied results were obtained when tests of cognitive functions were used to differential OC and non-OC schizophrenia; these tests included the Wisconsin Card Sorting Test (WCST), the Stroop Test, and the Trail Making Test.[6,11]

In our study, the diagnosis of schizophrenia and OCD in subjects was determined by standardized interview in order to accurately differentiate obsession and delusion. We used neuropsychological tests to further examine the cognitive effects of OC symptoms in schizophrenia and we investigated whether patients with comorbid OCD and schizophrenia represent a special category of the schizophrenic population.

Methods

Subjects

After interviewing 87 individuals who were potentially suitable for this study, we recruited 27 participants whose diagnosis of schizophrenia was made according to the Diagnostic and Statistical Manual of Mental Disorder Fourth Edition-Text Revision (DSM-IV TR) diagnosis of schizophrenia.[12] Subjects originated from the outpatient population at Inha University Hospital, Incheon, Korea, between February and June 2006. This study was approved by the institutional review board. Informed consent was obtained from all of the subjects after a careful explanation of the purpose of the study and its procedure. The ages of participants ranged from 16 to 65 years. The participants had no history of severe head injury, organic brain disorder, substance use disorder, or severe medical illness.

Methods

Clinical and demographic measures included age, gender, age of the onset of schizophrenia, duration of hospitalizations, length of schizophrenic illness, marital status, employment, and finished years of education. The diagnosis of OCD was determined by the Korean version of the Structured Clinical Interview for DSM-IV Axis I Disorder (SCID-IV) module pertaining to OCD, translated by Han and Hong.[13] We grouped the 27 patients as either OC or non-OC, and then used the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS)[14] to determine the severity of OCD in the patients. The two groups completed the Positive and Negative Symptom Scale (PANSS),[15] and the Hamilton Rating Scale of Depression (HRSD).[16] If the patient was undergoing antipsychotic combination therapy, we transformed each antipsychotic dosage into its chlorpromazine equivalent dose and calculated the total dose.[17-20]

Each patient was interviewed by three investigators on the same day. To reduce inter-rater bias, we used a double-blind method. The first investigator focused on clinical and demographic variables and evaluated OCD severity using Y-BOCS. The second investigator, who did not know the patient's OCD status, assessed the patient's clinical state using PANSS and HRSD. The third investigator, blind to the patient's clinical state, administered a neurocognitive test. However, in the event that the patient's psychiatric and cognitive evaluations could not be completed on the same day, the patient's evaluations were completed as soon as possible, over a period not exceeding 1 week.

Neurocognitive test

The Short Form of the Korean Wechsler Adult Intelligence Scale

Due to time constraints, the intelligence quotient (IQ) was tested using the short form of the Korean Wechsler Adult Intelligence Scale (K-WAIS), which includes vocabulary, math, picture arrangement, and block design.[21] Each subtest covered verbal expression, concentration, problem solving, and visuospatial function.

The Korean Auditory-Verbal Learning Test and Korean Complex-Figure Test[22]

The memory function test consisted of the Korean-

Auditory Verbal Learning Test (K-AVLT) and Korean-Complex Figure Test (K-CFT). In K-AVLT, the examiner presented 15 words repetitively 5 times and after 20 minutes, checked delayed recall and delayed recognition. In the K-CFT procedure, the examiner presented a complex figure. Each patient copied and drew the complex figure immediately; after 20 minutes, delayed recall was checked. The memory quotient (MQ) was obtained by adding up the score of verbal memory and visual memory; the mean is 100 and standard deviation is 15. In addition, each patient's learning curve, memory retention and retrieval efficiency were calculated.

Executive Intelligence Test

To determine the executive intelligence quotient (EIQ), we used the Kims executive intelligence test (EXIT),[23] which focuses on cognitive factors in executive function. Cognitive functions included concentration, vocabulary, visuospatial function, memory, and executive function. Since the executive function controls the others, we determined EIQ by testing concentration, vocabulary, visuospatial function, and memory. The following tests were used to assess cognitive functions: the Stroop test for concentration, verbal fluency for vocabulary, the Ruff figural fluency test for visuospatial function, and the K-AVLT for memory. The unique feature of EXIT is inclusion of qualitative and quantitative assessments in the tests. For example in the verbal fluency test, while the quantitative score is calculated using the correct responses, the qualitative score is calculated with word repetition, vulgar word. The EIQ was calculated as the sum of the qualitative score and quantitative score in EXIT; The mean is 100 and standard deviation is 15. In this study, we compared the quantitative score and EIQ between the OC and non-OC groups. The Stroop test and K-AVLT included subtests with high and low dependence on executive function. However, since the verbal fluency and Ruff figural fluency tests did not include subtests with low dependence on executive function, we used the K-WAIS information and picture completion subtests.

Data analysis

The mean±standard deviation of patients' age, onset age of schizophrenia, number of hospitalizations, finished years of education, chlorpromazine equivalent dose and duration of illness were analyzed using the independent t-test to compare OC and non-OC groups. Gender, marital status, and employment were analyzed using Fisher's exact test .

Scores obtained from PANSS and HRSD were analyzed using the independent t-test. And scores for K-WAIS, K-AVLT, K-CFT, and EXIT were also analyzed using the independent t-test with Bonferroni correction for multiple comparisons. The results from the Y-BOCS were analyzed using descriptive measure. Differences in cognitive function test scores between patients treated with antipsychotics only and patients receiving a combined treatment of antipsychotics and antidepressants were analyzed using the Mann-Whitney U test with Bonferroni correction for multiple comparisons.

Pearson's correlation coefficients were calculated using scores from Y-BOCS, chlorpromazine equivalent dose, PANSS, K-WAIS, K-AVLT, K-CFT and EXIT. Further Pearson's correlation coefficients were derived from the IQ, MQ, and EIQ scores. The analyses in this study were performed using the parametric method. However, gender, marital status, employment, and cognitive function test result variations between patients treated with antipsychotics only and patients receiving a combined treatment of antipsychotics and antidepressants were analyzed using the non-parametric method, because of the small sample size.

We used the Statistical Package for Social Science (SPSS; SPSS Inc, Chicago, IL, USA) 12.0 for Windows statistical package, with a p value of 0.05 denoting significance.

Results

Of the 27 patients we studied, 10 had OCD. The Y-BOCS scores for obsession were 6.10±5.02 and 7.90±5.72 for compulsion, for a total of 14.00±6.34.

The differences in between-group demographic variables and clinical rating scale scores were not significant except for the chlorpromazine equivalent dose (Table 1 and 2). With regard to each patient's main drug, 10 were on clozapine, 2 were on olanzapine, 5 were on aripiprazole, 1 was on quetiapine, 1 was on sertindole, 6 were on risperidone, 1 was on amisulpride, and 1 was on ziprasidone. There were three patients undergoing antipsychotic combination therapy in the OC group and four in the non-OC group. Clozapine was the most common drug prescribed with 4 of 10 patients in OC group and 6 of 17 patients in non-OC group. Anticholinergic drugs were prescribed for 2 patients in the OC group and 3 patients in the non-OC group. Seven patients in the OC group were treated with fluvoxamine (3 patients, 100-200 mg/day), fluoxetine (2 patients, 60 mg/day), or escitalopram (2 patients, 60 mg/day).

As a result of the correlation between Y-BOCS and PANSS, the compulsion score of Y-BOCS was positively correlated with the positive symptoms score (p=0.006), the negative symptoms score (p=0.035), and the total score (p=0.009) of PANSS. The total score of Y-BOCS

was positively correlated with the positive symptoms score of PANSS (p=0.018)(Table 3).

The K-WAIS test showed the IQ of patients with OCD to be average and significantly higher than that of non-OCD patients, who had below-average IQs (OC group: 105.10±14.32, non-OC group: 87.29±12.55, t=-3.29, p=0.003, significant after Bonferroni correction). The OC group also performed higher on the arithmetic subtest (OC group, 11.40±1.65; non-OC group, 8.12±3.08; t=-3.10, p=0.005, significant after Bonferroni correction), and block design subtest (OC group, 11.10±2.08; non-OC group, 8.82±1.63; t=-3.17, p=0.004, significant after Bonferroni

TABLE 1. Comparison of demographic and clinical characteristics between SPR patients with and without OCD

Variable	SPR with OCD (N=10)	SPR without OCD (N=17)	Statistics	p-value
Age (years)*	30.30±7.79	30.47±5.39	t=0.067	0.947
SPR onset age (years)*	20.70±7.32	21.76±4.79	t=0.411	0.687
Duration of hospitalization (years)*	2.60±2.07	2.53±1.87	t=0.093	0.927
Illness duration (years)*	9.30±5.49	8.70±4.64	t=0.300	0.767
Gender (F : M)†	3 : 7	7 : 10		0.692
Marital status (unmarried or married)†	8 : 2	15 : 2		0.613
Employment (employed : unemployed)†	2 : 8	2 : 15		0.613
Finished years of education†	13.60±2.06	14.11±2.05	t=0.-630	0.534
Chlorpromazine equivalent dose (mg)*	421.20±268.08	334.76±133.82		0.001‡

Data are presented as mean±standard deviation. *Independent t-test, †Fisher's exact test, ‡p value is significance at the 0.05 level. SPR: schizophrenia, OCD: obsessive-compulsive disorder

TABLE 2. Comparison of clinical rating scale scores between SPR patients with and without OCD

Variable	SPR with OCD (N=10)	SPR without OCD (N=17)	Statistics	
	Mean±SD	Mean±SD	t	p-value
PANSS-positive	13.40±3.71	12.41±3.97	-0.639	0.529
PANSS-negative	6.80±6.37	15.53±5.41	-0.552	0.586
PANSS-general psychopathology	31.20±8.09	28.94±6.59	-0.791	0.437
PANSS-total	61.40±14.78	56.88±11.61	-0.883	0.386
HRSD	5.60±4.22	4.47±3.45	-0.757	0.456

Independent t-test. SPR: schizophrenia, OCD: obsessive-compulsive disorder, PANSS: Positive and Negative Syndrome Scale, HRSD: Hamilton Rating Scale of Depression

TABLE 3. Pearson's correlation coefficient between Y-BOCS and other clinical rating scales

	Y-BOCS		
	Obsessive score	Compulsive score	Total score
PANSS–positive symptoms	0.015	0.790†	0.726*
PANSS–negative symptoms	-0.263	0.666*	0.393
PANSS–general psychopathology	0.066	0.521	0.418
PANSS–total	-0.146	0.771†	0.581
HRSD	-0.276	0.030	-0.191

Pearson's correlation. *Correlation is significance at the 0.05 level (2-tailed), †Correlation is significance at the 0.01 level (2-tailed). Y-BOCS: Yale-Brown Obsessive-Compulsive Scale, PANSS: Positive and Negative Symptom Scale, HRSD: Hamilton Rating Scale for Depression

TABLE 4. Comparison of IQ and other subtest scores of K-WAIS between SPR patients with and without OCD

Variable	SPR with OCD (N=10)	SPR without OCD (N=17)	Statistics	
	Mean±SD	Mean±SD	t	p-value
IQ	105.10±14.32	87.29±12.55	-3.38	0.002*
Vocabulary	11.60±3.06	9.35±2.06	-2.29	0.031
Arithmetic	11.40±1.65	8.12±3.08	-3.10	0.005*
Picture arrangement	9.60±2.95	8.82±2.27	-0.77	0.450
Block design	11.10±2.08	8.82±1.63	-3.17	0.004*

Independent t-test. *Significant level after Bonferroni correction: p=0.0125. IQ: intelligence quotient, K-WAIS: Korean Wechsler Adult Intelligence Scale, SPR: schizophrenia, OCD: obsessive-compulsive disorder

correction)(Table 4).

On the memory test, the OC and non-OC groups both scored below average on MQ, with no significant difference between groups. The OC group performed higher on trial 1 (OC group, 11.40±1.42; non-OC group, 9.47±2.06; t=2.859, p=0.009, significant after Bonferroni correction), but the other memory subscale showed no significant difference (Table 5).

In EXIT, the OC group demonstrated below-average EIQ, whereas the non-OC group had a borderline EIQ level, but the groups did not differ significantly. In the EXIT vocabulary areas, the groups showed no significant difference on the K-WAIS information test, which has a relatively low level of dependence on executive functioning. However, the OC group performed higher on the verbal fluency tests (OC group, 10.90±3.14; non-OC group, 7.12±2.64; t=-3.350, p=0.003, significant after Bonferroni correction), which are highly dependent on executive functioning. The groups did not differ significantly on the memory test, in which recognition had a low dependence and recall had a high dependence on executive function. The groups did not differ significantly on the concentration test, neither in the Stroop test-simple, which has a low dependence on executive functioning, nor the Stroop test-interference, which has a high dependence on executive functioning. Furthermore, the groups did not differ significantly on the visuospatial test. Of such tests, the Picture Completion test has a low dependence and the Ruff Figural Fluency test has a high dependence on executive functioning (Table 6).

In the OCD group, to identify the effects of antidepressants on cognitive functioning, we grouped 10 patients into either the antipsychotics-only group (3 patients) or the combined antipsychotics-and-antidepressants group

TABLE 5. Comparison of MQ and other subtest scores of Rey-Kim between SPR patients with and without OCD

Variable	SPR with OCD (N=10)	SPR without OCD (N=17)	Statistics	
	Mean±SD	Mean±SD	t	p-value
MQ	85.60±7.20	83.24±13.83	-0.500	0.622
Trial 1	11.40±1.42	9.47±2.06	2.859	0.009*
Trial 2	9.60±2.01	7.52±2.64	2.291	0.031
Trial 3	7.00±1.94	7.05±2.74	-0.065	0.949
Trial 4	7.90±1.10	6.47±3.60	1.518	0.144
Trial 5	8.30±2.40	6.94±3.28	1.233	0.230
Delayed recall (auditory verbal)	6.80±2.90	7.41±3.18	0.498	0.623
Delayed recognition (auditory verbal)	8.20±2.57	8.18±3.78	-0.017	0.986
Learning curve	27.50±3.53	32.77±3.32	0.565	0.577
Memory retention	26.17±32.62	46.35±32.04	1.570	0.129
Retrieval efficiency	15.63±15.82	25.81±23.19	1.226	0.232
Drawing	11.90±2.56	9.88±4.45	-1.494	0.148
Immediate recall (visual)	7.90±3.35	6.88±3.76	-0.706	0.486
Delayed recall (visual)	7.70±3.80	6.94±3.51	-0.526	0.603

Independent t-test. *Significant level after Bonferroni correction: p=0.01. MQ: memory quotient, SPR: schizophrenia, OCD: obsessive-compulsive disorder

TABLE 6. Comparison of EIQ and subtest scores of EXIT between SPR patients with and without OCD

Variable	SPR with OCD (N=10)	SPR without OCD (N=17)	Statistics	
	Mean±SD	Mean±SD	t	p-value
EIQ	87.80±20.98	78.76±15.49	-1.283	0.211
Stroop test-simple	9.10±1.72	8.06±3.69	-0.991	0.332
Stroop test-interference	11.40±2.54	8.12±3.62	-2.515	0.019
Information*	10.10±0.74	9.06±2.02	-1.920	0.067
Word fluency test	10.90±3.14	7.12±2.64	-3.350	0.003†
Picture completion*	10.60±2.95	8.24±1.99	-2.690	0.012
Ruff Figural Fluency test	7.50±4.52	6.76±3.73	-0.457	0.652
K-AVLT Delayed recognition	8.20±2.57	8.18±3.78	-0.017	0.986
K-AVLT Delayed recall	6.80±2.90	7.41±3.18	0.498	0.623

Independent t-test. *Subtests of K-WAIS, †Significant level after Bonferroni correction: p=0.0083. EIQ: executive intelligence quotient, EXIT: Executive Intelligence Test, SPR: schizophrenia, OCD: obsessive-compulsive disorder, K-AVLT: Korean-Auditory Verbal Learning Test

TABLE 7. Pearson's correlation coefficient between chlorpromazine equivalent dose, Y-BOCS and cognitive test

Cognitive test	Chlorpromazine equivalent dose (mg)	Y-BOCS		
		Obsessive score	Compulsive score	Total score
IQ	-0.002	-0.226	-0.004	-0.182
Vocabulary	-0.048	-0.106	-0.066	-0.143
Arithmetic	0.060	0.075	-0.431	-0.330
Picture arrangement	-0.178	-0.132	-0.108	-0.202
Block design	-0.078	0.382	-0.092	0.219
MQ	0.280	-0.574	0.091	-0.372
Trial 1	0.125	-0.192	0.331	0.147
Trial 2	0.031	-0.810†	0.151	-0.505
Trial 3	0.051	-0.524	0.220	-0.216
Trial 4	0.231	-0.923†	0.263	-0.494
Trial 5	0.180	-0.674*	0.527	-0.058
Delayed recall (auditory verbal)	0.376	-0.877†	0.427	-0.308
Delayed recognition (auditory verbal)	0.374	-0.827†	0.243	-0.436
Drawing	0.195	0.053	0.386	0.390
Immediate recall (visual)	-0.019	0.397	-0.412	-0.058
Delayed recall (visual)	-0.174	0.578	-0.328	0.161
Learning curve	0.190	-0.612	0.302	-0.212
Memory retention	0.276	-0.344	-0.071	-0.336
Retrieval efficiency	0.092	-0.456	0.350	-0.045
EIQ	-0.012	-0.288	0.170	-0.074
Stroop test-simple	-0.039	-0.040	0.304	0.243
Stroop test-intermediate	0.135	-0.500	0.381	-0.052
Stroop test-interference	0.046	0.040	0.140	0.158
Word fluency test	0.155	-0.365	0.469	0.134
Ruff Figural Fluency test	-0.239	0.310	-0.212	0.054

Pearson's correlation. *Correlation is significance at the 0.05 level (2-tailed), †Correlation is significance at the 0.01 level (2-tailed). Y-BOCS: Yale-Brown Obsessive-Compulsive Scale, IQ: intelligence quotient, MQ: memory quotient, EIQ: executive intelligence quotient

(7 patients). However, there were no significant difference between the groups with regard to IQ (p=0.908), MQ (p=0.819), or EIQ (p=1.000). Furthermore, there were no significant differences between the groups for any other subtests.

Overall, there was no correlation between the chlorpromazine equivalent dose and cognitive test. The obsession score of Y-BOCS was negatively correlated with trial 2 (p=0.005), trial 4 (p=0.000), trial 5 (p=0.001), the delayed recall subtest (p=0.001) and the delayed recognition subtest (p=0.003) in the memory subtest (Table 7).

Discussion

In this study, while the OC and non-OC groups did not appear to be different from a clinical perspective, we found a positive correlation between compulsion scores obtained with Y-BOCS and the positive symptoms score, the negative symptoms score, and the total score of PANSS. These findings do not support previous suggestions that obsession may arise from or be related to intrusive delusion and that obsessions could be transformed into delusions.[24] Our findings are compatible with those reported by Ongür and Goff.[11] They suggest that delusional individuals do more checking as a result of hypervigilance. And in our samples the obsessions were not correlated with positive symptoms and those patients with OCD did not have more positive symptoms than other patients, which suggests that the OCS are separate from symptoms of persistent psychosis in schizophrenia.

The two groups we analyzed for cognitive function did not differ significantly either clinically or demographically. And although this result cannot be generalized, due to small sample size, antidepressant medications did not affect cognitive function. In our study, the OC group showed higher IQ measurements and had higher levels of concentration and visuospatial functioning. In contrast, some studies that have tested IQ using the Mini-Mental State Examination,[6] Wide Range Achievement Test, or WAIS information subtest did not find a significant difference in IQ between OC and non-OC groups.[10] This difference in results may have been due to the difference in

test instruments. We used the short form of K-WAIS, which has been shown to be valid in Korea.[21] Additionally, in this study, IQ was assessed in terms of concentration, visuospatial function, vocabulary, and problem solving, all of which are under executive function control. Thus, in interpreting our results, the effect of each area itself must be distinguished from that of executive function. In our study, the total EIQ of the OC group was similar to that of the non-OC group, but the OC group scored higher on those vocabulary area subtests having a high dependence on executive functioning. Moreover, the difference between the groups was significant. Although subjects in this study had relatively higher IQs than generally found among schizophrenia patients, the higher IQs of the OC group could be partially explained by the effect of this higher executive functioning.

In this study, the OC group scored higher in Trial 1 on the K-AVLT, but the groups did not differ in other memory subscales. This result is in contrast to reports that OCD patients have poor visuospatial memory[25] and that schizophrenia patients have poor verbal memory.[26] Although we predicted that OC patients would have poor memory function due to their high chlorpromazine equivalent dose and frequent prescription of clozapine, we found no differences between the OC and non-OC groups. And MQ may not be low as we expected because this study recruited patients with relatively high IQs in both the OC and non-OC group. However, in contrast with the fact that IQ was associated with MQ (p=0.001), EIQ (p=0.001) and MQ was associated with EIQ (p=0.006) in the non-OC group, MQ was not associated with IQ (p=0.067), EIQ (p=0.064) except as it correlated with IQ and EIQ (p=0.001) in the OC group. It appears that high IQ or EIQ in the OC group does not affect these results. Based on this finding we propose that schizophrenia with OCD is a distinct type of schizophrenia rather than the alternative that schizophrenia and OCD independently coexist. As obsessions increase it is conceivable that they interfere with the registration process in memory causing deficits in subsequent recall and recognition. However it does not induce the difference between OC and non-OC schizophrenia in MQ.

In our study, the total EIQ of the OC group was similar to that of the non-OC group, but the OC group scored significantly higher on subtests having a high dependence on executive functioning. With respect to executive function, some studies have suggested that patients with OCD perform more poorly on the WCST.[6,10,27] However, Borkowska et al.[28] conducted frontal lobe neuropsychological tests on patients having schizophrenia with and without OCD (mean illness duration 7 years) and found that the OC group scored higher than the non-OC group.

Some studies have suggested that patients with both schizophrenia and OCD are more impaired across several neuropsychological domains than those with just one of these conditions and suffer a pathophysiological double jeopardy,[29] whereas in this study, the OC group performed higher on IQ measurements and the MQ, EIQ of the OC group was similar to that of the non-OC group. These results can be explained by the difference of test instrument. While the WCST, Trail Making test, and Stroop test are usually used to test frontal lobe function, those instruments characterize only the quantitative aspects of frontal lobe function rather than the combined qualitative and quantitative aspects, and are sensitive to specific frontal lobe functions rather than the whole. For measurement of collective functioning of frontal lobe function, EXIT is the most appropriate tool.

And Hwang and Opler[30] further characterized comorbid OCD and schizophrenia into several categories: OCD onset before schizophrenia onset, simultaneous onset of OCD and schizophrenia, and OCD onset during schizophrenia. Therefore in cross sectional study, there is possibility that subjects are heterogeneous.

Finally, we considered illness duration of subjects. Poyurovsky et al.[7] reported that an OC group scored significantly lower than a non-OC group on the Scale for the Assessment of Positive Symptoms (SAPS) formal thought disorder subscale and the Scale for the Assessment of Negative Symptoms (SANS) flattened affect subscale. They concluded that OCD may have a protective effect on some schizophrenic symptoms, at least in the early stages of the disease. In addition, Borkowska et al.[28] conducted frontal lobe neuropsychological tests on patients having schizophrenia with and without OCD (mean illness duration 7 years) and found that the OC group scored higher than the non-OC group. Comparing his results with those of Hwang et al.,[6] who assessed patients with a mean illness duration of 18 years, Borkowska et al.[28] suggested that OC symptoms may have an alleviating effect in the early stage of schizophrenia but that during the chronic course of the disorder, untreated OC symptoms may further compound the deteriorating clinical picture of schizophrenia. Our findings highlight the possibility that OCD may have a protective effect on some cognitive function, at least in relatively early stage of illness. We have also showed that schizophrenia with OCD could be considered as a distinct category of schizophrenia as opposed to viewing the patient as having two separate disorders.

However, illness duration, character of subjects and test instrument differences do not fully explain our results. We studied only patients who agreed to participate. Thus, subject bias must be considered, since more severely affected patients with both disorders might have been

less likely to participate. And this study was limited by the sample population of stable outpatients, who are not fully representative of patients with schizophrenia. Also, because a group consisting of 10 patients with schizophrenia and OCD could be too small for a useful statistical analysis and we used multiple measurements, it is possible this reflects a difference due to chance. Thus, in future studies, a larger sample size will be required. Finally, as this was a cross-sectional study, we could not consider cognitive function change or the etiology of impairment of cognitive function. Despite these limitations, our findings highlight the possibility that OCD may have a protective effect on some schizophrenic symptoms, at least in relatively early stage of illness and that based on this clinical, neurocognitive feature, schizophrenia with OCD can be considered as a distinct subtype of schizophrenia. Further studies will be required to fully clarify the significance of obsession and compulsions in schizophrenia.

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