Relationship between awareness (EQS) and attention function (TMT) among patients with schizophrenia

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Purpose: The social adaptation of patients with schizophrenia is generally thought to be inhibited by their lack of awareness. However, since awareness is a subjective experience and has never been clearly defined, no intervention capable of enhancing the cognition of patients with schizophrenia is known. The present study was performed to investigate the relationship between awareness and attention function in patients with schizophrenia.

Methods: The subjects were 21 patients with schizophrenia who currently received out patient care and satisfied the eligibility criteria. Attention function was evaluated by using the Trail Making Test (TMT) Part A. Awareness was evaluated on the Emotional Quotient Scale (EQS). Factors related to awareness were identified by using Pearson's correlation coefficient or the *t*-test.

Results: The results showed associations between self-coping capacity, person-coping capacity, and situation-coping capacity evaluated by the EQS and ratings based on the TMT Part A.

Conclusion: The results suggest that attention is associated with awareness of patients with schizophrenia; however, further investigations are required to clarify the causal relationship.

Introduction

Patients with schizophrenia can be characterized by: (1) difficulty recognizing their own emotion, (2) a tendency to behave impulsively, without taking their surroundings into account, (3) an unwillingness to take advice from other people, (4) stubbornness, and (5) strange speech and behavior that are pathologically driven[1-4]. Lack of the ability to assess perception and understanding of one's and others' emotion, i.e., awareness, can lead to inappropriate coping behaviors and thus inhibit social adaptation in patients with schizophrenia.

As it is known that attention function plays an important role in human behaviors, it is suggested that attention function plays a central role in the ability to recognize a given situation, awareness. Therefore, it is speculated that a reduction in attention function in schizophrenic patients[5] leads to difficulty in maintaining awareness during social relationships, resulting in inappropriate behaviors with other people[6]. However, no reports published to date have focused on the relationship between awareness and attention function in schizophrenic patients. The present study was undertaken to clarify the relationship between awareness and attention function in schizophrenic patients during their personal communication within society[7]. This study was based on the expectation that if the relationship between awareness and attention function in schizophrenic patients could be clarified, it would be possible to help more schizophrenic patients resume their social activities or adapt themselves to society by providing support focusing on reinforcement of their attention function.

Methods

This study was approved by the Institutional Review Board of the research facility.

Participants

The subjects of this study were patients age 18 or older who were receiving outpatient care at a rural psychiatric hospital (386 beds) and satisfied the following eligibility criteria: 1) diagnosed with schizophrenia according to DSM-IV, 2) no change in drug therapy over

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the past 3 months, and mentally stable, 3) able to understand the instructions contained in the tests, and 4) absence of complications that could cause psychiatric disorders (head trauma, epilepsy, alcohol abuse, etc.).

Measures

1) Demographic and medical information

Information about age, sex, education, job history, the age at the onset of symptoms, duration of illness, length of hospital stay, doses of psychotropic agents (chlorpromazine equivalents) was collected from the medical records.

2) Attention function (Trail Making Test, Part A)

The Trail Making Test (TMT)[8] was used to evaluate attention function. The test evaluates ability to respond to one stimulus or element among many stimuli, and at the same time evaluates ability to divide attention among multiple tasks. Part A of the test allows measurement of psychokinetic velocity when a simple task is given in the form of a category. In this study, time of the test was counted in seconds, and we assessed longer time means lower attention function.

3) Awareness (Emotional Quotient Scale; EQS)

The emotional quotient scale (EQS) was developed by Uchiyama et al[9] and has been reported to evaluate the emotional intelligence of individuals when communicating with other persons, which allows perception and understanding of one's and others' emotion. The scale is composed of three categories of emotional intelligence: self-coping, person-coping, and situation-coping, and each category is composed of three subcategories. The reliability and validity of the categories and the validity of the factors have been confirmed. Higher total scores mean greater ability related to the categories of emotional intelligence.

The EQS is based on the view that emotional intelligence allows perception of one's own and other persons' emotions. Because recognition was assumed to represent awareness in this present study, perception of emotions was assumed to mean recognition of emotions, i.e., awareness. We therefore assumed that evaluation by means of the EQS would allow assessment of awareness of individuals in terms of emotions related to ability for self-coping, person-coping, and situation-coping, i.e., assessment of awareness of individuals in regard to emotions during personal relationships on a societal level. We used the EQS to evaluate awareness in personal relationships on a societal level based on this view.

Statistical analysis

After the normality of the data was confirmed by the Shapiro-Wilks test, we attempted to identify factors related to awareness by using Pearson's correlation coefficient to analyze the relationship between the scores for self-coping, person-coping, and situation-coping on the EQS and the ratings on TMT Part A, demographic and medical factors except for gender and education, and using the *t*-test to analyze the relationship between the scores for self-coping, person-coping, and situation-coping on the EQS and gender and education.

In all tests, $p < 0.05$ was regarded as statistically significant (two-sided). The statistical calculations were performed by using the Statistical Package for the Social Sciences (SPSS) Ver. 14.0J for Windows.

Results

Patients enrolled

Of the 142 candidates, 37 satisfied the inclusion criteria, and 25 of the 37 patients gave their informed consent to participate in the study. Of these 25 patients, 4 were excluded from the final analysis because their responses to the EQS were rated as unreliable. Thus, data from 21 patients were used in the final analysis. Table 1 shows the demographic variables and the results of the TMT and EQS in these 21 patients.

Factors associated with each category of the EQS

1) Factors associated with self-coping capacity

The rating on the TMT Part A was the only factor found to be associated with self-coping capacity on the EQS (Table 2, Fig. 1). When factors associated with each subcategory of self-coping capacity, i.e., self-insight, self-motivation, and self-control, were explored, the only significant association found was between self-control and the rating on the TMT Part A.

2) Factors associated with person-coping capacity

The rating on the TMT Part A was the only factor found to be associated with the person-coping capacity on the EQS (Table 2, Fig. 1). When factors associated with each subcategory of person-coping capacity, i.e., sympathy, human love, and control of human relationships, were explored, all subcategories were found to be significantly associated with the rating on the TMT Part A.

3) Factors associated with situation-coping capacity

The same as with the other categories of the EQS,

situation-coping capacity was found to be associated with the rating on the TMT Part A (Table 2, Fig. 1). When factors associated with each subcategory of situation-coping capacity, i.e., insight into situation, leadership, and control of the situation, were explored, all subcategories were found to be significantly associated with the rating on the TMT Part A.

Table 1. Demographic variables and test results

Variables		N	Mean	Standard deviation	Range
Age (years)		21	48.0	12.0	25 – 62
Gender	Male	16			
	Female	5			
Age on the onset of symptoms (years)		21	28.1	9.2	16 – 46
Duration of illness (months)		21	221.4	138.3	21 – 516
Length of hospital stay (months)		21	98.7	70.6	0 – 208
Education	≦ 9 years	3			
	＞ 9 years	18			
Employed	Yes	20			
	No	1			
Mean daily dose of major tranquilizer (mg)[a]		21	578.8	444.4	0 – 1050
TMT Part A (seconds)		21	127.2	41.9	68 – 694
EQS	Self-coping	21	42.4	9.4	24 – 64
	Person-coping	21	35.7	11.4	14 – 67
	Situation-coping21	21	35.2	9.7	14 – 63

a: Chlorpromazine equivalent

Table 2. Factors associated with EQS (self-coping capacity, person-coping capacity, situation-coping capacity)

Variables		self-coping capacity		person-coping capacity		situation-coping capacity	
		r	P[a]	r	P[a]	r	P[a]
Age		– 0.327	0.148	- 0.243	0.289	0.067	0.773
Age on the onset of symptoms		– 0.294	0.196	- 0.311	0.170	– 0.190	0.409
Duration of illness		– 0.059	0.800	- 0.115	0.620	0.014	0.953
Length of hospital stay		– 0.352	0.117	- 0.343	0.128	– 0.195	0.396
Mean daily dose of major tranquilizer		0.185	0.422	0.390	0.080	0.302	0.183
TMT Part A		– 0.572	0.007	- 0.521	0.015	– 0.458	0.037
		Mean	P[b]	Mean	P[b]	Mean	P[b]
Gender	Male	43.312	0.457	37.437	0.241	37.437	0.707
	Female	39.600		30.400		30.400	
Education	≦ 9 years	39.333	0.554	30.666	0.420	30.666	0.425
	＞ 9 years	42.944		36.611		36.611	

r: Pearson product-moment correlation coefficient P: Observed significance level of the test
a: Pearson's correlation coefficient
b: *t*-test

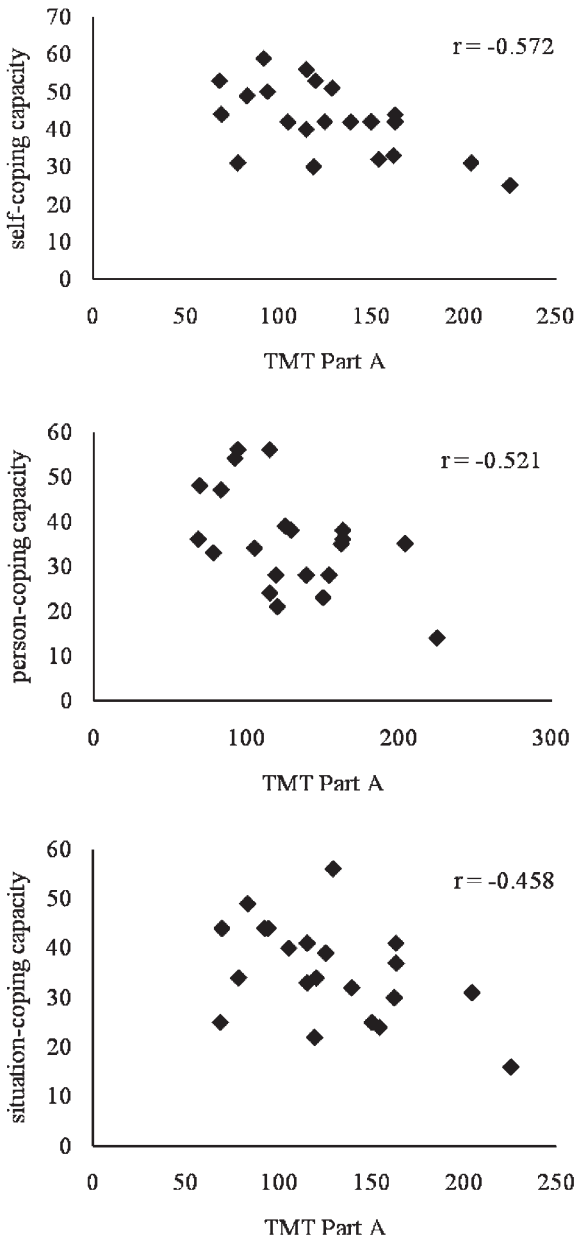

Fig. 1. Association between the TMT Part A and EQS (self-coping capacity, person-coping capacity, situation-coping capacity) – scatter plots

Discussion

The analysis of the relationship between EQS and attention function showed that attention function was associated with all three categories of the EQS: self-coping capacity, person-coping capacity, and situation-coping capacity.

The self-coping capacity part of the EQS measures the ability in human relationships, i.e., the ability to know one's mental activity, support one's actions, and take effective action. The results of the present study demonstrated that attention function was associated with only self-control, i.e., awareness needed for deciding one's actions. Strayhorn[10] mentioned that it is necessary for self-control to recognize one's self, which is based on attention function. The results of the present study support such a view. The person-coping capacity in the EQS pertains to the ability in extensive human relationships than assessed by self-coping capacity. This category is reported to allow assessment of the ability to appropriately maintain relationships with other persons on the basis of cognition and sympathy with other persons' emotions. When the relationships between attention function and the subcategories were analyzed, attention function was found to be significantly associated with every subcategory. In regard to personal relationships, it is known that understanding the intention or emotion of other persons requires appropriate attention to and processing of information about other persons' emotions expressed on their faces. In the previous study, Adolphs[11] reported that patients with schizophrenia exhibited cognitive disorders related to understanding of other persons' emotions expressed facially. These findings suggest that schizophrenic patients with attention deficit cannot adequately understand the intention or emotion of other persons and increase person-coping capacity to accept the stimulus produced by other persons. Situation-coping capacity may be viewed as an extension of person-coping capacity. The analysis of the relationships between attention function and the subcategories showed that attention function was significantly associated with every subcategory. This finding suggests that attention deficit makes it difficult for patients with schizophrenia to acquire appropriate information from the surrounding world.

The first limitation of this study that can be cited is that the number of subjects analyzed was not large enough to allow generalization of the results. The second limitation is that although the EQS was used to evaluate awareness, since no clear-cut definition of awareness was available, we cannot draw any definite conclusions about the extent to which EQS scores reflect the ability as it relates to emotions. Third, the ability of individual subjects in regard to social activities was not assessed using existing tools. For this reason, the relationship between awareness and social adaptation was not analyzed in detail. Finally, the evidence for causal relationship between awareness and attention function is tenuous.

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