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Acute and transient psychotic disorder and schizophrenia: On a continuum or distinct? A study of cognitive functions

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Abstract

Background: The overview of epidemiology of acute and transient psychotic disorder (ATPD) shows that it is wrong to assume that ATPD is somehow rudimentary or attenuated form of schizophrenia. This explorative study was designed to ascertain if there are any cognitive function differences between ATPD and cases of first episode schizophrenia (FES).

Aims and objective: To study the cognitive functions in the cases of ATPD and FES.

Materials and Methods: Cognitive functions of 60 patients (30 patients with ATPD and 30 FES patients) were studied using various tests from National Institute of Mental Health and Neurosciences (NIMHANS) neuropsychological battery. Assessment of the level of cognitive impairment was done using cut off scores of NIMHANS neuropsychological battery. Prevalence of cognitive impairment and comparison of mean scores on different parameters of tests was studied using chi square and student t test using SPSS Ver. 20 software. P value of <0.05 is considered as significant.

Results: In terms of cognitive function both the groups were comparable. Prevalence of cognitive impairment was significantly more in FES group only in the domains of sustained attention (p=0.028) and visuospatial working memory (p<0.05). Mean score of DVT errors (p=0.002), DVT time (p=0.005), N Back1 Visual Errors (P=0.02) and N Back2 Visual Errors (P=0.001) were significantly high in FES group whereas N Back 1 Visual Hits score (P=0.003) was significantly high in ATPD group.

Conclusions: Both the groups were comparable in cognition impairment; this supports the hypothesis of both the disorders lying on the same continuum.

Keywords: ATPD, first episode schizophrenia, cognitive functions, NIMHANS battery, BPRS 4.0

1. Introduction

Acute and transient psychosis as a descriptive entity was recognized with the advent of ICD-10 in 1992, where it is included under psychotic disorder (F23) as a three-digit code [1]. The prevalence of ATPD varies from 3.9-9.6 per 100,000 population. The disorder has preponderance of females; with female to male ratio of almost 2: 1 [2].

A study concluded evidence in favor of a continuum of psychopathological subgroups with a lot of overlap which may differ to a certain extent in respect of course, genetics and response to treatment. By this argument, there is evidence to think that schizophrenia and ATP be considered to lie on a continuum of psychosis [3].

The overview of epidemiology of ATPD shows that it is wrong to assume that acute and transient psychotic disorder is somehow rudimentary or attenuated form of schizophrenia. These are distinct form of psychosis with acute and florid onset, polymorphous symptomatology, are usually short lived and have much better outcome. The psychological domains/ processes/components are mediated by specific brain structures and connected brain forming functional networks.

Identification of disruptions in specified cognitive function indicates damage to the brain structures/ networks, which mediate these processes. Assessment of cognitive functions therefore has goals to identify disrupted psychological components/ processes/ domains in an individual patient and arrive at a profile adequacies and deficits of psychological functions [4].

Cognitive impairment is present in first-episode schizophrenia and likely precedes the onset of illness in an attenuated form. However, the present study findings have been mixed regarding the magnitude of cognitive impairment in the First episode schizophrenia as compared to Chronic schizophrenia, while some studies reported negligible differences between First episode schizophrenia and Chronic schizophrenia and others reported less impairment in First episode schizophrenia relative to Chronic schizophrenia [5, 6].

It is a quarter of a century since phenomenology of ATPD was systematically studied in India. Apart from a recent study by Kar *et al.* cognitive functions also have not been systematically studied in ATPD cases in India [7]. This explorative study was designed to ascertain if there are any cognitive function differences between ATPD and cases of First Episode Schizophrenia (FES). The findings of the study will help not only in delineating the clinical syndromes but also likely to give clues to the direction of investigations to ascertain the putative biological underpinnings of ATPD and schizophrenia.

2. Materials and Methods

Sixty patients of ATPD and schizophrenia attending In and Out Patients Department having age between 18-50 years satisfying ICD-10 diagnostic criteria for the disorder were studied after dividing in to ATPD (n=30) and FES (n=30) patients.

Institutional Ethics Committee Approval and written informed consent was obtained before starting present study. Patients having age below 18 and above 50 years and patients with significant medical condition which might affect cognition were excluded from the study. Illness-related variables were rated with the Brief Psychiatric Rating Scale (BPRS) at the time of first encounter [8]. This was a non-invasive, one point, comparative study and cognitive functions were assessed after clinical recovery from ATPD and schizophrenia first episode.

Patients were interviewed and assessed for; Speed: mental or cognitive speed was tested using Digit Symbol Substitution Test [9], Attention: sustained and divided attention were tested using Digit Vigilance Test [10] and Triads Test [11] and Executive Functions: working memory was tested using N Back test.

Three domains of cognitive functions including sustained attention, divided attention, cognitive speed and working memory were assessed using Digit Vigilance Test, Triads test, Digit Symbol Substitution Test and N-Back test respectively. Cut-off values for each test were used as provided in the NIMHANS battery. Prevalence of Cognitive impairment amongst the patients of ATPD & FES was tested by various parameters of NIMHANS Neuropsychological Battery.

All the data was analyzed using IBM SPSS Ver. 20 software. Chi square test was applied to calculate the level of significance. Mean scores on different parameters of tests of cognitive functions was compared using student t test. Level of significance was assessed at 5% level.

3. Results

Mean age of study cohort was 30.65±9.00 years and mean age of ATPD and FES patients was 30.00±8.70 and 31.30±9.39 years respectively (p=0.580). Out of 60 patients, 25(41.66%) were males and 35(58.34%) were females (P=0.432).

Table 1: Prevalence of cognitive Impairment among ATPD and FES patients

Parameters	ATPD (n=30)	FES (n=30)	Chi square	P value
DVT Errors	20 (66.66)	27 (90)	4.81	0.028
DVT Time	11 (36.66)	17 (56.66)	2.41	0.121
N-Back1 Visual Hits	10 (33.33)	15 (50)	1.71	0.190
N- Back1 Visual Errors	12 (40)	16 (53.33)	1.07	0.301
N-Back2 Visual Hits	9 (30)	13 (43.33)	1.15	0.284
N-Back2 Visual Errors	6 (20)	13 (43.33)	3.71	<0.05
N-Back1 Verbal Hits	15 (50)	18(60)	0.60	0.436
N- Back1 Verbal Errors	13 (43.33)	17 (56.66)	1.07	0.302
Triads Numbers	10 (33.33)	12 (40)	0.287	0.592
DSST	13 (43.33)	17 (56.66)	1.07	0.302

Data is expressed as no of patents (percentage), DVT, DSST, ATPD, FES

Table 2: Comparison of mean scores on different parameters of tests of cognitive functions in ATPD and FES patients

Parameters	ATPD	FES	't' test Value	P value
	Mean ± SD	Mean ± SD		
DVT Errors	20.83±20.078	45.20±35.033	3.305	0.002
DVT Time	628.70±143.927	788.37±264.287	2.906	0.005
N-Back 1 Visual Hits	6.70±1.803	5.00±2.464	3.050	0.003
N- Back 1 Visual Errors	7.10±3.181	9.10±3.377	1.889	0.02
N-Back 2 Visual Hits	3.80±1.627	3.23±1.547	1.382	0.172
N-Back 2 Visual Errors	10.57±3.501	13.77±3.350	3.618	0.001
N-Back 1 Verbal Hits	6.90±2.090	5.80±2.592	1.810	0.076
N- Back 1 Verbal Errors	3.40±2.283	4.57±3.002	1.694	0.096
Triads Numbers	5.07±3.965	6.83±4.018	1.714	0.092
DSST	332.20±148.193	403.83±229.253	1.437	0.156

Data is expressed as mean±SD, DVT, DSST, ATPD, FES

4. Discussion

In present study three domains of cognitive functions were studied and DVT errors (P=0.028) and N-back-2 visual errors (P< 0.05) were found significantly different. Comparing mean score of different parameters revealed that patients with ATPD performed better on the tests of sustained attention and visuospatial working-memory in comparison with FES patients. Findings in our study are consistent with the findings from the previous FES studies [12, 13, 14] such findings have been documented in the previous studies of adolescent onset schizophrenia [15] and also in other studies [16].

Working memory (which is based upon the focus of attention) deficits have been found to be present in schizophrenia, independent of specific modalities but visuospatial working memory has been found to be impaired more consistently [17].

This has been associated with both inferior frontal and posterior parietal functions. Attention/vigilance and visuo-motor processing have been found to be selectively impaired in patients with FES. Whereas in the patients of ATPD apart from the changes in auditory P300 amplitude and cerebral blood flow no structural or functional brain alteration has been reported. These changes might explain the worst performance in the verbal domain as compared to the visuospatial domain by the patients with ATPD [12].

In our study the measures of global intellectual functioning, attention/vigilance, verbal learning and memory, visual memory and cognitive speed processing showed a significant impairment in the patients with FES as compared to ATPD group.

Studies in the patients of schizophrenia (not specifically first episode) consistently reported impairment of working memory, executive functioning, attention and disturbances in

the selection and processing of information. These type of impairments are present in 85 of patients [18].

Numerous previous and contemporary studies have reported the occurrence of cognitive disorders many years before the onset of the disease, frequently even in childhood. The occurrence of cognitive disorder confirmed with neurological markers is more specific of schizophrenia than changes in structural MRI [19].

To the best of our knowledge ours is the first study to compare cognitive impairment in the patients of ATPD with those with FES in so many domains of cognitive functioning. Kar *et al.* 2014 studied 28 cases ATPD by means Brief psychiatric Rating Scale (BPRS) for phenomenology and Wisconsin Card Sorting Test (WCST) for executive functions. They found 13 out of 28 had impaired executive functions [7]. They did not compare the cognitive impairments found in ATPD patients with patients of other psychotic illnesses or with the healthy controls. Comprehensive assessment of specific cognitive functions like attention, speed of information processing and working memory and simple assessment of global cognitive function have not been attempted so far by any investigator. Although there are studies that assessed impairment in the cognitive functions in the patients of FES and compared it with other affective and non-schizophrenic psychosis [20]. Motjabai *et al.* [21] found that FES patients showed significantly poorer attention, concentration and mental tracking skills than those with affective psychosis, similarly Verdous *et al.* [22] reported that individuals with schizophrenia performed more poorly on the task of memory functioning than bipolar disorder and non-schizophrenic psychotic disorder. Eileen Joyce [23] suggested that memory impairment in schizophrenia might be a risk factor for- rather than a consequence of an earlier onset. They suggested that memory impairment was indicative of the degree of damage to the limbic structure which is implicated in the generation of psychotic symptoms. Since the damage in schizophrenia is far more severe as compared to that in the patients of ATPD visual memory deficits were found to be more in the patients of FES.

It is important to clarify whether neurocognitive deficits in such psychotic disorders are static or progressive with the duration of the disease and whether they are associated with the patient's age and other factors (duration of disease, type of treatment, number of hospitalizations, duration of untreated psychosis). The premorbid intellectual functioning has been reported to be one of the strongest predictors of neuro psychological performance in the patients of FES. A higher premorbid intelligence may be a protective factor against most severe cognitive impairment [14].

Predilection of developing schizophrenia or other psychotic disorder might depend upon the severity of brain injury. Earlier onset of injury poses a greater risk for more severe psychotic illness such as schizophrenia, onset of which may be early during childhood or adolescence or later in adulthood, depending upon the severity of brain injury, whereas later onset of brain injury, like in adulthood, would cause a less severe psychotic illness such as ATPD. We hypothesized that if both the disorders are lying on the same continuum of a spectrum we won't find any difference in the prevalence of cognitive impairment and the mean scores of different tests of cognitive functioning.

The prevalence and the mean scores of cognitive impairment were found to be low in the patients of ATPD when compared with FES patients, though the difference was not statistically significant in all the domains. In our study the difference in the cognitive impairment between the patients of ATPD and FES was more quantitative than qualitative, this supports the hypothesis of both the disorders lying on the same continuum.

In our study the illness related variables were rated with the Brief Psychiatric Rating Scale (BPRS 4.0) and negative symptoms were found to be more in the patients of FES. Fitzgerald *et al.*, reported that negative symptoms are more predictive of cognitive impairments in the tasks of learning and memory [14].

In our sample population we expected that a few patients won't be having another episode of ATPD in their lifetime and a few will be having one or more episodes of ATPD in their lifetime (Non-Converters). Few will have the conversion of their diagnosis from ATPD to schizophrenia or other psychotic disorders (Converters). We assumed that while the non-converts might improve in their state-related deficit with time or deterioration during recurrence of ATPD episode, the converts are more likely to stay stable or show a deterioration in their baseline cognitive impairment.

It will be very interesting to see in the longitudinal studies how neurocognitive impairment changes over time. The distinction between ATPD and schizophrenia will be clearer if we will be able to find the differences in the cognitive impairments in the converts. Stability of these cognitive impairments or comparison to their baseline levels if there is any change, will help us to delineate the boundary between these two disorders i.e., ATPD and schizophrenia more precisely.

More future research in this area will be able to demonstrate the link between cognitive reduction seen in the psychotic patients as compared to the healthy controls.

Cross sectional nature was the main limitation; hence follow up reassessment was not done. We might have been biased in the recruitment of our patients in both the groups as we might have selected only F23.1 category and we could not assess the role of these in ATPD as it was beyond the scope of this study. To make cognitive testing possible we recruited only those patients who were educated, therefore the sample population of our study does not represents the general population.

5. Conclusion

The impairment in cognition was found to be comparable in the two groups excluding the domains of sustained attention and visuospatial working memory, where the impairment was found to be significantly more in the FES group. In our study the difference in the cognitive impairment between the patients of ATPD and FES was more quantitative than qualitative; this supports the hypothesis of both the disorders lying on the same continuum.

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