

HYPERHOMOCYSTEINEMIA, METHYLENETETRAHYDROFOLATE REDUCTASE 677C→T POLYMORPHISM AND PSYCHIATRIC DISORDERS IN CHILDREN

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Background

Homocysteine (hereinafter - Hcy) was first described by *Butz* and *du Vigneud* in 1932. They obtained the product by treated methionine with a concentrated acid [1].

Methylenetetrahydrofolate reductase (hereinafter – *MTHFR*) converts 5,10-methylene tetrahydrofolate to 5-methyltetrahydrofolate which is needed for the remethylation of Hcy to methionine [2].

MTHFR is a critical component of the 1-carbon cycle, and the *MTHFR* polymorphisms C677T affect nucleotide synthesis and DNA methylation. This gives a plausible biologic explanation for potential associations between genetic variation in folate metabolism and both depression and schizophrenia [3].

The obtained information points to the fact that a risk to come down with psychiatric illness correlates with elevated level of Hcy [4]. Men, who have *MTHFR* C677T polymorphism for genes, have a greater risk to become ill with schizophrenia than women do; for their part, it is a greater risk to get bipolar affective disorders (BAD) [5].

Aim of study

The aim of the study was to get information about a serum level of Hcy and examine the associations between the level of Hcy and *MTHFR* gene C677T (rs1801133) polymorphism for patients with schizophrenia, affective spectrum disorders and in a control group.

Material and methods

There was 198 patients from Children’s Psychiatric Hospital.

According to the diagnosis (ICD-10) and the current health condition, the patients were divided into four diagnostic groups.

The level of Hcy was stated by isocratic HPLC (High-performance liquid chromatography) system with fluorometric detection (*Shimadzu LC-20, model RF-10AxL*).

DNA isolation from venous blood by phenol-chloroform method, in order to detect *MTHFR* C677T polymorphism, the RFLP–PCR (restriction fragment length polymorphism - polymerase chain reaction) analyses were used.

Results

The average level of Hcy was 11.94±5.6 μmol/L for patients with schizophrenia’s spectrum disorders, 11.26±3.3 μmol/L for patients with affective disorders, 7.47±2.9 μmol/L in a control. There were found known association between *MTHFR* gene polymorphism C677T and Hcy level by additive model ($r=1.41$; $p=0.029$).

Conclusions

The data are indicative of a link among the level of Hcy and the pronounced affect in schizophrenia and affective disorders, and its severity and course. The association between the level of Hcy, schizophrenia and affective disorders and the *MTHFR* C677T polymorphism was not found.

List of references:

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Statement of conflicts of interest

There is no potential conflict of interest.

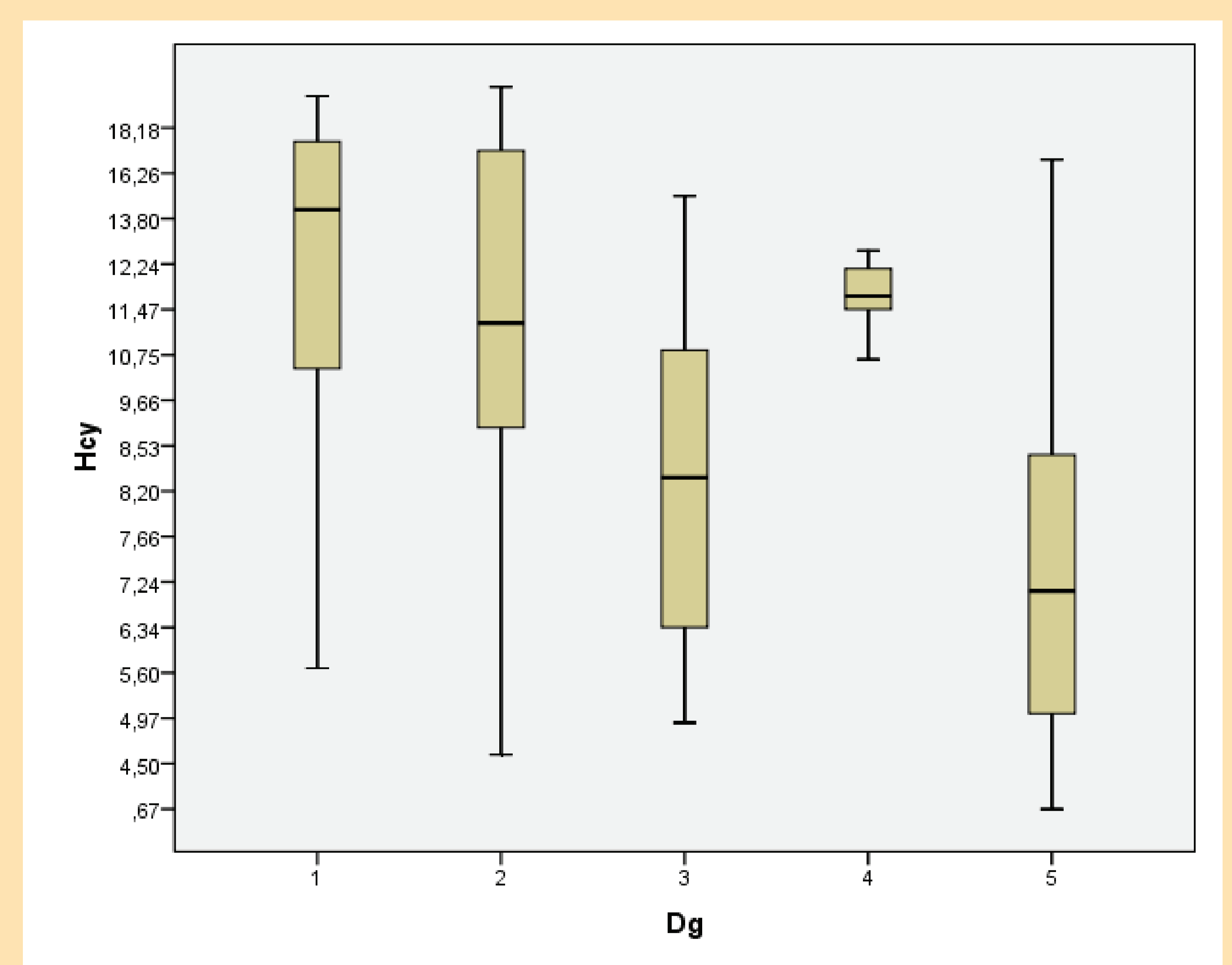
Table 1
Codes of diagnostic groups used in the study

Code	Diagnosis	Number of patients involved
1.	paranoid schizophrenia – continuous	18
2.	paranoid schizophrenia - episodic with residual symptoms and schizoaffective disorders	37
3.	simple schizophrenia and schizotypal disorders	27
4.	with affective spectrum disorders (depressive syndrome with anxiety, mixed affective disorders and depressive syndrome without anxiety)	22
5.	control group - intact	94

Table 2
Correlation (r) of Hcy concentration between control group and psychiatric disorders

group Diagnosis	Control	Pearson's correlation	p-value
Schizophrenia spectrum disorders		-0.46	<0.01
Paranoid schizophrenia – continuous		-0.58	<0.01
Paranoid schizophrenia - episodic with residual symptoms and schizoaffective disorders		-0.53	<0.01
Simple schizophrenia and schizotypal disorders		-0.19	<0.01
Patients with affective spectrum disorders		-0.45	<0.01

Picture 1
The mean level of Hcy (μmol/L) in patients with affective disorders and schizophrenia spectrum disorders



Codes of diagnosis:

- 1 – Paranoid schizophrenia – continuous
- 2 – Paranoid schizophrenia - episodic with residual symptoms and schizoaffective disorders
- 3 – Simple schizophrenia and schizotypal disorders
- 4 – Depressive episode, recurrent depressive disorder, bipolar affective disorders
- 5 - Control group (intact)