Quantitative determination of immunoglobulin IgM and apolipoprotein A1 in schizophrenia population

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ABSTRACT

Schizophrenia is a mental disorder painful with prevalence of about 1% in the world. Nowadays, there is no experimental test aiding the accurate diagnosis of schizophrenic patients but recently quantitative determination of some serum proteins led to many investigations on the roles of these in neuropsychiatric.
In the present study, our aim is to quantitative determination ApoA1 and IgM between 134 schizophrenic patients and 127 healthy control persons. Schizophrenia patients were selected from the Tehran Razi hospital. The age (p=0.53) and sex distributions of schizophrenic patients were similar to those of control persons. We measured ApoA1 and IgM levels by immunoturbidimetry method. P<0.05 was considered significant. ApoA1 showed a significant decrease in serum (p=0.00) and IgM to be significantly increased (p=0.00).
Furthermore, female patients showed an increase IgM more than males. These results for ApoA1 and IgM support other reports. Decrease ApoaA1 confirmed the relationship of lipid metabolism in schizophrenia patients, also increase IgM evaluate the impact of treatment. This report can help to identify disease markers and treatment such as immunoglobulin therapy or regulate lipid metabolism. It can be imagined that immunoglobulin therapy more effective in the female patients than male and need to expand about them.

Keywords: schizophrenia; immunoglobulin; apolipoprotein A1

INTRODUCTION

Schizophrenia is a mental disorder, which affects 1% of the world population and is characterized by a lack of perception and expression of reality that can lead to complications such as the lack of rational communication behavior and speech, excessive isolation and withdrawal, delirium and hallucinations. The person usually hears voices, sees scenes and touch's things that others cannot understand [2]. Surveys show that one of the principle risk factors for schizophrenia is genetic susceptibility, and some genes may make people more at risk for this disease [3-5] and the most significant is VCH RNA gene [6].
Environmental factors such as being born in winter, problems during pregnancy and birth complications, including influenza, Rh factor, viral infections (Retrovirus) and malnutrition during fetal life and geographical alterations influence disease [2,7] . In addition to above factors, like many other diseases, schizophrenia is associated with metabolism dysfunction. As the brain is main organ affected in diseases of CNS and because of the high concentration of lipids are in brain, lipid metabolism dysfunction is involved in the disease pathogenesis [8].
Extensive studies of lipid metabolism dysfunction have shown performance and changes in apolipoproteins, including, ApoE, Apo A1, Apoc, ApoD in patients with schizophrenia [9-11], also change of ApoA1 and ApoE have been observed in some of the other mental disorders [12, 13].
Apolipoprotein through activation or inhibition of enzymes involved in lipid metabolism and binding lipoproteins by lipoprotein receptors on the cell surface play an important role in the transmission lipids [7]. In the present study, we evaluated ApoA1 with due to attention to the role of apolipoproteins and available facilities. ApoA1

is a major protein component of HDL whit 243-245 amino acid and 28000KD weight. ApoA1 active enzyme lecithin cholesterol acyl transferase (LCAT) and leads flow of cholesterol from tissues to the liver [14, 15].

Following above noted, researchers have focused on the interaction of the central nervous system (CNS) and immune system in patients with schizophrenia over the past three decades such as viral diseases in the foetus which will cause automatically immunity against parts of the brain and increase the risk of schizophrenia. Schizophrenia is caused by changes in the immune system and the central nervous system to produce antibodies against antigens and can disrupt neuronal function [6].

Antibodies are part of immune responses vast network that can recognize and eliminate foreign substances [17]. The studies conducted so far, the changes have been reported in the immunoglobulins such as IgM that first antibody is against pathogens in the body, therefor their changes is measurable earlier compare with else immunoglobulins. However, laboratory diagnosis of schizophrenia is still unclear and present study evaluated new laboratory diagnosis of ApoA1 and IgM.

STUDY POPULATION AND METHODS

All study subjects consisted of 133 patients with schizophrenia (62 males and 71 females; mean age: 41±6.2 years) and healthy controls (59 males and 69 females; mean age: 40±6.1).we recruited all patients from Tehran Razi Hospital and healthy controls from volunteer's subjects.

Schizophrenia of patients was confirmed by specialists, according to DMS-IV diagnostic criteria and healthy controls were recruited with history of mental health. The study samples were filled questionnaires based on age, sex, weight, smoking history and education level.

The blood samples were collected and immediately transported to the biochemistry laboratory of Pasteur Institute then were isolated serum samples by centrifugation (3000 rpm, 30 min at 4 C) and stored at -80 C.

ApoA1 and IgM were measured with commercial kits by autoanalyzer biochemistry and were determined using the immunoturbidimetry method.

Statistical analysis

Statistical analysis were performed by SPSS 16 and significance was set at P < 0.05.normality parametric analyzes were performed with Mann-Whitney test.

RESULTS

A total of 133 samples patients and 118 healthy groups were compared in this study, and results showed a correlation between ApoA1and IgM.

ApoA1 in patients was decreased, but IgM was increased (P values of both 0.001) (table 1)

Furthermore, IgM levels in females, showed a significant increasing more than males (p = 0.005) (Table 2).

Table 1: statistical analysis of ApoA1 and IgM between control group and schizophrenia patients

	ApoA1	IgM
Mann-Whitney U	19400/000	3800/500
Wilcoxon W	10825/000	12056/500
Z	-10/826	-7/729
P value (t test)	0/001	0/001

Table 2: Statistical analysis of ApoA1 and IgM due to sex in the schizophrenia patients

	sex	ApoA1 female patients	IgM female patients
Mann-Whitney U	2197/500	1812/000	1576/500
Wilcoxon W	4753/500	3765/000	3529/500
Z	-0/016	-1/756	-2/817
P value (t test)	0/987	0/079	0/005

DISCUSSION

The brain of Schizophrenia patients is heavily involved, imaging results using DTI (diffusion tensor imaging) and MTI (magnetization transfer imaging) have show significant variations in the brains of people with schizophrenia [3].

The studies have shown that because central nervous system dysfunction in patients with schizophrenia is a disorder of lipid metabolism. Brain has highest concentration of lipids [8] and lipids play a role in making myelin and oligodendrocyt function at brain prefrontal cortex

and anterior cingulated cortex of patients with schizophrenia, and this contributes strongly to the pathogenesis of schizophrenia [22].

In patients with schizophrenia, associated with the regulation of lipid metabolism, including apolipoproteins Apo, A, C, D, E have received much attention [20].

Last studies have shown ApoA1 levels in the cerebrospinal fluid - CSF and in peripheral tissues such as liver, blood cells and serum is reduced [14].these These studies show that the reduction in cerebrospinal fluid (CSF) reflected in peripheral tissues, and its value can be evaluated in their blood [9].

ApoA1 levels were measured in the present study showed significantly reduction; In addition, there was a little loss in female patients than males. Therefore, female patients showed more metabolism dysfunctions.

However, this correlation was weak but the new finding, so more researchs and greater numbers of samples can be achieved beneficial results.

Blalock's research suggested that the immune system as a sensory organ for external stimulations that the nervous system did not recognize it [23], even the immune response of a person with mental states, such as grief, loss, loneliness, etc., change [16].

In schizophrenia patients, presence of antibodies against central nervous system neurotransmitters such as dopamine, serotonin, cardiolipin, antigen's cytoplasmic and nuclear antigens, has been shown. This finding supported the increase of dopamine.

Since dopamine is a specific component of brain cells, and as a target for antibodies in the brain and leads to increase more antibodies that these antibodies can block or regulate a function of neurons.

However, antibodies against antigens of the central nervous system, are produced both in normal subjects and patients with schizophrenia, but schizophrenia cause changes in the nervous system and one of these changes is increasing of dopamine so Brain's antigens, leading to a further increase in the amount of natural antibodies, including IgM [24,17].

However, these differences in immune reactivity between healthy subjects and patients with schizophrenia, can affect brain antigens and pathogenesis [6].

IgM levels elevated in patients with 8 weeks of drug therapy has been shown [17, 25] Chong and colleagues have been shown IgM elevated regardless of whether or not patients are treated [18].Sane Sane and colleagues showed increasing of IgM in mental disorders and patients who were not treated [26] even there are also reports indicating no change in the amount of IgM [19]. These differences were due to non-specific IgM in the immune system, under different conditions [17]. Today, there are high-precision methods such as nephelometry and immunoturbidimetry that IgM level is, measure carefully.

In the present study, significant increasing of IgM have been seen , Even in females, the increase was higher in previous studies. Disease in women, mostly associated with immunological changes more than lipid metabolism and in male patients decreased ApoA1 was higher. In addition, IgM used as biomarkers for evaluate of the disease population, diagnosis of patients from healthy individuals.

CONCLUSION

ApoA1 and IgM were compared patients and controls changes. Therefore, these two parameters as diagnostic tests used in conjunction with other diagnostic methods.

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