Uric acid levels in serum in the assessment of some psychiatric disorders in India

Md Abu Nasar¹, Tarannum Fatima Subhani², R. P. Gupta¹, Arif Naseer³, Syed Saif Subhani⁴

¹Department of Biochemistry, Nalanda Medical College, Patna, Bihar, India, ²Department of Biochemistry, Hind Institute of Medical Sciences, Sitapur, Uttar Pradesh, India, ³Department of Pharmaceutical Chemistry, Adarsh Vijendra Institute of Pharmaceutical Sciences, School of Pharmacy, Shobhit University, Saharanpur, Uttar Pradesh, India, ⁴Consultant Orthopaedic Surgeon, Juran Chapra Ortho Clinic, Muzaffarpur, Bihar, India

Abstract

Background: The increasing number of latent and manifest hyperuricemia is important concerning differential diagnosis in neurological and psychiatric diseases. The pathological importance of hyperuricemia in these diseases is particularly unknown. Previous studies have shown that uric acid (UA) estimation in cerebrospinal fluid was made with neurological and psychiatric diseases. Monitoring serum UA levels, a relatively inexpensive and easily available test, may prove to be a useful adjunct in the assessment of certain indices of certain psychiatric illness. Tranquilizers like 1,4-benzodiazepine (purinergic) are shown to decrease xanthine oxidase activity initially and may cause fluctuations in serum UA levels.

Objective: In the present study, an attempt was made to understand the effect of tranquilizers on serum UA levels in different psychiatric conditions.

Materials and Methods: A total of 40 cases (22 males and 18 females) of manic depressive psychosis and Schizophrenia who were undergoing treatment with different tranquilizers from the Psychiatric Hospital, Patna, India and 20 healthy controls (12 males and 8 females) not using any tranquilizers were included in the study.

Results: The serum UA levels were significantly elevated \((P < 0.05)\) in these patients receiving treatment with tranquilizers. The levels of UA in male patients were significantly higher when compared with females and also over male controls \((P < 0.01)\). In female patients UAs levels are raised but not significant \((P > 0.05)\) over control females.

Conclusion: This preliminary study does indicate that serum UA levels do change with the administration of these drugs. Nature, gender, duration and the type of drugs used and their individual effects on different psychiatric disorders will be discussed.
more than 85% of total antioxidant capacity in the plasma.\(^{6,7}\) Therefore, measuring levels of specific antioxidant molecules, such as plasma UA can yield valuable information. Several studies have demonstrated derangement of UA levels in various disease states. UA levels have been shown to be positively associated with various markers of systemic inflammation.\(^{8,9}\) Elevated UA level is a risk factor for endothelial dysfunction, hypertension, metabolic syndrome, cardiovascular and cerebrovascular diseases, and all-cause and specific-cause mortality.\(^{10-17}\) Derangement of UA levels has been seen in several neurological and psychiatric conditions. For instance, serum UA levels are elevated in epilepsy,\(^{18}\) and bipolar disorder (especially during the manic phase)\(^{19}\) while they are decreased in Parkinson’s disease,\(^{20}\) multiple sclerosis,\(^{21}\) optic neuritis,\(^{22}\) Alzheimer’s disease,\(^{23}\) and schizophrenia.\(^{24}\) Reduced levels of UA are seen with a variety of medications like L-Dopa, allopurinol, aspirin, probenacid, coumadin and corticosteroids.\(^{25,26}\) Several studies have demonstrated that there is a variation in cerebrospinal fluid (CSF) UA levels in different neurological and psychiatric disorders.\(^{27-29}\) In conditions like multiple sclerosis, myelopathy, epilepsy, stroke, and viral meningitis, CSF UA is increased 2-3-fold compared to controls.\(^{30}\) Therefore, since there exists a definite relationship between UA levels, and various psychiatric and neurologic conditions, the current study was conducted in order to understand the effect of treatment on serum UA levels in different psychiatric conditions.

**Materials and Methods**

Patients being treated at the Psychiatric Hospital, Patna, India during the period September 2013-February 2014 were included as cases in the study. Controls were healthy volunteers. Serum samples were collected from all patients irrespective of their fasting status. UA was measured by using phosphotungstic acid method.

**Results**

A total of 40 cases (22 males and 18 females) who were undergoing treatment at the psychiatric hospital, Patna, India for various diagnoses like acute psychosis, schizophrenia, affective disorders, depression and drug addiction; and 20 healthy volunteers (12 males and 8 females) not using any tranquillizers were included as controls. The drugs given included cogentine, serenace (haloperidol), largactyl (chlorpromazine), depakin, and inderal (propranolol). The study findings are shown in Table 1. The serum UA levels were significantly elevated (\(P < 0.05\)) in these patients receiving treatment with tranquilizers. The levels of UA in male patients were significantly higher when compared with females and also over male controls (\(P < 0.01\)). In female patients, UAs levels are raised but not significant (\(P > 0.05\)) over control females.

<table>
<thead>
<tr>
<th>Number of cases</th>
<th>Serum uric acid Mean±SD</th>
<th>(P) value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cases</td>
<td>40</td>
<td>6.63±1.16</td>
</tr>
<tr>
<td>Male cases</td>
<td>22</td>
<td>6.98±0.81</td>
</tr>
<tr>
<td>Female cases</td>
<td>18</td>
<td>5.7±1.36</td>
</tr>
<tr>
<td>Total controls</td>
<td>20</td>
<td>5.6±1.5</td>
</tr>
<tr>
<td>Male controls</td>
<td>12</td>
<td>5.5±1.4</td>
</tr>
<tr>
<td>Female controls</td>
<td>8</td>
<td>4.5±1.2</td>
</tr>
</tbody>
</table>

SD: Standard deviation

**Discussion**

The findings of the current study showed a positive correlation between UA levels and effect of treatment in the patients with psychiatric disorders. Patients, who were being treated, had significantly higher levels of serum UA compared to controls (\(P < 0.05\)). These findings are in line with those of other studies, which show that UA levels are decreased in various psychiatric conditions and improvement in levels with treatment. In schizophrenia, the levels of UA are decreased.\(^{22,24,31,32}\) Chaudhari et al. demonstrated that there is a significant decrease in serum UA (\(P < 0.0001\)) was observed in newly diagnosed major depressive disorder subjects when compared to healthy subjects; and this trend was reversed after 6 weeks and more significantly after 12 weeks (\(P < 0.001\)) of fluoxetine or citalopram treatment with improvement in Hamilton rating scale for depression score.\(^{33}\) Haloperidol has also shown to decrease UA levels in animal models.\(^{34}\) According to a study by Brunstein et al., in schizophrenic patients, there exists either an altered adenosine (purine) metabolism or is influenced by treatment with antipsychotics, particularly clozapine.\(^{35}\) Recent studies suggest a dysregulation of the purinergic system in patients with bipolar disorder, especially in the manic phase; and that UA is not only a potential marker of treatment response, but its elevated levels may represent a state marker during mania.\(^{36,36}\)

**Conclusions**

UA is an important antioxidant, derangement of which is observed in several neurological and psychiatric disease states, like Parkinson’s disease, Alzheimer’s disease, multiple sclerosis, optic neuritis, schizophrenia, bipolar disorder and depression. Treatment has shown to improve the UA levels in these patients. Our study also demonstrated an increase in serum UA levels with treatment in psychiatric patients. However, the limitation of our study was that the sample size was small, and larger randomized controlled studies are required to confirm the findings of our study.

**References**

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