Case Report

Glucose-6 Phosphate Dehydrogenase Deficiency and Psychotic Illness

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ABSTRACT

Mr. T, a 28-year-old unmarried male, a diagnosed case of Glucose-6 Phosphate Dehydrogenase (G6PD) deficiency since childhood, presented with 13 years of psychotic illness and disturbed biological functions. He showed poor response to antipsychotics and mood stabilizers and had three prior admissions to Psychiatry. There was a family history of psychotic illness. The General Physical Examination and Systemic Examination were unremarkable. Mental Status Examination revealed increased psychomotor activity, pressure of speech, euphoric affect, prolixity, delusion of persecution, delusion of grandiosity, delusion of control, thought withdrawal and thought insertion, and second and third person auditory hallucinations, with impaired judgment and insight. A diagnosis of schizophrenia paranoid type, with a differential diagnosis of schizoaffective disorder manic subtype, was made. This case is being reported for its rarity and atypicality of clinical presentation, as well as a course of psychotic illness in the G6PD Deficiency state, with its implications on management.

Key words: Glucose-6 phosphate dehydrogenase deficiency, management, psychotic illness

INTRODUCTION

Glucose-6 Phosphate Dehydrogenase (G6PD) is a cytosolic enzyme needed for Nicotinamide adenine dinucleotide phosphate (NADPH) production, which acts as an electron donor in the defense against oxidizing agents and in reductive biosynthetic pathways.[1] The gene coding for G6PD has been linked to the human X-chromosome, and missense mutations in the human X-linked gene coding for G6PD have been found. The clinical presentations are due to an enzyme deficiency associated with acute hemolytic anemia, triggered by fava beans and drugs.[2] G6PD deficiency has been found to present with psychiatric manifestations like acute psychosis, catatonic schizophrenia, and bipolar disorders, but the exact role of the G6PD deficiency state in psychiatric manifestations has not been well-studied. Literature mentions only case reports of acute psychosis and surveys of G6PD enzyme activity levels in hospitalized populations.[3,4] A retrospective study from a Lithium Clinic in Sardinia found a disproportionate rate of manic schizoaffective patients with acute recurrent psychotic manic episodes, mostly in patients of G6PD deficiency, characterized by loosening of association, agitation, confusion, concurrent hyperbilirubinemia, positive family history of psychiatric illness, and partial response to long-term lithium treatment.[5]

Dern and co-workers (1962), had raised the hypothesis of a potential role of G6PD deficiency in schizophrenia patients.[3] Nasr and co-workers (1982), had reported a trend for the increased proportion of G6PD deficiency in bipolar patients.[6]
There is a need to understand the interplay of the G6PD Deficiency state with psychiatric manifestations, particularly those that are psychotic or affective in nature. The current case is purported to highlight the rarity and atypical presentation of this case, in terms of clinical manifestations and course of psychotic illness in the G6PD Deficiency state, and the difficulties faced by clinicians in managing such cases.

**CASE REPORT**

Mr. T, a 28-year-old unmarried male, from a lower socioeconomic status family of Dehradun, India; presented to the Outpatient Department of the Institute of Human Behavior and Allied Sciences (IHBAS); An Institute providing Quality Care in Mental Health, Neurosciences and Behavioral Sciences in Northern India; with abnormal behavior, which was unmanageable at home. He was admitted at IHBAS; on detailed assessment, it was found that the patient was a diagnosed case of G6PD Deficiency since his childhood. He had 13 years of psychiatric illness, which was of insidious onset. It was a continuous course, with several exacerbations, and the duration of the last exacerbation was for one-and-a-half months preceding the index admission. His illness was characterized by muttering to self, unprovoked aggressive behavior, irritability, over-talkativeness, which was difficult to be interrupted, and claiming that the rays of the sun and moon enter his brain and make him hit his family members and destroy the household articles. He would also claim that planets Mars and Saturn were exerting a bad impact on his physical health and making him physically weak. He also stated that these two planets would insert various thoughts into his mind and would take away his thoughts from his mind, against his wishes, following which his mind would go blank for a few minutes. The patient would also frequently complain of hearing voices of Pakistani soldiers marching toward Dehradun, his native place; in clear consciousness through his ears and he would hear voices of Pakistani soldiers telling him that they would kill him and destroy his nation. The patient would be distressed due to these voices and on several occasions would be found responding to these voices. He also used to claim that he possessed special powers, due to which he had cured his father’s diminished vision, and would also claim to cure his earache. His other family members shared none of these beliefs. During exacerbations of his illness, he would donate the fruits and vegetables of his shop to people, at times he would even donate the day’s earning to beggars, and would also smoke bidis excessively. His sleep would also decrease by about three hours a day and he would eat more food than his usual pattern.

During all these 13 years, the patient had never been asymptomatic, although the intensity and frequency of his symptoms would decrease with treatment. He had both affective as well as psychotic symptoms all through his illness. There was a past history of repeated hemolytic crises in the form of bleeding from the gums, till 12–13 years of age, but there was no history of recent hemolytic crisis. Since 1993, the patient had been tried on three different classes of antipsychotics, in adequate doses, for adequate durations, but with poor response. Mood stabilizers were also tried, with some improvement in symptoms. He had a history of three prior admissions and also had a family history of psychotic illness in his mother and two elder sisters, who were maintaining well on treatment. The patient’s birth and developmental history was uneventful and he had a well-adjusted, pre-morbid temperament.

On physical examination, black discoloration of the gums of both upper and lower jaws was present and the rest of the physical examination was within normal limits. On mental status examination; his psychomotor activity and rate of speech were increased; reaction time was decreased, and there was pressure of speech. Affect was euphoric, with full range and reactivity, thought content revealed delusion of persecution, delusion of control, delusion of grandiosity, and delusion of thought insertion and thought withdrawal. He also had second and third person auditory hallucinations, with impaired judgment and poor insight into illness. All routine investigations were within normal limits (Hb-14g/dl, PCV-40.6%, MCV-98.6fl, MCH-32.4pg, MCHC-32.9g/dl, S.Bilirubin-0.88mg/dl, and no RBCs were detected in the urine examination).

Following discussions during the hospital stay, he was diagnosed as a case of Schizophrenia Paranoid Subtype, as per ICD-10.[7] However, a differential diagnosis of Schizoaffective Disorder Manic Subtype was also entertained, in view of the prominent manic symptoms during the course of illness. During his stay of three weeks, he gradually improved and was discharged. The patient later dropped out of follow-up.

**DISCUSSION**

G6PD deficiency is common in the Mediterranean region and some reports from the Indian subcontinent also mention that the prevalence of the G6PD deficiency state varies from 0 – 27% in different castes, ethnic and linguistic groups, and 5.7 to 27.9% in different hospital groups.[8-10] Literature is mostly available in the form of case reports and surveys, suggesting the possible association of G6PD deficiency with acute psychosis, catatonic schizophrenia, and bipolar disorders.

The current case is being reported because of its rarity
and atypical clinical manifestations of predominant manic symptoms in the presence of florid schizophrenic symptoms all through the illness, as compared to the previous findings of acute recurrent psychotic episodes seen in patients of G6PD deficiency, and the course of illness was chronic and continuous, with fluctuations, as compared to the acute and recurrent course as reported previously. There were significant treatment implications in this case as there was only partial response to treatment with antipsychotics, as well as mood stabilizers, tried in adequate doses, for adequate durations, which was supported by previous literature also.

There are reports of an increased proportion of the G6PD deficiency state, with schizophrenia and bipolar disorder patients. There is a paucity of literature regarding the relationship of the G6PD deficiency state with psychotic disorders. G6PD deficiency has been regarded as a susceptibility state for manic schizoaffective disorders. Systematic, clinical, and genetic studies are needed to find the exact relationship between the G6PD deficiency state and psychotic disorders, which will further help in understanding the course and management of such cases.

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