Case Report

HYPERHOMOCYSTEINEMIA IN A PATIENT WITH SCHIZOPHRENIA – A CASE REPORT

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Abstract
Hyperhomocysteinemia is a common metabolic disorder that is associated with mental disorders. Treatment with vitamin supplements was found to be beneficial in reducing elevated homocysteine levels. An 18-year-old male, presenting with a 1 ½ years history of schizophrenia, had elevated serum homocysteine. The elevated homocysteine level reached normal with vitamin supplements, and schizophrenic symptoms subsided with a relatively low dose of antipsychotics. Correcting metabolic errors such as hyperhomocysteinemia can result in significant improvement of associated psychotic symptoms.
Keywords: Hyperhomocysteinemia, Schizophrenia, Vitamin Supplements

INTRODUCTION

Homocysteine is a sulfur-containing amino acid that plays a crucial role in methylation, redox homeostasis, and the metabolism of neurotransmitters.[1.] Hyperhomocysteinemia is a metabolic disorder characterized by elevated plasma homocysteine levels above 15micromol/L.[2.] Hyperhomocysteinemia is associated with an increased risk of cardiovascular disease, stroke, neurodegenerative disorders, and psychiatric illnesses.[1] Goff et.al reported that elevated homocysteine levels lead to endothelial dysfunction, oxidative stress, excitotoxicity, and neurotransmitter imbalance, contributing to cognitive decline, depression, and schizophrenia.[3] Intellectual Disability Disorder (IDD formerly Mental retardation), cerebral atrophy and seizure have been reported in severe homocysteinemia and homocystinuria.[4] Elevated levels of plasma homocysteine were also observed among schizophrenia patients, and it was found to be significantly correlated with negative symptoms of schizophrenia.[5] Here, we present a case of hyperhomocysteinemia in a young male with schizophrenia. Written informed consent was obtained from the patient and the parent for publication of the data.

CASE REPORT

An 18-year-old, B. Tech dropout, male belonging to an average-income family from a rural background, presented with suspiciousness, muttering to self, reduced social interaction, deterioration in academic performance, and poor self-care associated with disturbed sleep of 1 ½ years duration.

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Symptoms were of gradual onset but progressed rapidly with significant deterioration in his socio-occupational functioning and personal care. After about 2 months of onset, he developed a significant change in his behavior, which included disorganized behavior such as passing motion outside the commode and often in his dress, lying in the playground for no apparent reason, and returning to class with soiled dress. He failed to give any explanation for such behavior. Initially, he took no psychiatric treatment, but due to the deterioration and advice from teachers, he was taken for psychiatric treatment in the past month. Still, he didn't comply with the treatment. After admission, he reported some unreal feelings when asked about his disorganized behaviors, such as passing motion in his dress. There was no history of loss of awareness or abnormal movements of the body. He was born to non-consanguineous parents as a full-term LSCS delivery. He had a history of nocturnal enuresis until the age of 10. There was no past or family history of mental illness or any neurological disorders like seizure disorder or neurodegenerative disorders. He had a good scholastic performance and was actively involved in sports till the onset of the disease.

The examination revealed that his height was 158 cm, his weight was 42 kg, and his BMI was 17. Mental status examination showed increased blink rate and ill-sustained eye-to-eye contact with smiling and muttering to self. He appeared fidgety, and the rapport was poor. His talk was normal, but his thoughts revealed wooliness, thought broadcasting, delusions of persecution, delusions of reference, and thought withdrawal. He denied hallucinations but had derealization. His mood was anxious. He was alert but distractible with normal orientation and memory. His intelligence was average. His abstract ability and judgment were impaired. Insight was grade 1. Physical systems examinations revealed no abnormalities. A neurology consultation was conducted to address his disorganized behavior, derealization, and rapid deterioration.

The EEG and MRI of the brain were normal. Blood investigations, including CBC, ESR, LFT, RFT, RBS, TSH, serum PTH, serum vitamin B12, serum ceruloplasmin, and anti-microsomal antibody, were also within normal limits. Serum Vitamin D3 was low (17 ng/ml). Serum homocysteine level was 22.58 micromol/L. (normal level- <15 micromol/L) Repeat S. Homocysteine level after 2 weeks was 24.89 micromol/L/L. He was treated with risperidone 1 mg, which was hiked up to 3 mg, and was supplemented with 60000IU of vitamin D. Psychotic symptoms subsided with treatment. Personal care and social interaction improved. Biological function returned to normal. He was prescribed B1, B6 & B12, considering a mild but persistent elevation in homocysteine. After one month of treatment with vitamin supplements, the serum homocysteine level became normal (11.51 micromoles/L). His social interaction became better, and he continued on risperidone 3mg.

DISCUSSION

Hyperhomocysteinemia can result in endothelial dysfunction, oxidative stress, excitotoxicity, and neurotransmitter imbalance, contributing to cognitive decline, depression, and schizophrenia.[3] Many researchers have observed a high prevalence of elevated serum homocysteine levels in patients with schizophrenia.[5,6,7] Similar to our case, adolescent male and first-episode schizophrenic patients were found to have elevated plasma

homocysteine levels compared to healthy controls.[8,9] Male adolescent schizophrenia patients had a higher homocysteine level compared to female patients, and there was a significant difference between the mean homocysteine levels of male and female adolescent patients with schizophrenia.[8] Although studies have found lower levels of vitamin B6 and B12 in schizophrenic patients with elevated serum homocysteine, our patient demonstrated normal folate and B12 levels.[10] This may indicate a causation other than malnutrition for elevated serum homocysteine. However, our patient's homocysteine level returned to normal after 1 month of taking folate and B12 vitamin supplements. Along with this, despite the severity and long duration of untreated psychosis, treatment with a relatively lower dose of risperidone resulted in significant improvement in schizophrenic symptoms like disorganised behaviour and delusions. This may suggest the contribution of elevated homocysteine levels in the development of schizophrenic symptoms. Additionally, it can be observed that identifying and correcting metabolic errors can lead to a prompt and favorable recovery. Though previous studies noticed a positive association between negative symptoms of schizophrenia and hyperhomocysteinemia, our patient had more positive symptoms. Still, despite treatment, social interaction remained lower compared to the premorbid level, indicating a possible association with elevated serum homocysteine levels. [3,5]

The association between hyperhomocysteinemia and psychotic disorders is well documented. This case points out the possible association of schizophrenic symptoms with elevated serum homocysteine levels. Many a time, psychotic patients are not screened for metabolic disorders like hyperhomocysteinemia. Such undetected metabolic errors may contribute to persisting psychotic symptoms and poor outcomes. This case suggests the need for screening for metabolic errors when patients, particularly young patients, present with severe or atypical symptoms with rapid deterioration.

The authors attest that there was no use of generative artificial intelligence (AI) technology in the generation of text, figures, or other informational content of this manuscript.

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