Frequency of Vitamin B12 Deficiency in patients of Pancytopenia

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ABSTRACT

Background: Vitamin B12 insufficiency is prevalent in developing nations. It often causes megaloblastic anaemia, but it may also impact the other two cell lines, i.e. platelets and leukocytes (pancytopenia), and may be misdiagnosed as cancer or bone marrow failure. A therapeutic test may be performed, providing a prompt diagnosis and preventing a high death rate.

Methodology: This cross sectional study was done at Children’s Hospital & The Institute of Child Health Lahore in 6 months. This study involved 242 children of 6 months to 14 years age of both genders admitted in Children Hospital Lahore and had pancytopenia on their CBC.

Results: The age of the patients ranged from 6 months to 14 years with a mean of 6.4±2.8 years. There were 111 (45.9%) male and 131 (54.9%) female patients with a male to female ratio of 1:1.2. A total of 6.2% patients were found to have B12 deficiency.

Conclusion: It is concluded that, 6.2% of patients with pancytopenia had a deficiency of B12; thus, patients may be routinely evaluated for pancytopenia and its reasons, since many of them are entirely curable and others are managed.

Keywords: Vitamin B12 deficiency, cobalamin, Pancytopenia, Megaloblastic

INTRODUCTION

Vitamin B12 (cobalamin) insufficiency has long been recognized as a clinical condition1,2. Due to incorrect DNA synthesis, megaloblastic anaemia is caused by aberrant maturation of hematopoietic cells3. Few data exist to indicate that many children in low- and middle-income countries have insufficient vitamin B12 and folate consumption2. Clinical B12 insufficient shown by typical hematological and neurological symptoms is infrequent. Nevertheless, subclinical insufficiency occurs between 2.5% and 26% of the general population, depending on the criteria used, but the clinical significance is uncertain4. Cobalamin (vitamin B12) and folic acid are needed for DNA biosynthesis1,4. Insufficiency in any of these vitamins causes the nucleus and cytoplasm of rapidly renewing cells to mature asynchronously1,5.

Vitamin B12 deficiency may result in significant hematologic changes, including pancytopenia, macrocytosis, neutrophil hypersegmentation, and hypercellular bone marrow with blastic differentiation6. Pancytopenia is defined by a reduction in the quantity of at least two types of blood cells. Acute progression of pancytopenia is possible, such as with decreasing blood cell counts in severe sepsis, disseminated intravascular coagulation, or fast hemorrhysis7.

Identification of pancytopenia requires a comprehensive diagnostic strategy tailored to the clinical context. However, numerous etiologies, such as vitamin insufficiency, may also be responsible for this rather frequent occurrence8. In Pakistan, it is the third biggest cause of pancytopenia in children, with a prevalence of 19.5%9.

Inadequate ingestion of animal foods and pernicious anaemia (loss of intrinsic factor owing to autoimmune atrophic gastritis) are the leading causes of severe vitamin B12 insufficiency in children and adults, respectively, across the globe10. Cobalamin deficit in newborns is often caused by a defect in the mother. If the diagnosis is delayed, megaloblastic anaemia, pancytopenia, and failure to thrive may be present, along with neurological abnormalities11.

There have been studies undertaken elsewhere, but not in our environment. These findings will contribute to the current body of knowledge. Policymakers, planners, managers, and practitioners may utilize the findings to implement effective interventions for the benefit of the general community.

MATERIALS AND METHODS

This cross sectional study was conducted in Children Hospital & Institute of Child Health Lahore for a period of 6 months. Patients were selected by Non-Probability, Convenience sampling. Sample size is 242, calculated with 95% confidence level and 5% absolute precision considering 19.5% prevalence of B12 deficiency in pancytopenia9.

Inclusion Criteria: All the children of 6 months to 14 years age of both genders admitted in The Children’s Hospital Lahore and had pancytopenia on their CBC.

Exclusion Criteria
• All those children who had received blood transfusion.
• All known cases of leukemia/lymphoma.

Data collection procedure: Questionnaire was used for data collection. After informed consent children 6 months to 14 years, fulfilling the inclusion criteria admitted in The Children’s Hospital & ICH Lahore was enrolled. 5cc blood was drawn and sent to the laboratory of The Children’s Hospital & ICH Lahore. Their CBC and serum B12 levels was measured. Pancytopenia was labelled when there was a decrease in all the three cellular elements of blood; prevailing when the hemoglobin(Hb) less than 10 g/dl, absolute neutrophil count (ANC) less than 1.5 x 109/L , platelet count less than 100 x 109/L.

Data analysis procedure: The information collected was analyzed by using statistical software SPSS -20. The quantitative variables like age was presented as mean and SD. Chi square test was employed and p value ≤ 0.05 was considered significant. Data was presented in the form of tables and diagrams.

RESULTS

Patients varied in age from 6 months to 14 years, with a mean of 6.42±8 years. The mean age of patients was 6.39±2.80 years. There were 111 male patients (45.9%) and 131 female patients (54.9%), for a male to female ratio of 1:1.2. The mean height and weight of these patients were 114.65±15.66 cm and 20.18±5.79 kg. The mean Hb was 8.61±0.84 while the mean TLC and Platelet was 2.59±0.79 and 63.02 ± 20.88. There were 70(28.9%) cases who had history of breast feeding while 172(71.1%) cases were not breast fed. A total of 6.2% of individuals with pancytopenia had a defect in B12.
Vitamin B12 deficiency contributes for 16% of all three formed components of the blood. Vitamin B12 deficiency may be routinely diagnosed and treated. Many doctors should have a high index of suspicion for vitamin B12 deficiency and that can be done as much as feasible.

DISCUSSION

Pancytopenia is a trio of observations that emerge from a variety of illness processes. It is characterised as a reduction in the quantity of all three formed components of the blood. Vitamin B12 deficiency due to malnutrition is prevalent in underdeveloped regions of the globe.

In the current investigation, 6.2% of individuals with pancytopenia were found to have B12 insufficiency. According to reports, B12 deficiency contributes for 16%-61% of Pancytopenia patients. The majority of patients reported poor eating habits, including dietary taboos, low food quality, and self-avoidance of required meals. The higher incidence of megaloblastic anaemia has been attributed to the high prevalence of nutritional anemias in India. Due to geographical and societal similarities, dietary anemias may also contribute to the increasing prevalence of megaloblastic anaemia in some parts of Pakistan.

In a study conducted in Malaysia, 64% of patients with megaloblastic anaemia exhibited pancytopenia. Only 13.7% of instances of pancytopenia in patients with megaloblastic anaemia were recorded in a research that was carried out in New York. This indicates that the prevalence of pancytopenia has decreased in Western nations. According to a recent research, Vitamin B12 and Folic Acid shortage is a crucial component in the suppression of bone marrow in malnourished children. Our results showed that folic acid deficit was much lower in females and Vitamin-B12 in men.

Megaloblastic anaemia is one of the health issues that is becoming more prevalent on a worldwide scale as a result of deficiencies in folic acid and vitamin B12. This problem is also becoming more widespread. Vegetarianism is a leading source of vitamin B12 deficiency, which in turn may lead to elevated levels of homocysteine in the blood. If it is not recognised or treated in a timely manner, a lack of vitamin B12 may result in potentially fatal issues inside the human body. These issues can manifest in a variety of ways, making it difficult to diagnose. In patients who appear with anaemic symptoms including pallor and weakness and/or are found to have pancytopenia following further inquiry, doctors should have a high index of suspicion for vitamin B12 deficiency. This should be done as much as feasible.

CONCLUSION

It is concluded that 6.2% of patients with pancytopenia had a deficiency of B12; thus, patients may be routinely evaluated for pancytopenia and its reasons, since many of them are entirely curable and others are managed.

REFERENCES