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CLINICO-HEMATOLOGICAL PROFILE OF MEGALOBLASTIC ANAEMIA IN CHILDREN

Pediatrics

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ABSTRACT

Background: Megaloblastic Anemia is an important reversible cause of neurodevelopmental deterioration. The present study intended to describe the common presenting complain, clinical and haematological manifestations of the disease. The main objective of study is to describe the varied clinical and hematological manifestations of Megaloblastic Anemia in children admitted to a tertiary care hospital, and to observe the mode of presentation of disease and its distribution among various age groups. **Methods:** A retrospective observational study was conducted in children aged between 1 to 14 years, who were admitted with diagnosis of Megaloblastic anemia from June 2018 to May 2020 in Darbhanga Medical College and Hospital, Darbhanga, Bihar. Case records of eligible participants were analysed for primary outcome measures like presenting complaints, method of diagnosis, peripheral smear findings, and clinical features and secondary outcome measures like age, sex. **Results:** out of 110 cases, diagnosis of 55% cases was confirmed by Vitamin B12 assay, 46% were diagnosed by bone marrow examination. Macrocytic anemia was observed in peripheral blood smear examination in 100% cases. Hyperpigmentation was noticed in 72%. Blood transfusion secondary to severe anemia was needed in 79%. Anorexia, generalised weakness, pallor was observed in 100% cases, neurologic manifestations in 32% cases. **Conclusions:** The most common presenting complaint in megaloblastic anemia due to Vitamin B12 deficiency is anorexia, generalised weakness, irritability manifesting clinically as pallor, hyperpigmentation and haematologically as macrocytic anemia with bicytopenia.

KEYWORDS

Hyperpigmentation, Macrocytic anemia, Pallor, Vitamin B12 deficiency

INTRODUCTION

Megaloblastic anemia is one of the important causes of anemia in children (1). Anemia in children differ from those in adults as they tend to be more pronounced and develop rapidly (2). Megaloblastic anemia is an important reversible cause of neurodevelopmental deterioration(3).It is classically defined as a macrocytic anemia that is characterised by megaloblastic bone marrow morphology showing metamyelocytes and megaloblasts, accompanied by leucopenia and thrombocytopenia(3). Early diagnosis and treatment of vitaminB12 deficiency is must since it is a reversible cause of bone marrow failure and demyelinating nervous system disease (4). It results from abnormal maturation of hematopoetic cells due to faulty DNA synthesis. Two vitamins VitB12 and folic acid are essential for DNA biosynthesis .Deficiency of either vitamin results in abnormal nuclear maturation with normal cytoplasmic maturation, apoptosis, ineffective erythropoesis, intramedullary hemolysis, pancytopenia and typical morphological abnormalities in blood and marrow cells(5,6,7).The most common presenting complaints in Megaloblastic anemia due to vitaminB12 deficiency are anorexia, generalised weakness and irritability manifesting clinically as pallor, hyperpigmentation and hematologically as macrocytic anemia.

MATERIALAND METHODS

In this retrospective observational study , children aged 1 to 14 years admitted with a diagnosis of Megaloblastic anemia from june 2018 to May 2020 in Darbhanga Medical College and Hospital, Darbhanga, Bihar were included. The case records were accessed through admission and discharge database of the hospital. The records were examined and primary outcome measures like chief complaints, method of diagnosis, PBS findings and bone marrow findings were noted. The method of diagnosis considered was either vitaminB12 assay or bone marrow examination.

RESULTS

Out of 110 children were included in the study over the period of 2 years, 55% (n = 60) were diagnosed by Vitamin B12 assay, whereas, 46% (n=50) were diagnosed by bone marrow examination. 52% (n=58) were females, 48% (n=52) were males. Age wise distribution listed in table 1.

Table1: Age wise distribution of cases.

Age	Percentage %	(n)
1-5 years	41	(n = 45)
5-10 years	29	(n = 32)
10-14	39	(n = 43)

Table 2: Clinico-hematological profile of megaloblastic anemia

Clinical profile	Percentage	No of cases
Anemia	100	110
Irritability / tremors / neurologic involvement	32	35
Anorexia / generalised weakness	100	110
Hyperpigmentation	72	79
Haematological profile	Percentage	No of cases
Bicytopenia	70	77
Macrocytic anemia (MCV >100 µg/L)	100	110
Severe Anemia (Hb <6 g/dl.) Need blood transfusion	72	79
Diagnosed by bone marrow findings of megaloblasts	46	50
Diagnosed by Vitamin B12 assay	60	55

Anorexia, generalised weakness, pallor was observed in 100% (n=110) cases, hyperpigmentation in 72% (n=79) children, neurologic manifestations like irritability, tremors/seizures in 32% (n=35) children. Macrocytic anemia, bicytopenia was observed in peripheral smear examination in 100% (n=110) and 70% (n = 77) subjects respectively. The median haemoglobin was 7g/dL with severe anemia noted to be in 72% (n=79) subjects who needed blood transfusion. All the measured outcomes correlated with the disease outcome with pvalue<0.005.

DISCUSSION

In our study most common presenting complaint in megaloblastic anemia due to Vitamin B12 assay is generalized weakness and/or anorexia,irritability with the most common clinical finding of pallor, hyperpigmentation which is comparable to study by Zengin et al who also reported the mean hemoglobin as 6.4 g/dL and similar rate of presenting complaints(8) . Incecik F et al reported incidence of neurologic manifestations (irritability, tremors /seizures) to be 33% in their study which is comparable to present study (32%)(9). Hyperpigmentation results from decreased glutathione which induces tyrosinase activity, which in turn mobilizes melanocytes to keratinocytes, causing increased melanin synthesis (11). 55% of the cases needed blood transfusion secondary to severe anemia in a study conducted by Gomber et al,whose percentage is higher in the present study (10). Given the fact that Vitamin B12 is necessary for red cell maturation, this correlation with Bicytopenia, was noted in the same

study as well as in Meghann et al, study to be 44.8%, which is far less compared to present study (75%) which could be explained by the increased number of cases with severe anemia in the present study (12).

Megaloblastic anemia predominantly diagnosed by bone marrow and Vitamin B12 assay, where emphasis has to be laid on Vitamin assay in order to standardise the diagnostic options among various hospital settings. It also adds the advantage of less expertise, easy to perform process and decreased risk of infection. We are in an opinion that regular reporting of common diseases like megaloblastic anemia and its varied presentation in various age groups guides child care physicians in early detection of disease. The merits of study being the description of varied clinical features and modes of presentation of Megaloblastic Anemia, along with the distribution among various age groups.

CONCLUSION

The most common presenting complaint in megaloblastic anemia due to Vitamin B12 deficiency is anorexia, generalized weakness, irritability manifesting clinically as pallor, hyperpigmentation and hematologically as macrocytic anemia with bicytopenia. Regular report of common presentations of megaloblastic anemia in various age groups keeps the child care expert vigilant for its early detection. Megaloblastic anemia is a preventive and treatable cause of progressive neurologic disease in children with poor reporting of wide range of clinical presentations and distribution among various age groups.

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