ASSESSMENT OF CLINICAL AND HEMATOLOGIC PROFILE OF CHILDREN WITH MEGALOBLASTIC ANEMIA

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ABSTRACT

Background: Megaloblastic anemia is traditionally described as a macrocytic anemia distinguished by a characteristic megaloblastic bone marrow morphology, featuring metamyelocytes and megaloblasts, often accompanied by leukopenia and thrombocytopenia. The spectrum of diseases associated with vitamin B12 deficiency varies widely, ranging from asymptomatic cases to life-threatening conditions like pancytopenia or myelopathy. **Material & Methods:** The present cross sectional, prospective study was carried out at department of pediatrics, at our tertiary care hospital. The study duration was of six months from January 2015 to June 2015. In this prospective study we enrolled 100 children of age group of 6 months to 18 years presented at outpatient department with a diagnosis of Megaloblastic Anemia and enrolled by simple random sampling. **Results:** In the present study, out of total enrolled participants, on the basis of clinical presentation it was found that 100% children had pallor, 90% children had Anorexia and generalized weakness, 68% children had Hyperpigmentation and 36% children were diagnosed with Irritability/ tremors/ neurologic involvement. On the basis of hematological parameters it was found that 100% children had Macrocytic anemia (MCV >100 µg/L), 100% children were diagnosed by VitaminB12 assay and 32% children had Severe Anemia (Hb <6 g/dl). There was no mortality reported in present study. **Conclusion:** We concluded from the present study that, most frequent presenting symptoms in megaloblastic anemia due to Vitamin B12 deficiency typically include anorexia, generalized weakness, and irritability, clinically manifested as pallor and hyperpigmentation.

Keywords: Macrocytic anemia, VitaminB12 deficiency, Pallor.

INTRODUCTION:

Megaloblastic anemia is traditionally described as a macrocytic anemia distinguished by a characteristic megaloblastic bone marrow morphology **(1),** featuring metamyelocytes and megaloblasts, often accompanied by leukopenia and thrombocytopenia **(2).** The spectrum of diseases associated with vitamin B12 deficiency varies widely, ranging from asymptomatic cases to life-threatening conditions like pancytopenia or myelopathy **(3).** Timely recognition and treatment of vitamin B12 deficiency **(4)** are crucial as it represents a reversible cause of bone marrow failure and demyelinating diseases of the nervous system **(5).**

Nutritional deficiency has historically been identified as the primary cause of widespread disease manifestations, particularly among low-income groups **(6).** The aim of the present study

is to observe the clinical and hematologic profile of megaloblastic anemia in a tertiary healthcare center, with a focus on common modes of presentation and distribution among various age groups **(7).** This research seeks to enhance understanding of the prevalence and characteristics of megaloblastic anemia, aiding in more effective diagnosis and management strategies.

MATERIALS & METHODS

The present cross sectional, prospective study was carried out at department of pediatrics, at our tertiary care hospital. The study duration was of six months from January 2015 to June 2015. A sample size of 100 was calculated at 95% confidence interval at 10% acceptable margin of error by epi info software version 7.3. In this prospective study we enrolled 100 children of age group of 6 months to 18 years presented at outpatient department with a diagnosis of Megaloblastic Anemia and enrolled by simple random sampling. Institutional Ethics Committee Clearance was obtained before start of study and written and informed consent from their mother and father for the study was obtained from all the patients. Strict confidentiality was maintained with patient identity and data and not revealed, at any point of time.

Patients with clinical diagnosis without laboratory or pathological diagnosis of disease were excluded from the present study. These cases were investigated as per study guideline and follow up period was of 3 months. All data were entered in the MS office 2010 spread sheet and Epi Info v7. Data analysis was carried out using SPSS v22.

Qualitative data was expressed as percentage (%) and Pearson's chi square test was used to find out statistical differences between the study groups and sensitivity, specificity, positive predictive value and negative predictive value were calculated.

If the expected cell count was < 5 in more than 20% of the cells then Fisher's exact test was used. All tests were done at alpha (level significance) of 5%; means a significant association present if p value was less than 0.05 and highly significant if p value less than 0.01.

RESULTS

In the present study, we enrolled 100 children of age group of 6 months to 18 years presented at outpatient department with a diagnosis of Megaloblastic Anemia by simple random sampling. Out of the total enrolled children 44% were males and 56% were females.

Mean weight of study participants was 11.3 ± 2.8 kg. Out of total, 28% were in group of less than 5years, 25% were in the age group of 5-10 years, 23% were in the age group of 10-15 years and 24% were in the age group of 15-18 years. (Table 1)

Table 1: Distribution of study participants according to study parameters.

Parameters		No. of patients
Gender	**Male**	44%
	Female	56%
Age group	**< 5years**	28%
	5-10 years	25%
	10-15 years	23%
	15-18 years	24%

In the present study, out of total enrolled participants, on the basis of clinical presentation it was found that 100% children had pallor, 90% children had Anorexia and generalized weakness, 68% children had Hyperpigmentation and 36% children were diagnosed with Irritability/ tremors/ neurologic involvement. There was no mortality reported in present study. (Table 2)

Table 2: Distribution of study participants according to clinical presentation.

Parameters	No. of patients
Pallor	100%
Anorexia / generalized weakness	90%
Hyperpigmentation	68%
Irritability / tremors / neurologic involvement	36%

In the present study, out of total enrolled participants, on the basis of hematological parameters it was found that 100% children had Macrocytic anemia (MCV >100 µg/L), 100% children were diagnosed by VitaminB12 assay and 32% children had Severe Anemia (Hb <6 g/dl). (Table 3)

Table 3: Distribution of study participants according to hematological parameters.

Parameters	No. of patients
Macrocytic anemia (MCV >100 µg/L)	100%
Severe Anemia (Hb <6 g/dl.)	32%
Diagnosed by VitaminB12 assay	100%

DISCUSSION

In the present study, we enrolled 100 children of age group of 6 months to 18 years presented at outpatient department with a diagnosis of Megaloblastic Anemia by simple random sampling. Out of the total enrolled children 44% were males and 56% were females. Mean weight of study participants was 11.3 ± 2.8 kg. Out of total, 28% were in group of less than 5years, 25% were in the age group of 5-10 years, 23% were in the age group of 10-15 years and 24% were in the age group of 15-18 years.

Similar findings were reported in a study conducted by Sunil Gomber et al conducted to assess the children with megaloblastic anemia and found that Two children exhibited focal seizures, while two other children displayed features of infantile tremor syndrome. Upon examination, all patients presented with pallor. Additionally, hepatomegaly (up to 4 cm) was observed in 19 cases (66%), and splenomegaly was noticed in 6 cases (21%) (8).

In the present study, out of total enrolled participants, on the basis of clinical presentation it was found that 100% children had pallor, 90% children had Anorexia and generalized weakness, 68% children had Hyperpigmentation and 36% children were diagnosed with Irritability/ tremors/ neurologic involvement. There was no mortality reported in present study. Similar findings were reported in a study conducted by S H Lee et al conducted to assess the children with megaloblastic anemia and found that histological examination revealed numerous intracytoplasmic desmosomes, along with aggregated bundles of tonofilaments and highly condensed keratohyalin granules. The pathophysiological mechanism linking vitamin B12 deficiency to pigmentary disturbances and alterations in nuclear size is deliberated upon (9).

In the present study, out of total enrolled participants, on the basis of hematological parameters it was found that 100% children had Macrocytic anemia (MCV >100 μg/L), 100% children were diagnosed by VitaminB12 assay and 32% children had Severe Anemia (Hb <6 g/dl). Similar findings were reported in a study conducted by Faruk Incecik et al conducted to assess the children with megaloblastic anemia and found that infants exhibited symptoms of anorexia, pallor, hypotonia, and neurodevelopmental retardation. Seizures were observed in 46.6% (7/15) of patients, while tremors were present in 33% (5/15). Among those with seizures, four patients experienced generalized tonic-clonic seizures, one patient experienced generalized tonic seizures, and two patients had focal seizures (10).

CONCLUSION

We concluded from the present study that, most frequent presenting symptoms in megaloblastic anemia due to Vitamin B12 deficiency typically include anorexia, generalized weakness, and irritability, clinically manifested as pallor and hyperpigmentation. Megaloblastic anemia represents a preventable and treatable cause of progressive neurologic disease in children, highlighting the importance of thorough reporting of its diverse clinical presentations and distribution among different age groups.

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