

Pattern of Anemia in Children in Age Group 1 to 5 Years

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ABSTRACT

Aim: To determine the pattern of anemia in age group of 1 to 5 years admitted in pediatric ward.

Methods: This descriptive study was carried out in the Department of Pediatrics, Shaikh Zayed Hospital, Lahore from January 2005 to December 2005. Two hundred anemic patients in age group of 1 to 5 years, admitted in ward from 1 January 2005 to 31st December 2005 were studied.

Results: Out of two hundred, one hundred and eighteen (59%) patients were male and 82(41%) were female. Regarding different age groups, 1-2 years 159(79.5%) patients, >2 to 3 years 29(14.5%) >3 to 4 years 12(6%) and >4 to 5 years were 10(5%) patients. Five (2.5%) had severe anemia. Fifty two (26%) had moderate and 143(71.5%) had mild anemia. Microcytic picture was seen in 181(90.5%) patients. Macrocytic anemia was in 2(1%), dimorphic picture in 4(2%) and normocytic picture in 13(6.5%).

Conclusion: Present study highlights that microcytic anemia especially iron deficiency anemia is the commonest variety of anemia found in children. This can be diagnosed easily by hemoglobin percentage, peripheral picture, TIBC, serum iron levels and treated successfully by iron supplementation and proper nutrition.

Keywords: Anemia, nutritional anemia, microcytic anemia, hemoglobin percentage, peripheral smear.

INTRODUCTION

Anemia is defined as reduction of red cell mass or hemoglobin below the normal range for the patient's age and sex¹. There are several kinds of anemia, produced by a variety of underlying causes. Based on morphology of red blood cells hematologists tend to categorize anemia as microcytic, macrocytic or normocytic².

Out of long list of causes few more common are like, nutritional deficiencies or presences of antagonists like drugs and worm infestation³. There can be genetic problem in absorption of iron like due to certain mutation, body cannot use absorbed iron. There can be blood loss, which can be both internally or externally. Genetic disorders of Hb synthesis may be present⁴. Sometimes erythropoiesis is inhibited by immune mechanisms or erythropoietin deficiency. Endocrine suboptimal function may also lead to anemia. Bone marrow suppression leading to anemia may be due to presence of certain toxins, radiotherapy chemotherapy, heavy metal poisoning, certain viral infections and different drugs. In other cases the etiology may be multifactorial like anemia in uremia, malignancy or connective tissue disorders^{5,6}.

Early recognition and treatment of anemia is of crucial importance as the anemia in children is

associated with poor developmental outcome.^{7,8} It is associated with poor growth, developmental delay and made the child prone to infections. If this anemia is not managed accordingly that may leads to other organ involvement like chronic anemia can heart failure, hepatosplenomegaly and neurological or psychomotor disorder⁹. World Prevalence of anemia is approximately 30% with highest prevalence in the regions of South Asia and Africa¹⁰.

MATERIAL AND METHODS

This descriptive study was conducted in Paediatric Department at Shaikh Zayed Hospital Lahore in a period of one year from January to December 2005. Two hundred anemic patients in age group 1 to 5 years were admitted in ward.

These patients were further evaluated through a detailed medical history which was taken from parents or guardian. Certain points were specifically noted like demographic and socioeconomic data, any change in behaviour like irritability, pica, easy fatigability, any bleeding from any site, bruising, petechial malena, haematemesis. Special importance was given to the history of any worm infestation and drug history with duration of drug intake. Detailed nutritional history was taken with daily calorie intake as it can point toward nutritional anemia. Development assessment was done. Family history of inherited anemia was sorted out. Detailed systemic inquiry was made for chronic anemia. A detailed systemic examination was done. We weigh and was taken as underweight if their weight was less than 3rd

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centile. Similarly height was also noted on centile charts. Blood samples were drawn by venipuncture into different containers. One tube with EDTA, for determination of hemoglobin, hematocrit, mean corpuscular volume, mean corpuscular hemoglobin concentration. RBC's count, WBC's count, erythrocyte sedimentation rate (ESR). Peripheral smear was prepared and RBC's morphology was studied to know the type of anemia. Other tube was plain and blood was drawn for total iron binding capacity, serum ferritin and serum iron and was allowed to clot at room temperature. Both tubes were sent to laboratory where immediate analysis was done. Anemia was diagnosed if hemoglobin was less than 11gm/dl as WHO standard.

After this basic classification which based on morphology further investigations were carried out to see the etiology like, reticulocyte count, LFT, serum bilirubin level, hemoglobin electrophoresis, bone marrow aspiration and biopsy etc.

RESULTS

In this study 118 (59.0%) patients were male and 82(41%) were female with male to female ration of 1.5:1 (Table 1). In age group of 1 to less than 2 years 159(79.5%) patients were presented, 29(14.5%) patients were in age group of 2 to less than 3 years and 12(6%) patients were between age group of 3 to 4 years 12(6%) patients. In 4 to 5 years of age group 10(5%) were presented (Table 2).

Most common clinical presentation was pallor, it was 200(100%). After that the most common presentation was malnutrition that was present in 95(47.5%) of cases. Behaviour changes were observed in 30(15%) of patients. These changes were easy fatigability and irritability was observed in 12(6%) patients and 18(9%) patients had easy fatigability and history of pica. Malena and hamatemesis was present in 4(2%) patients each. History of worn infestation was present in 17(8.5%) of patients, 3(1.5%) patients have history of drug intake and 2(1%) of patients has history of inherited anemia in family, 35(17.5%) of patients had systemic illness. Anthropometry 95(47.5%) of patients were below expected for their age and 74(37%) has height less than 50 centimeter (Table 4).

Out of 200 patients 5(2.5%) of patients had severe anemia with hemoglobin of less than 5gm/dl, 52(26%) patients has 8gm/dl and mild anemia with hemoglobin of >8gm were present in 143(71%) of patients (Table 5).

Thirteen (6.5%) of patients had normocytic anemia i.e., 2(1%) of patients had macrocytic and 181(90.5%) had microcytic peripheral picture and mix

cellularity was present in 4(2%) of patients. Macrocytic anemia was noted in 2(1%) of patients and both of these had folic acid+vitamin B12 deficiency. Further vitamin levels were not done due to unavailability of required laboratory facilities.

Microcytic anemia was noted in 181(90.5%) out of these patients 9(4.5%) has thalassemia major as confirmed on Hb electrophoresis. Remaining 172 patients has iron deficiency anemia Table 7. Out of these 172 patients with iron deficiency, seven patients (4%) had celiac disease. Three(2%) had chronic renal insufficiency. Four patients (2.3%) had persistent diarrhea and remaining 158(92%) patients had nutritional anemia Table 8.

Four (2%) patient has diamorphic out of these 2(50%) patients were of celiac disease with double deficiency anemia and 2(50%) patient of cerebral palsy has double deficiency (Table 6).

Table 1: Sex Distribution of patients (n=200)

Gender	Frequency	%age
Male	118	59.0
Female	82	41.0

Male to female ration: 1.5:1

Table 2: Age Distribution of patients (n=200)

Age in Years	Frequency	%age
1 to <2	149	74.5
2 to <3	29	14.5
3 to <4	12	6.0
4 to 5	10	5.0

Table 3: Symptomatology of Patients (n=200)

Symptoms	Yes	No
Pallor	200 (100%)	0 (0%)
Behaviour changes	30 (15%)	170 (85%)
Pica	12 (6%)	
Fatigue	18 (9%)	
Malena	4 (2%)	196 (98%)
Hamatemesis	4 (2%)	196 (98%)
Warm infestation	17 (8.5%)	183(91.5%)
Drugs intake	3 (1.5%)	197(98.5%)
Inherited anemia	2 (1%)	198 (99%)
Malnutrition	95 (47.5%)	105(52.5%)

Table 4: Anthropometry of patients (n=200)

Clinical Signs	Frequency	%age
Weight		
Normal	105	52.5
Low	95	47.5
Height		
Normal	126	63.0
Low	74	37.0

Table 5: Investigations (Hemoglobin level) of patients

Hemoglobin level	Frequency	%age
<5gm/dl	5	2.5
>5mg to 8mg/dl	52	26.0
> 8 gm	143	71.5

Table 6: Peripheral Smear of Patients (n=200)

Peripheral Smear	Frequency	%age
Normocytic	13	6.5
Macrocytic	2	1.0
Microcytic	181	90.5
Mix cytology	4	2.0

Table 7: Further breakdown of microcytic anemia (n=181)

Diagnosis	n	%age
Thalassemia major	9	5
iron deficiency	172	95

Table 8; Further breakdown of iron deficiency anaemia (n=172)

Diagnosis	n	%age
Coeliac disease	7	4
Chronic renal failure	3	2
Persistent diarrhea	4	2
Nutritional anemia	158	92

DISCUSSION

Anemia in all age groups is of immense public health significance. It is the commonest problem with global prevalence of 30% i.e., 1500 million people all over the world¹⁰. The nutritional anemia has major consequences not only on the morbidity and mortality in children but also affects growth and intellectual development of these children.

In our study it was found that more males were suffering from anemia as compared to female. In past this difference may be observed due to the fact that in our society males are given more importance than females and obviously in case of illness they are brought in hospitals earlier than females. In other studies females are found to be mostly involved^{11,12}.

Out of clinical symptoms and sign pallor was noted in 100% of patients. This finding was in consistent with others studies^{13,14}. Malnutrition i.e., delayed weaning, cow milk intake and decreased caloric intake was noted in 48% of patients. It was noted frequency of anemia was high in under nourished children. This was same findings as in other studies^{15,16}.

Behaviour change was also noted in 30 patients the commonest symptoms were pica and irritability and easy fatigability as noted in other studies¹⁷⁻¹⁹. Worm infestation was noted in 17(8.5%) it was markedly low as compared to find in other studies were 76% of patients has worm infestation. The reason of this difference may be that study was done in rural areas and present study most of patients were from good socioeconomic status.²⁰⁻²²

Similarly only 4 patients has hematemesis and melena 2 of them has chronic liver disease and remaining 2 had aplastic anemia same patients had bruises and petechiae+bone tenderness. It was

inconsistent with other studies that anemia may be presenting complaints of various systemic illness^{23,24}.

In this study the patients with inherited anemia has typical facial features, jaundice, hepatosplenomegaly similar findings were noted in other studies²⁵. It was also noted that stunted and underweight children had markedly lower haemoglobin levels that their well-nourished counterparts.²⁶ As reported elsewhere that prevalence of malnutrition increases rapidly between 3 to 18 months and was highest among children who were 18-23 months of age similarly in present study²⁷⁻³⁰.

Peripheral smear shows normocytic cells in 13 patients this was noted in patients with chronic anemia and leukemia, macrocytic was noted in 2(1%) patients. Microcytic was noted in most of these patients 181(90%) patients as noted in different studies that more prevalent anemia is microcytic³¹ and in this microcytic anemia mostly patients was observed to have come deficiency anemia and only 7 person have thalassemia.

Various studies support our finding that iron deficiency anemia is the commonest variety and after that common one is normocytic anemia their case diamorphic anemia³². Different studies done in India³³ also support our diagnosis that most of iron deficiency children are malnourished.

In this study most common type of anemia found was iron deficiency or can say nutrition anemia and this was found to be more common in malnourished children of age 1-2 years as noted in studies done in different parts of world³³.

CONCLUSION

In conclusion the present study high lights that anemia is a major health problem in this part of world where there is high prevalence of malnutrition. As anemia remains a major health burden, delay in diagnosis, institution of inappropriate therapy, ongoing infections, severe malnutrition and lower socioeconomic status can be associated with significant morbidity and mortality and this may significantly increases the risk of adverse outcome. Nutritional deficiency especially iron deficiency anemia is major cause of anemia in our population. This can be easily diagnosed by simple laboratory tests like Hb%, TIBC, serum iron and ferritin levels and can be treated by iron supplementation.

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