

Original Research Article

Analytical Study of Morphological Patterns of Anemia and Associated Illnesses in Females

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ABSTRACT

Context: The clinical consequence of long term anemia is significant and hence proper diagnosis and management is important to avoid untoward complications.

Aim: To study the various morphological patterns of anemia in females of different age group and to study their severity and associated illnesses.

Materials and Methods: 200 anemic patients diagnosed as per WHO guidelines were included in this study. Clinical details including age, gender and any associated illness were obtained. Smears were examined to morphologically classify the anemia based on size of RBC and RBC indices as normocytic normochromic, microcytic hypochromic, macrocytic and dimorphic.

Results: Age of the patients ranged from 12-74 years. Majority 129 (64.5%) of them had moderate degree of anemia, 36 (18%) of them had milder degree of anemia and 35 (17.5%) of them had severe anemia. Morphological classification of the patients revealed that 92 patients (46%) had microcytic hypochromic anemia, 45 patients (22.5%) had normocytic normochromic anemia, 37 patients (18.5%) had dimorphic anemia and 26 patients (13%) had macrocytic anemia. Out of 200 patients, 26 had chronic diseases, 52 had menstrual irregularities, 20 are pregnant and 4 had hemoparasites.

Conclusion: This study concludes that microcytic hypochromic anemia is the most common morphological pattern of anemia prevalent in females. Majority of the females were from rural population and they had nutritional anemias. The magnitude of the problem is far high than expected and hence timely community based screening and interventional programmes should be initiated at all levels for the target population effectively to revert the scenario.

Keywords: Anemia, Microcytic hypochromic, Iron deficiency anemia, pregnancy, Morphological classification

INTRODUCTION

Anemia is the commonest hematological abnormality encountered all over the world especially in the developing nations. It is common in females because of the increased iron demand during pregnancy, lactation and menstrual blood loss. ⁽¹⁾ The clinical consequence of long term anemia is significant and hence proper diagnosis and management is important to avoid untoward complications. Though there are many

screening programs available for screening of anemia in general population, a clear cut data regarding the prevalence and morphological categorization of the anemia in females in India is still lacking. This study was done to identify the prevalence and morphological categorization of anemia in females of different age group as this influences the overall treatment outcome and .quality of life.

Aims and Objectives:

This study aims to morphologically categorize the anemia in females of different age group and to find the most prevalent morphological pattern of anemia. This study also aimed to analyze the variation in the hematological indices in the study population and also to study the severity of anemia in females of different age groups.

MATERIALS AND METHODS

We included 200 patients in this study who were diagnosed to have anemia as per WHO guidelines, based on initial hematological screening. Relevant clinical details including age, gender and any associated illness were obtained. Hematological parameters including hemoglobin, mean corpuscular volume, mean corpuscular hemoglobin, mean corpuscular hemoglobin concentration were obtained from their EDTA treated blood samples processed in an auto analyser. All the blood samples were processed within 4 hours of collection. Peripheral smears were prepared and stained using Leishman stain. Smears were examined to morphologically classify the anemia based on size of RBC and RBC indices as normocytic normochromic, microcytic hypochromic, and macrocytic and dimorphic.

RESULTS

The age of the 200 patients included in this study ranged from 12-74 years. Out of them, 53(26.5%) were less than 20 years, 90(45%) were between 20-40 years,

47(23.5%) were between 40-60 years and 10 (5%) were above 60 years of age. Majority 129 (64.5%) of them had moderate degree of anemia, 36 (18%) of them had milder degree of anemia and 35 (17.5%) of them had severe anemia. The severity of anemia in different age groups in the study population was shown in Table.1. Morphological classification of the patients revealed that 92 patients (46%) had microcytic hypochromic anemia, 45 patients (22.5%) had normocytic normochromic anemia, 37 patients (18.5%) had dimorphic anemia and 26 patients (13%) had macrocytic anemia. The morphological categorization of anemia in the study population was shown in Table.2. The mean hemoglobin in the study population was 9.23 ± 1.7 with a minimum of 3.2 and a maximum of 11.8g/dl. The mean PCV was 31.06 ± 3.41 with a minimum of 18.6 and a maximum of 44.3. The mean RBC count was 4.48 ± 0.72 with a minimum of 2.35 and a maximum of 5.7. The mean MCV was 70.05 ± 11.72 with a minimum of 43 and a maximum of 108. The mean MCH was 24.9 ± 4.02 with a minimum of 18.2 and a maximum of 34.6. The mean MCHC was 32.6 ± 2.35 with a minimum of 24.3 and a maximum of 34.1. The variation in the hematological parameters in the study population was shown in Table.3. Totally 102 patients had associated illness and out of them, 26 had chronic diseases, 52 had menstrual irregularities, 20 are pregnant and 4 had hemoparasites.

Table.1 Severity of anemia in different age groups in the study population

Age (in years)	Mild anemia	Moderate anemia	Severe anemia	Total	Percentage
< 20	10	35	8	53	26.5
20- 40	25	55	10	90	45
40-60	1	31	15	47	23.5
>60	0	8	2	10	5
Total	36	129	35	200	100

Table.2 Morphological categorization of anemia in the study population

Type of anemia	Number of cases	Percentage
Normocytic normochromic	45	22.5
Microcytic hypochromic	92	46
Dimorphic anemia	37	18.5
Macrocytic	26	13
Total	200	100

Table.3 Variation in the hematological parameters in the study population

Hematological parameter	Minimum	Maximum	Mean \pm S.D
Hemoglobin	3.2	11.8	9.23 \pm 1.7
PCV	18.6	44.3	31.06 \pm 3.41
RBC	2.35	5.7	4.48 \pm 0.72
MCV	43	108	70.05 \pm 11.72
MCH	18.2	34.6	24.9 \pm 4.02
MCHC	24.3	34.1	32.6 \pm 2.35

Abbreviations: PCV: Packed cell volume; RBC: Red blood cells; MCV: Mean corpuscular volume; MCH: Mean corpuscular hemoglobin; MCHC: Mean corpuscular hemoglobin concentration

DISCUSSION

Anemia by itself is not a disease per se but an indication of the silently underlying disease. It generally indicates reduction in the amount of hemoglobin and red blood cells in the blood. Khusun et al ⁽²⁾ found that the mean hemoglobin and iron levels in females are significantly lower than that of the males of similar age group.

In this study majority of the cases (92) (46%) had microcytic hypochromic anemia. Though there are many causes of microcytic anemia apart from iron deficiency, like thalassemia, anemia of chronic disease, lead poisoning and sideroblastic anemia, iron deficiency is the commonest cause in most cases. This can be attributed to the poor nutrition, increased physiological demand during pregnancy and lactation, blood loss especially menstrual blood loss in females of reproductive age group. Nutritional anemia though prevalent globally, is a serious devastating health issue in developing nations because of the high prevalence rate and its impact on a nation's human resources.

Adolescent age group is more prone for anemia because physiological demand is more as 30% of the adult weight and 20% of the adult height are attained during this period. ⁽³⁾ They are prone to have inadequate and improper dietary habits and worm infestation further aggravates the incidence of anemia in this age group. ⁽⁴⁾ Anemia is also common in pregnancy because of the increased demand and maternal anemia can result in poor pregnancy outcomes including premature delivery, spontaneous miscarriages, fetal death and low birth weight babies. ⁽⁵⁾

Dimorphic anemia included a combined blood picture of

normocytic/microcytic and microcytic/macrocytic. A blood picture of normocytic/microcytic is usually indicative of an early stage of iron deficiency and microcytic/macrocytic blood pictures often indicate a coexisting another nutritional anemia due to Vitamin B12 and folic acid. Many patients with normocytic normochromic and normocytic/microcytic blood picture were in the pre latent phase of anemia and hence prompt diagnosis and effective management of these patients will prevent these patients from the complications of anemia.

Most of the patients in this study were of low socio economic status with poor educational status. Hence lack of knowledge about nutritional value of food stuffs and faulty dietary habits resulting in reduced absorption and bioavailability of nutrients is a factor further contributing to the increased prevalence of nutritional anemias in the study population.

The relationship between anemia and infections is debatable. ⁽⁶⁾ However it is generally accepted that anemia results in reduced immune response which predisposes to infections. ⁽⁷⁾ Further associated respiratory and gastrointestinal infections aggravate the severity of the anemia. ^(8,9) Women with menstrual irregularities and other gynecological diseases causing increased blood loss should be advised to take timely intervention and treatment.

As the magnitude of the problem is high supplementation of iron, multivitamins and fortification of the food products with the micronutrients and deworming the children can reduce the prevalence rate to a great extent. Dietary habits of the individuals have to be properly scrutinized

to find the inhibitors of iron absorption included in the regular diet and it should be advised to minimize their intake. ⁽¹⁰⁾

CONCLUSION

This study concludes that microcytic hypochromic anemia is the most common morphological pattern of anemia prevalent in females. Majority of the females in the study group from rural population had nutritional anemias. The magnitude of the problem is far high than expected and hence timely community based intervention with supplementation of iron and folic acid should be initiated at all levels for the target population effectively to revert the scenario. Females especially from the rural population should be made aware about the high prevalence of anemia and regular hematological check up should be encouraged for the early diagnosis of anemia.

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