Prevalence and category of Anemia with Assessment of clinical parameters

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Abstract

Introduction: The prevalence of anemia is much higher and has far reaching consequences, especially the severe degrees of anemia. We evaluate the hematological parameters and categorization of anemia in adults in a tertiary care hospital.

Materials and Methods: Cases were selected according to criteria mentioned above. Also, detailed history taking and clinical examination was done. This was followed by investigations.

Result: We studied 115 cases which showed low hemoglobin percentage in automated blood cell counter. Out of 115 cases 84(73.04%) were female and 31(26.95%) were males.

Conclusion: The utility of hematological parameters obtained from automated cell counters aids in increased diagnostic accuracy. In the present study, there was predominance of anemia in 2nd decade among females and microcytic hypochromic type was common.

Keywords: Hematological parameters, categorization, anemia

Introduction:

It is classified based on the morphological characteristics which include the red cell size, degree of hemoglobinization and shape of red blood cells(RBCs).[1] Anemia is the manifestion of an underlying disease. Typing of anemia and further workup include evaluation of haemoglobin and RBC indices which include mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC).[2] The haemoglobin concentration is the most commonly used parameter of anemia. [3] Modern instruments are capable of counting and estimating the size of circulating blood cells.[4,5] It is based upon the generation of an electrical pulse when a blood cell passes through a small a perture surrounded by electrode.[6] Each electrical pulse generated represents an individual cell and the pulse height corresponds to the cell volume.

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The prevalence of anaemia during pregnancy is much higher and has far reaching consequences, especially the severe degrees of anaemia. It is estimated that about 60 million pregnant women worldwide are anaemic. Only 4 million of these are in developed countries. In developing countries, the prevalence of anaemia in pregnant women varies anywhere between 50-90% among different population groups. In contrast to this, 18 to 20% of pregnant women in developed countries are anaemic. Throughout Africa 50% of pregnant women are anaemic. In Latin America, prevalence of anaemia in pregnant women is about 40%. The prevalence is high in the Caribbean, reaching 60% in pregnant women on some islands. South Asia has highest prevalence of anaemia. In a steering committee report from India, 13% women were reported to have haemoglobin less than 5 gm% and 34% had haemoglobin less than 8gm%.[7]

Various studies have assessed the association between severe anemia and maternal mortality. Brabin et al. in a re- view used cross-sectional, longitudinal, and case-control studies and found a strong association between severe ane- mia and maternal mortality. However, the association was not as strong for mild or moderate anemia.[8] Harrison found that both maternal and fetal mortality rise sharply in cases of severe anemia. The causes for maternal death were due to anemic heart failure, fulminating bacterial infection, and shock from even a small loss of blood at delivery or abortion.[9] severe anemia was associated with a fourfold increase in risk of death in a study by Fullerton and Turner.[10]

Materials and Methods:

This retrospective study was carried out in department of Medicine, National Institute of medical science and research Jaipur Rajasthan, teaching associated district hospital laboratory for a period of 3 months.

Cases were selected according to criteria mentioned above. Also, detailed history taking and clinical examination was done. This was followed by investigations. Following hematological investigations were performed: Hemoglobin (Hb), Red blood cell (RBC) count, Total leucocyte blood cell (TLC) count, Differential count (DLC), Platelet count, Erythrocyte sedimentation rate (ESR), PCV (packed cell volume), Mean Corpuscular volume (MCV), Mean Corpuscular hemoglobin (MCH), Mean corpuscular hemoglobin concentration (MCHC) and Leishman stained peripheral smear (PBF). Hb, TLC, DLC, Platelet count and RBC indices were estimated using automated cell counter. ESR was done by Westergren's method. PBF was carried out by Leishman's stain.

The study included 115 cases which showed low haemoglobin percent in fully automated blood cell counter- model PCE-210 and then correlated with red cell indices parameters. The severity of anemia was graded based on the haemoglobin concentration (gm/dl) according to World Health Organisation guidelines (WHO guidelines) Table 1. The type of anemia was studied based on the red cell indices. The

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distribution of severity and type of anemia was studied in each age and sex group. The study was then compared with other studies. The severity of anemia was graded based on WHO the cut off range of haemoglobin concentration.

Results:

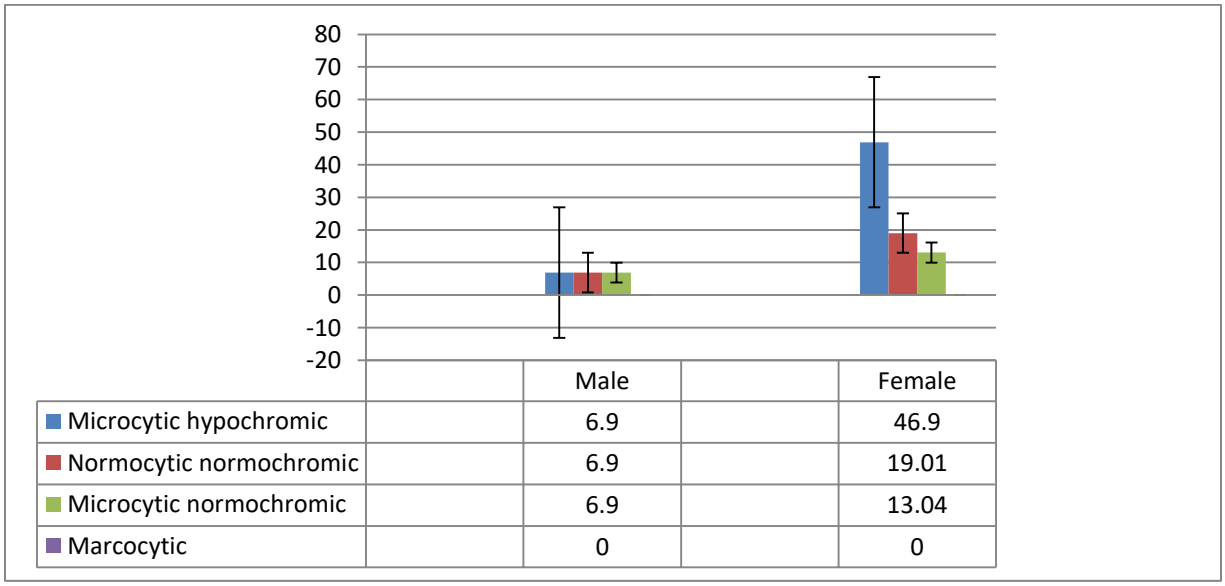
We studied 115 cases which showed low haemoglobin percentage in automated blood cell counter. Out of 115 cases 84(73.04%) were female and 31(26.95%) were males. The severity of anemia was assessed based on the range of haemoglobin percentage as mild, moderate and severe as shown in the Table 1.

Table 1: Normal range of Hemoglobin concentration (gm/dl) for grading severity of anemia (WHO guidelines)

	Mild	**Moderate**	**Severe**
Female	12 – 12.8	9 - 11.7	<9
Male	12 – 13.7	9 – 11.8	<9

Out of 115 cases 84(73.04%) were female and 31(26.95%) were males as shown in Figure 1.

Figure 1: Sex distribution of anemia cases based on morphology



	Male	Female
Microcytic hypochromic	6.9	46.9
Normocytic normochromic	6.9	19.01
Microcytic normochromic	6.9	13.04
Marcocytic	0	0

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Microcytic hypochromic anemia was the most common morphological type constituting 64(55.65%) patients followed by normocytic normochromic constituting 28(24.34%) patients. The distributions of age group based on morphological type of anemia are as shown in Table 3.

Table 3: Age distribution of anemia cases based on morphology

Morphology	**21 – 30 yrs**	**31-40 yrs**	**41-50 yrs**
Microcytic hypochromic	30(26.08 %)	21(18.26 %)	14(12.17%)
Normocytic normochromic	15(13.04 %)	-	14(12.17%)
Microcytic normochromic	21(18.26 %)	-	-
Marcocytic	-	-	-

Discussion:

Thus evaluation of anemia aids in diagnosing the various disease processes and guides in efficient management of patients. The basic parameters that are helpful in evaluation are haemoglobin, and RBC indices. The present study was conducted on 105 patients and the results were obtained by the fully automated blood cell counter. Most of the patients in this study were female in the age group of 21-30 years and the most common type of anemia was microcytic hypochromic. This is similar to the study conducted by Reena Kouli et al which was done on 1330 cases [11] in tertiary care centre of north east India and study by S.Patel in Gujarat.[12] In our study, 26(24.76%) male and 79 (75.23%) female had anemia which i s similar to the study by Reena Kouli et al[11] but in contrast to study by Gerardo Alvarez- uria et al[13] which showed 50.55% males and 49.45% females. In our study, among females mild degree of anaemia (37.14%) was more common followed by severe and moderate degree in contrast to the study by Reena Kouli et al which showed moderate degree of anaemia (47.2%) to be more common in females followed by mild and severe degree.

Thrombocytopenia is a common problem during pregnancy that is not frequently detected and as a result is often inappropriately managed. The obvious concern with thrombocytopenia during pregnancy is the risk of significant bleeding at the time of delivery. Platelets are non- nucleated cellular fragments of megakaryocytes, they play a critical role in haemostasis. In pregnancy, most cases are due to gestational thrombocytopenia, idiopathic thrombocytopenic purpura or pre-ecalmpsia. Other causes include infections such as malaria, folate deficiency, and diseases such as leukaemia and aplastic anaemia.

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Although the pathogenesis of gestational thrombocytopenia is not well understood, it may involve factors such as haemodilution and/or accelerated platelet clearance.[14] Confirmation of a normal platelet count prior to pregnancy decreases the probability of underlying immune thrombocytopenia purpura.[14] Pregnant women with thrombocytopenia have a higher risk of bleeding excessively during or after childbirth, particularly if they need to have a caesarean section or other surgical intervention during pregnancy, labour or in the puerpurium. Such bleeding complications are more likely when the platelet count is less than $50\times10^3/\mu l$. The prevalence of gestation thrombocytopenia in our study is 10% lower than the figure of 15.3% as reported by Olayemi et al.[15] The higher prevalence in their study may be as a result of malaria infections.

According to a Lancet review article, vitamin B12 deficiency is associated with lactovegetarianism in India and the scarcity of meat products in many South-Asian diets.[16] However, our study did not show any baseline difference between the two groups in terms of their diets. Majority of women in Group 1 were severely anemic as compared with 64% in Group 2. 52% patients were taking haematinics in Group 1 as against 94% in Group 2. The difference between the two groups was statistically significant. However, the benefits of this supplementation or the regularity of the administration of this supplementation were not assessed in the present study, and therefore a direct relation between severely anemic and not taking of haematinics was not established. An important observation in the meta-analysis of Sloan, Jordan, and Winikoff was that though iron supplementation increased initial hemoglobin level, the extent of the effects is limited.[17]

Conclusion:

It is associated with significant fetal and maternal morbidity and mortality. It can be easily diagnosed and responds quickly to intervention and treatment that is both inexpensive and readily available. Efforts to improve maternal and infant mortality could be addressed by diagnosis and treatment of anemia that on a global scale will have most impact in resource-poor countries but that could also lead to significant improvements in pregnancy outcome and maternal well-being for less advantaged women in more industrialized countries. The utility of hematological parameters obtained from automated cell counters aids in increased diagnostic accuracy. In the present study, there was predominance of anemia in 2^{nd} decade among females and microcytic hypochromic type was common. Also the study showed maximum number of mild degree of anemia. Thus the combination of various RBC parameters and haemoglobin percentage provides adequate information of the hematological profile.

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