

A Study on Morphological Types of Anemia Prevalent In A Tertiary Care Hospital of Rajkot (Gujarat), Western India: A Study Over A Period Of Two Years.



Medical Science

KEYWORDS : Anemia, females, hypochromic microcytic

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ABSTRACT

Data was collected from Central Clinical Laboratory, Department of Pathology, PDU Medical College & Hospital, Rajkot. Blood sent in EDTA (Ethylenediamine Tetraacetic Acid) vacuttes was tested in automated cell counter and peripheral smear examination was done which concluded that hypochromic microcytic anemia is the most common type and females are more commonly affected than males.

INTRODUCTION:

Even in this era of modern and advanced facilities for the treatment of the critical illness, we find many health related problems in our daily practice. One of the most common examples is anemia. Anemia is defined as reduced hemoglobin content or the reduction in hematocrit below the lower limit of the 95% reference interval for the individual's age and sex. Not just reporting the condition as the anemia is enough, but the pathologist needs to subtype the anemia, so as to guide the clinician in a proper direction towards the prevention and treatment. One of the ways to type the anemia is by morphological classification. Morphologically, anemia can be hypochromic microcytic type, macrocytic type, dimorphic type and normochromic normocytic type. Each of these anemias has varied etiology. Besides nutritional, hemolysis is also the common cause for anaemia. This study may direct the health facilities to take appropriate steps for prevention and treatment. Study of morphological subtypes of anemia in a particular region may guide the health system to take appropriate measures towards the problem in the community.

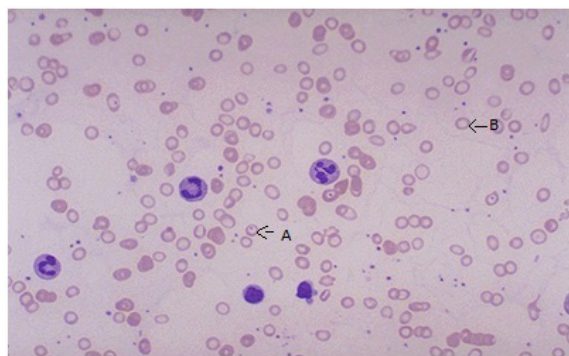
MATERIAL & METHODS:

The study was done in Central Clinical Laboratory at Department of Pathology, PDU medical College & Hospital, Rajkot. The study participants were the patients admitted and investigated at PDU Hospital between January 2012 to December 2013 time period. The blood collected in EDTA vacuttes was sent to laboratory and reporting was done based on readings from automated cell counter SYSMEX KX 21as well as by peripheral smear examination from the slide stained with Romanowsky stains.

RESULTS:

50,370 cases of anemia were studied during the period of two years.

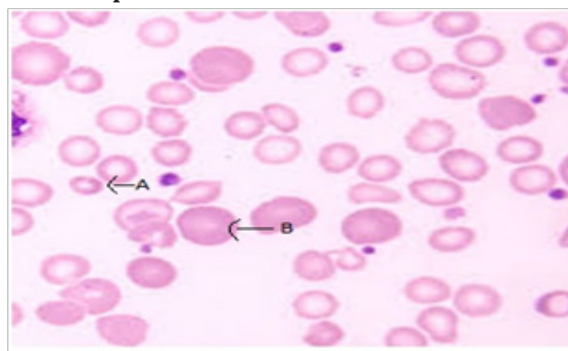
1. Hypochromic Microcytic anemia:



A= Target cells

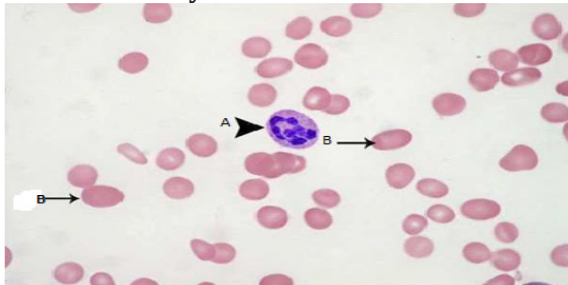
B= Hypochromic microcytic RBC (Red Blood Cell)

2. Dimorphic anemia:



A = Microcytes B = Macrocytes

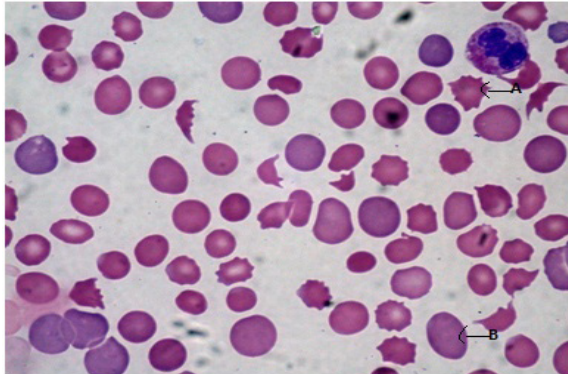
3. Macroovalocytic anemia:



A= Hyper segmented Neutrophil

B=Macro ovalocyte

4. Hemolytic anemia:



A = Fragmented RBC

B = Polychromatic RBC

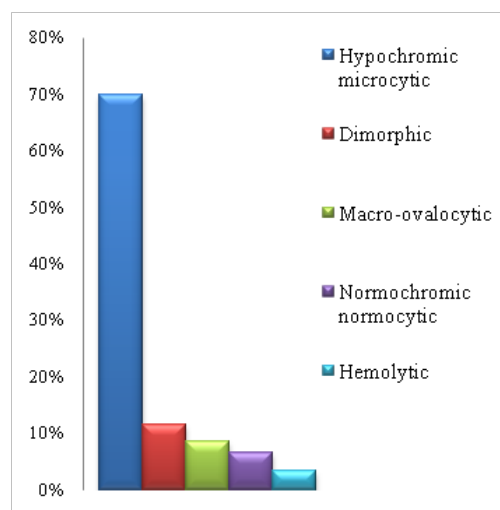
Above peripheral smear findings show that in hypochromic mi-

crocytic anemia there is raised population of target cells also. In case of iron deficiency anemia, the anisocytosis which is identified by automated cell counters as red cell distribution width (RDW normal 13%-16%) is raised, while it may be in the normal range in case of thalassemia trait. Dimorphic anemia shows both microcytic and macrocytic RBCs. Macrocytic type may show hypersegmented neutrophils also. Many fragmented RBCs were evident with polychromatic RBCs in hemolytic anemia. It was further stained with supravital stains for the reticulocyte count which was raised in hemolytic anemias.

Following were the results:

Table1. Case distribution according to the morphological types:

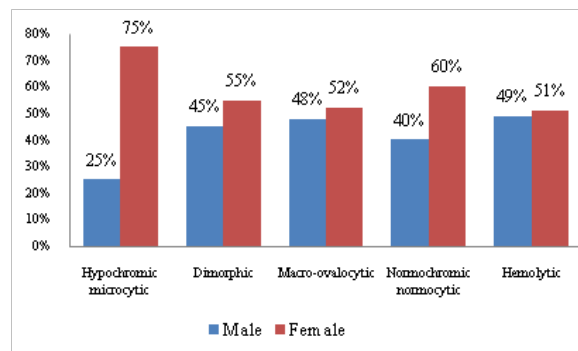
Anemia Type	Prevalence
Hypochromic microcytic	35259 (70%)
Dimorphic	6044 (12%)
Macro-ovalocytic	4030 (8%)
Normochromic normocytic	3526 (7%)
Hemolytic	1511 (3%)



X-Axis: Type of anemia, Y-Axis: Prevalence

Table2. Distribution according to age:

Age group	0 – 18 years	18 – 45 years	>45 years
Type of anemia			
Hypochromic microcytic	42%	69%	52%
Dimorphic	40%	9%	12%
Macro-ovalocytic	1%	6%	19%
Normochromic normocytic	10%	12%	15%
Hemolytic	7%	4%	2%

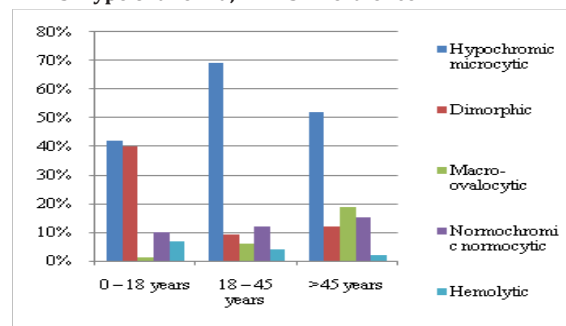


X-Axis: Age group, Y-Axis: Prevalence

Table 3. Distribution according to sex:

Anemia Type	Male	Female
Hypochromic microcytic	25%	75%
Dimorphic	45%	55%
Macro-ovalocytic	48%	52%
Normochromic normocytic	40%	60%
Hemolytic	49%	51%

X-Axis: Type of anemia, Y-Axis: Prevalence



DISCUSSION:

Anemia being the most common example of the health related problems faced by the society, it is essential to diagnose anemia at the early stage. Morphological typing of anemia by peripheral smear examination is helpful to reach to the probable etiology of anemia. Hypochromic microcytic anemia is the most common type of anemia in our study. Females are affected more than males. In support to our study, study done by Rakesh Kumar Singh (2012) [5] proves that anemia is more prevalent in females compared to males. Maximum percentage of females were affected in Rajasthan and prevalence was lower in Bihar and Madhya Pradesh. Education plays a very important role in the health of people. Females with high school education or more were found two times less anemic than those with lower education. Smoking and tobacco chewing persons had higher incidence than those with not. Even diet affects the severity of anemia. Consumption of milk and green leafy vegetables in the women had shown lesser severity of anemia than those without. Study on prevalence of anemia in pregnant women revealed that hypochromic microcytic is the most common (48%) type of anemia in pregnant women (Babita Bansal 2011) [3] because of the weakness of their resistance to infection and increased need of iron and folic acid. Study conducted by Amit Bhasin (2011) [4] has proved that in geriatrics, following hypochromic microcytic anemia, macroovalocytic type is the common one, may be due to folate and vit B12 deficiency. Study done at Uganda clinic Africa showed that children with HIV infection are more prone to anemia and is associated with poor virological suppression. Our study showed the prevalence of various types of anemia in different age groups, and both sexes, being more common in females and hypochromic microcytic as the most common type. Thus this tallies with the national and international data. Red cell indices like MCV (Mean Corpuscular Volume), MCH (Mean Corpuscular Hemoglobin), MCHC (Mean Corpuscular Hemoglobin Concentration) can provide the information regarding the typing of anemia. MCV is found to be low in hypochromic microcytic anemia, it is in normal range in normochromic normocytic anemia and is raised in macrocytic anemia. From this study it was proved that Hypochromic microcytic was the most common morphological subtype followed by Dimorphic which was followed by Macro ovalocytic type of anemia. The study participants were followed with evaluation of the history, clinical examination, peripheral smear examination. After the morphological typing of anemia done, the participants were investigated with further biochemical investigations. Hypochromic microcytic type of anemia patients were investigated for the levels of serum iron, serum ferritin, TIBC (Total Iron Binding Capacity). It was found that nearly 90% of hypochromic microcytic anemia patients had low levels of serum iron (normal 50-160

microgram/dl), serum ferritin(normal 12-300 microgram/L) and the TIBC(normal 250-400 microgram/dl) was found to be raised. In case of the patients with macrocytic anemia, serum Vit B12 (normal 200-900 ng/L) levels were done which were found to be low in nearly half of such cases. With this further workup, it was proved that nutritional deficiency has been the most common cause of anemia in our study participants. Patients with hemolytic anemia were further investigated with serum bilirubin levels. Hemoglobin fractionation studies helped to diagnose the patients of thalasemias, sickle cell anemias and other hemoglobinopathies. These were collaborative findings to prove our hypothesis.

CONCLUSION:

Our study being done among all age groups and both the sexes, proved that anemia is the among the most common health problems faced by the society. Females are more commonly affected than males and particularly of the reproductive age group. Each of the morphological subtypes of anemia has varied etiology. With the initial steps of investigation by complete blood count, red cell indices and peripheral smear, one can diagnose the morphological type of anemia. With the help of history given by the patient, clinical examination and further investigation, one can sub type the anemia which helps the health facilities to take appropriate measures for the prevention & treatment of the particular anemia. Most common cause being the nutritional deficiency, health facilities can target their approach towards the same by providing nutrition education and preventive supplements. The hemogram reports should be measured at regular intervals of the same population and should be maintained by the health facilities so as to know the effectiveness of the measures conducted for the condition. Investigations like serum iron, serum ferritin and total iron binding capacity, serum vitamin B12 levels and others should be done at regular interval for the follow up. All efforts should be made to ensure safe motherhood and to achieve the relevant targets of the Millenium Development Goals.

REFERENCE

- (1) Richard A McPherson, Mathew R Pincus Henry's clinical diagnosis and management by laboratory methods. | (2) S M Lewis B J Bain. I Bates Dacie and Lewis Practical Hematology. | (3) Bansal B. Comparative Study of prevalence of anemia in muslim and non-muslim of western Rajasthan. Ijrhs. ISSN(o):2321-7251 | (4) Bhasin A. Rao Y.M. Characteristics of Anemia in Elderly: A Hospital Based study in South India. Indian Society of haematology and transfusion medicine 2011. | (5) Singh R K. Lifestyle behavior affecting prevalence of anemia among women in EAG states, India. Population association of America 2012 Annual Meeting Program. |