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Pathology

Survey of Different Types of Anemia

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Abstract **Original Research Article**

Background: Anemia is a major public health problem of considerable importance in the developing countries in the world. ***Aim and objective:*** The aim of present study is to determine the prevalence of anemia and various type of anemia in admitted patients in PDU Hospital, Rajkot. ***Material and methods:*** The duration of this study is of 6 months since December 2018 to May 2019. Total 4775 cases were studied, out of 27,033 which were indoor patient admitted in various wards in our Hospital. The sample for test were collected in EDTA tube and received at central clinical laboratory in our Hospital. The slides were prepared and stained with field stain. The samples were run in hematology cell counter Sysmex KX-21 for hematology indices and other parameters. Microscopic examination of slides was done for peripheral smear examination and complete blood count estimation. ***Results:*** In our study, anemia found in 4775 (17.66%) cases out of 27,033 admitted in different wards of our Hospital. 3187(66.74%) were females and 1588(33.25 %) were males. Maximum cases 2942(61.605) are found in age group of 21 to 40 years.In our study Microcytic hypochromic anemia was found in 2410(50.47%), normocytic normochromic anemia 2260 (47.32%), Diamorphic ane mia 314 (6.57%), haemolytic anemia 193(4.04%), macrocytic anemia 188(3.93%), pancytopenia 51(1.06%), sickle cell anemia 38(0.79%). ***Conclusion:*** The prevalence of iron deficiency anemia is increasing in female, mainly in reproductive age group in developing countries. A diagnosis of anemia needs adequate clinical attention, to find out the cause, type, severity and this forms the basis for treatment of anemia**.**

Keywords: Anemia; Microcytic Hypochromic; Normochromic Normocytic.

INTRODUCTION

Anemia is defined as a reduction of the total circulating red cell mass below normal limits. Anemia reduces the oxygen-carrying capacity of the blood, leading to tissue hypoxia. In practice, the measurement of red cell mass is not easy, and anemia is usually diagnosed based on a reduction in the hematocrit (the ratio of packed red cells to total blood volume) and the hemoglobin concentration of the blood to levels that are below the normal range [1].

A classification of anemia is based on underlying mechanism and according to alterations in red cell morphology. Morphologic characteristics provides etiologic clues like red cell size (normocytic, microcytic, or macrocytic); degree of hemoglobinization, reflected in the color of red cells (normochromic or hypochromic); and shape. In general, microcytic hypochromic anemias are caused by disorder s of hemoglobin synthesis (most often iron deficiency), while macrocytic anemias often stem from abnormalities that impair the maturation of erythroid precursors in the bone marrow. Normochromic, normocytic anemias have diverse etiologies; in some of these anemias, specific abnormalities of red cell shape provide an important clue about cause.

Anemia can caused by deficiency of essential elements required for hemoglobin synthesis (iron, vitamin B12 and folic acid), repeated pregnancy, blood loss s, worm infestation, chronic conditions like chronic renal failure, rheumatoid arthritis and tuberculosis are also known causes [2]. In elderly females, genital blood loss due to pelvic malignancies and in both sexes gastrointestinal blood loss is also an important cause of anemia in this age group [3-4].

According to the World Health Organization (WHO), there are two billion people with anaemia in the world and half of the anaemia is due to iron deficiency [5]. Anemia is a late indicator of iron deficiency, so it is estimated that the prevalence of iron deficiency is 2.5 times that of anemia [5]. Iron

deficiency is the most common nutritional disorder in the developing world and the most common cause of nutritional anemia in young children and women of reproductive age. With 40 per cent prevalence of anemia in the world on an average for the general population, the prevalence in the developing countries tends to be three to four times higher than in the developed countries.

The diagnosis of iron deficiency anemia ultimately rests on laboratory studies. Both the hemoglobin and hematocrit are depressed, usually to a moderate degree, in association with hypochromia, microcytosis, and modest poikilocytosis [1].

Impaired red cell production associated with chronic diseases is second most common cause of anemia among hospitalized patients. The chronic illnesses associated with this form of anemia can be grouped as below:

- Chronic infections, such as osteomyelitis, bacterial endocarditis, and lung abscess.
- Chronic immune disorders, such as rheumatoid arthritis and regional enteritis.
- Neoplasms, such as carcinomas of the lung and breast, and Hodgkin lymphoma.

It is global problem, mainly affecting poor people in developing countries [6]. Pregnant and lactating females, growing children and elderly people, with some underlying disease causing blood loss are at more risk as compared to other groups of population [7]

MATERIAL AND METHOD

The study was carried out in PDU Hospital, Rajkot. The patients of all age groups admitted in various wards of our hospital were included in study. Outdoor patient were excluded from study. The blood samples were collected in ethylenediaminetetraacetic acid (EDTA) tubes and were immediately sent to the laboratory for hematological testing. The hematological testing was performed in the central Clinical Laborator. The equipment used is Sysmex KX-21 5 part Automated Hematological cell counter. The evaluated parameters included the hemoglobin concentration and red blood cell indices- Mean Cell Volume (MCV), Mean cell hemoglobin (MCH), Mean cell hemoglobin concentration (MCHC), hematocrit, Red blood cell count, total leucocyte count, differential count and platelet count.

RESULT

According to a UNICEF report 2 billion people suffer from anemia worldwide and most of them have IDA, especially in underdeveloped/developing countries. According to WHO, almost 20 % of [8].

This study was carried out in PDU Medical Hospital, Rajkot in December 2018 to May 2019 for a period of 6 month. Total 4775 cases were studied, out of 27,033 patients which were indoor patient admitted in various wards in PDU Hospital.

Table-1: Cases of Anemia

Duration	Total cases	Cases of anemia
December 2018 to May 2019	27,033	4775
%	100%	17.66%

Out of 27,033 studied patients, anemia was found 4775 patient of different age group. Prevalence of anemia in indoor patient is 17.66%.

Table-2: Gender wise distribution of anemic patient

	No of Cases of Anemia	%
Male	1588	33.25
Female	3187	66.74

In this study total numbers of male were 1588 and female were 3187. So females are affected (66.74) more than male (33.25%)

Table-3: Age wise distribution

Age in years	Total	%
<20	765	16.02
20-40	2942	61.60
>40	1068	22.36

In this study anemia is most common in 20-30 years (61.60%), which includes reproductive age of female.

Table-4: Total cases of Anemia in admitted patient month wise

MONTHS	Total no of patient admitted	TOTAL no of Anemia found	%
DECEMBER 2018	4585	742	16.18
JANUARY 2019	4811	583	12.11
FEBRUARY 2019	4686	715	15.25
MARCH 2019	4011	997	24.85
APRIL 2019	4120	836	20.29
MAY 2019	4820	902	18.71

In this study, the average cases of anemia are between 15 to 25 % in every month.

Table-5: Different types of Anemia

Month	Microcyytic Hypochromic Anemia	Normochromic Normocytic Anemia	Dimorphic Anemia	Haemolytic Anemia	Macrocytic Anemia	Pancytopenia	Sickle Cell Anemia	Total
December 2018	434	179	52	28	43	3	3	742
January 2019	279	251	24	3	20	2	4	583
February 2019	302	283	37	27	34	12	20	715
March 2019	380	525	30	43	12	6	1	997
April 2019	343	383	48	25	27	8	2	836
May 2019	422	347	60	29	29	12	3	902
Total	2410	2260	314	193	188	51	38	4775
%	50.47	47.32	6.57	4.04	3.93	1.06	0.79	100

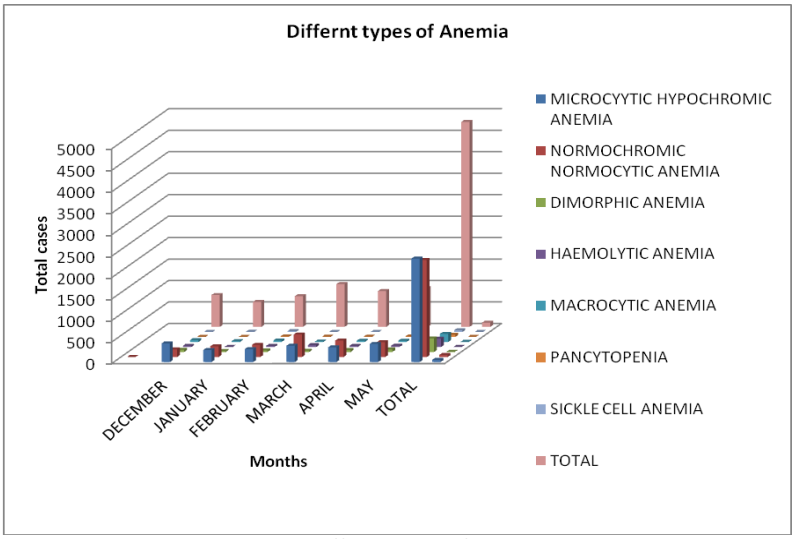

Fig-1: Different types of Anemia

In this study cases of microcytic hypochromic anemia is highest 2410 (50.47%) which is most common in this area and the next common anemia is normochromic normocytic anemia (2260 [47.32%]). Diamorphic anemia 314(6.57%, haemolytic anemia 193 (4.04%), macrocytic anemia 188(3.93%), pancytopenia 51(1.06%), sickle cell anemia 38(0.79%).

DISCUSSION

The high proportion of microcytic anaemia and the fact that gender differences were only seen after the menarche period in women indicate that iron deficiency was the main cause of anaemia**.** Other Indian studies have also shown high prevalence of iron deficiency anaemia among young women [2]. The high prevalence of iron deficiency anaemia among women in childbearing age has important public health implications. It is estimated that anaemia accounts for 12.8% of maternal mortality in Asia [9]. Iron requirements are greater in pregnancy, and iron deficiency is associated with maternal death, preterm delivery, and low birth-weight [10, 11]. In India, only 28% of women consume meat, fish, or eggs on a weekly basis [12] and the iron bioavailability of the vegetarian diet is poor [2, 13]. Effective public health programmes aimed at reducing iron deficiency among young women could have a major impact in reducing maternal and infant mortality [13].

It is important to remember that anemia is multifactorial, and its occurrence may be due to the presence of cancer, inflammatory diseases, kidney disease (due to diabetes and hypertension), and the use of several drugs commonly required in the elderly population [14].

In our study, anemia found in 4775(17.66%) cases out of 27,033 admitted in different wards of PDU hospital, Rajkot. 3187(66.74%) were females and 1588 (33.25%) were males. Maximum cases 2942(61.60%) are found in age group of 21 to 40 years. So females are more affected and mainly in reproductive age group.

In our study Microcytic hypochromic anemia 2410(50.47%) is the predominant type of anemia as seen in Gerardo et al studies [15] and S Patel *et al*., [16] study in which microcytic hypochromic anemia was seen in 72%. In our study normocytic normochromic anemia was found in 2260(47.32%) which is similar to the Kaur *et al*., [17] in which normocytic normochromic anemia is the predominant type 56%. So in this study normochromic normocytic anemia is second most common anemia after microcytic hypochromic anemia. Other anemia found are Diamorphic anemia 314(6.57%), haemolytic anemia 193(4.04%), macrocytic anemia 188(3.93%), pancytopenia 51(1.06%), sickle cell anemia 38(0.79%).

CONCLUSION

The prevalence of anemia in patients admitted in our hospital was higher in female of reproductive age. The predominant type is microcytic hypochromic which is mainly due to iron deficiency. Second most prevalent type is normocytic normochromic which may be because of chronic diseases, inflammation, blood loss, malignancies or aging process. Anemia is not a condition that should only be associated with the dietary deficiency; it is associated with pathologies which deserves adequate medical attention.

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