Prevalence of Different Types of Anaemias in Patients having Haemoglobin below 8gm% at a Tertiary Care Hospital in Jalandhar

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Abstract

Background: Anemia is a condition in which the hemoglobin concentration in the blood is decreased, below the normal range. Peripheral blood smear examination and Bone marrow examinations are the two major tests done to evaluate anaemia. **Materials and Methods:** Study was conducted in Department of Pathology at PIMS Jalandhar. Total 100 patients having anemia (HB < 8gm%) was studied using PBF, Bone marrow aspiration and biopsy. A random and non-consecutive selection of 100 anemic patients was done amongst the anemic population to study the pattern and causes of anemia. **Result:** This study showed that females form the majority of patients suffering from anemia. It can be the result of various causes; nutritional deficiency forms the majority of those causes. **Conclusion:** The present study found out high prevalence of anemia in both males and females. Anemia can be the presenting sign of various disorders which can be evaluated by Bone marrow examination.

Keywords: Anemia, Bone Marrow, Hemoglobin, Prevalence

1. Introduction

Anaemia is a global public health problem which affects both the developing and the developed countries and it is an indicator of poor nutrition and poor health with major consequences for human health, as well as for the social and economic development of the ulation[1]. India is facing a grave public health problem, since the prevalence of anaemia in India is > 40%[2]. Anaemia may be defined as a clinical condition that is characterized by a reduction in the haemoglobin concentration of blood below the lower limit of the normal reference range for an individual's age, sex and geographical location[3]. Anaemia is rarely an isolated disease and is most often a sign of an acquired or inherited disorder[4].

1.1 Etiology

Anaemia is the most prevalent nutritional deficiency disorder in the world. It is a clinical diagnosis which can the result of a wide variety of causes. Most of the anaemias are due to inadequate supply of nutrients like iron, folic acid and vitamin B12, proteins, amino acids, vitamins A, C, and other vitamins of B-complex group i.e., niacin and

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pantothenic acid are also involved in the maintenance of haemoglobin level[5]. Among the other causes of anaemia, heavy blood loss as a result of menstruation, or parasite infections such as hookworms, ascaris, and schistosomiasis can lower blood haemoglobin (Hb) concentrations. Acute and chronic infections, including malaria, chronic diseases, malignancy, leukaemias, tuberculosis, and HIV can also lower blood Hemoglobin concentrations. The most common cause of nutritional deficiency anaemia is iron deficiency.

1.2 Evaluation of Anaemia

To establish the cause of anaemia is the focus of attention in the care of many patients. Routine tests like peripheral blood smear examination and other tests help in finding the itiology of anaemia in some cases but are not helpful in establishing the diagnosis of various other diseases which affect the blood and bone marrow[6].

One of the special investigations often indicated in the diagnosis of anaemia is bone marrow aspiration and biopsy. Bone marrow aspiration offers a complete picture of the reaction of the haemopoietic tissue to anaemia than can be gained from peripheral blood smear alone.

It plays an important role in establishing etiology of anaemia like various malignancies, storage disorders and some chronic diseases.

2. Aims and Objective

The objectives were as follows:

- To find out the prevalence of anaemia in relation to age-groups and sex referred to haematology section of PIMS Jalandhar.
- To study spectrum of diseases diagnosed by bone marrow aspiration cytology done for anaemia.

3. Materials and Methods

Study was conducted in Department of Pathology at PIMS Jalandhar. Total 100 patients having anaemia (HB < 8gm%) were studied using PBF, Bone marrow aspiration and biopsy. The above tests were performed in the Department of pathology under all aseptic conditions

A random and non-consecutive selection of 100 anemic in-patients was done amongst the anemic population to study the pattern of anemia.

A detailed clinical history was noted down and physical examination of the patient was done The following hematological investigations were carried out for all patients- Hb, Total Leucocute Count (TLC), Differential Leucocyte Count (DLC), Platelet count, Mean Corpuscular Volume (MCV), Mean Corpuscular Hemoglobin Concentration (MCHC), Mean Corpuscular Hemoglobin (MCH), Packed Cell Volume (PCV), Reticulocyte count, Peripheral smear for blood picture, Serum Iron studies, Bone marrow aspiration and bone marrow iron stores. The PBF samples were taken either intravenous or capillary blood and will be stained with Giemsa stain and studied. Bone marrow aspiration and biopsy was taken from Posterior superior iliac spine after taking Consent from the patient. The procedure was done in fully aseptic conditions. The aspiration smears prepared immediately was stained using Giemsa stain with special stain for Bone marrow Iron stores (Prussian blue stain). Bone marrow biopsy was kept in Zenker's solution and processed after decalcification for few hours using 5% nitric acid solution and processed as routine histopathology specimen (block making, section cutting and staining). Vitamin B12 and folate assays were done for dimorphic and macrocytic anemia or in patients with normocytic or microcytic blood picture in which no other cause could be found. Additional investigations as indicated for detection of underlying cause-chest X-ray, UltraSonoGraphy (USG) of abdomen and pelvis, Stool occult blood, Upper GastroIntestinal (GI) endoscopy and colonoscopy, serum electrophoresis, tissue biopsy, imaging-Computed Tomography (CT)/Magnetic Resonance Imaging (MRI), and Anti Nuclear Antibodies (ANA). The data collected was analyzed for pattern of anaemia in 100 patients.

All the patients referred to Department of pathology having Hb level below 8 gm% for bone marrow aspiration were included in the study.

3.1 Statistical Analysis

The results were analyzed on a percentage scale.

4. Results

Statistical analyisis of the data showed that out of 100 patients of Anaemia 63% were females and 37% were males (Figure 1). That indicates that females more prone to develop anaemia than males.
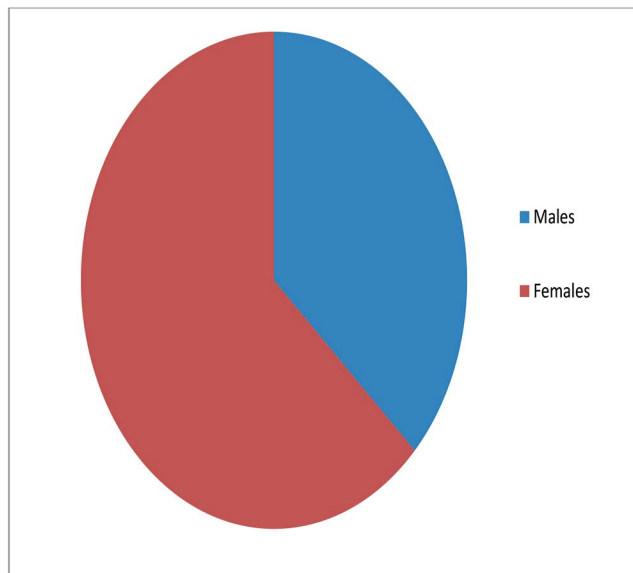
Figure 1. Pie chart depicting gender-wise prevalence of anemia (n=100), males 37% and females 63%.

Table 1. Itiology of anemia (n=100)

	Nutritional	%	Others	%
Males	26	69%	11	30.5%
Females	48	76%	15	23.8%

Table 2. Cause of nutritional anaemia

	Iron deficiency	%	Vit B12 folic acid def	%	Dimorphic	%
Males (n=26)	2	7.6%	15	57.6%	9	34.6%
Females (n=48)	7	14.7%	20	41.6%	21	43.7%

Table 3. Other causes of anaemia (n=26)

Diagnosis	Females	Males
Leukemia	5	3
Bone marrow Depression (Infection)	5	2
Drug induced	2	2
Multiple Myeloma	1	1
Haemolytic	1	1
Aplastic Anaemia	0	1
Tuberculosis	1	0
Secondary Deposits	1	0

Patients were divided into four groups. Age groups are <25yr, 26-45 yrs, 46-65yrs and >65yrs. Females of reproductive and middle age group ie of two groups of the study 26-45 yrs and 46-65 yrs form the majority of the anaemic females on the other hand males in the middle and old age are more effected (Figure 2).
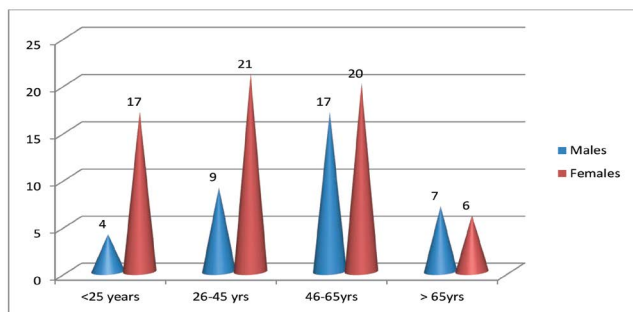

Figure 2. Histogram showing age and sex-wise distribution of anaemia (n=100).

Itiology of Anaemia is nutritional in majority of cases 69% in males and 76% in females (Table 1).

Vitamin B12 and Folic acid deficiency amounts for majority of nutritional deficiency anaemias in males whereas majority of the females suffer from Dimorphic anaemia (Iron (Fe) Deficiency, folic acid and B12 deficiency) (Table 2).

Other causes of anaemia were Aplastic anaemia, Anaemia of chronic disorders,drug induced viral and some leukemias (Table 3).

5. Discussion

The study showed that females form the majority of patients suffering from anaemia. Higher prevalence is found in females of reproductive age group (21%). Other study found about 41% of the women of reproductive age were anemic[7]. More of the old age males presented with anaemia. Studies indicate that the prevalence of anemia increases with advancing age and under age 75 years, anemia is more common in females, but over age 75 years it is more common in males[8]. Etiology of anaemia in majority of patient came out be nutritional deficiency. Among the various types, megaloblastic anemia was the most common as in many other studies. Moreover, it was the most common disease overall too in the present study in concordance with other studies[9]. Dimorphic anemia due to mixed deficiency was the next common cause of anaemia in our study. Third most common cause of anaemia in our study was Fe deficiency anaemia. Females

are more affected by Fe deficiency Anaemia than males. Although globally, the most significant contributor to the onset of anaemia is iron deficiency but it comes out to be the third most common cause in our study because Bone marrow examination is usually not required to establish the Fe deficiency[10].

Other than nutritional causes, Patients suffering from chronic disorders or patients on Chemotherapy and patient suffering from leukemia also presented with anaemia in the OPD. Bone marrow examination played an important role in diagnosis in those patients.

Other than nutrition deficiency, Leukemia came out to be the most common diagnosis of anaemia in our study. Leukemia as a group was the most common malignant disorder (15%) and acute myeloblastic leukemia was found to be the most common type of leukemia in our study as in other studies[10]. Majority of the leukemia patients presented with Pancytopenia. The cases of ALL and AML presented with pancytopenia were diagnosed in bone marrow smears with the presence of 20% of lymphoblasts and myeloblasts.

Tuberculosis is endemic in India as in other developing countries. One case (1% of total cases) was diagnosed based on the presence of granulomatous inflammation on bone marrow biopsy. Supplementary investigations were advised to confirm the diagnosis. Other researchers also found a few cases (1.3%) of granulomatous inflammation in their studies[9]. Some studies did not find any granulomatous inflammation as the cause of anaemia.

In our study bone marrow examination came out to be diagnostic in all the cases of megaloblastic anemia, a plastic anemia, dimorphic anemia due to mixed deficiency, ALL, AML and multiple myeloma.

Findings of bone marrow examination were not conclusive in some non haematological cases of Bone marrow depression yielding a dry tap (Case with Secondary deposits), bone marrow biopsy was done in those cases.

Hence, whenever indicated the two procedures should be performed together, since the two methods are often considered complementary[11].

6. Conclusion

The present study found a high prevalence of anaemia in both males and females. It can be concluded that anaemia is just a manifestation which can result from a spectrum of diseases, nutritional deficiency forms the majority of those. It is just a tip of iceberg, underlies the various causes that could be haematological or non haematological.

Bone marrow examination plays an essential role in haematological practice for the diagnosis of haematologicalor non haematological diseases presenting as anaemia.

9. Competing Interests

None declared

10. References

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