Quest Journals
Journal of Medical and Dental Science Research
Volume 10~ Issue 2 (2023) pp: 139-141
ISSN(Online) : 2394-076X ISSN (Print):2394-0751
www.questjournals.org

Research Paper

Evaluation of bone marrow aspiration, hematological profile, Vitamin B12 and peripheral blood smear in megaloblasticanaemia.

Dr. Gazala Gul[1], Dr. Roman Latif[2], Dr. Krishnaraj Upadhaya[3]
[1]*Yenepoya Medical College, Mangalore, Karnataka 575018, India*
[2]*Sher-e-Kashmir Institute of Medical sciences, Soura, Srinagar, India*
[3]*Yenepoya Medical College, Mangalore, Karnataka 575018, India*

Abstract:
Aim: *To know the type of anemia and analyse the cause of anemia to provide treatment to the patient.*
Materials and methods: A hospital based retrospective and prospective study was done for a period of two years.
Results: *Total 36 cases were analysed on peripheral blood film. The patient age group ranged from 15-70 years. Out of 36 patients, 22 were males and 14 were females. Most of the patients (38%) had macrocytic anemia and low Vitamin B12 levels.*
Conclusion: *Megaloblastic anemia is one of the common causes of undiagnosed anemia. A correct diagnosis and prompt therapy leads to complete and eventful recovery. For patients with macrocytic anemia, it is mandatory to do serum vitamin B12 assay along with bone marrow study because two important findings in megaloblastic anemia is reduced Vitamin B12 levels and significant degree of dyserythropoiesis.*
Keywords: *Megalablastic anemia; Bone marrow; Vitamin B12; Peripheral blood smear*

Received 12 Feb., 2023; Revised 22 Feb., 2023; Accepted 24 Feb., 2023 © The author(s) 2023.
Published with open access at www.questjournals.org

I. Introduction

Megaloblasticanemias are a group of disorders characterized by the presence of distinctive morphological appearances of the developing red cells in the bone marrow. The cause is usually deficiency of either cobalamin or folate, but megaloblastic anemia may arise because of inherited or acquired abnormalities affecting the metabolism of these vitamins or because of defects in DNA synthesis not related to cobalamin or folate. Macrocytosis is found in 2.5-4% of adults who have a routine complete blood count. Macrocytosis without anemia may be an indication of early folate or cobalamin deficiency, as macrocytosis preceded development of anemia. Without bone marrow examination, the diagnosis is usually not confirmatory [1].

II. Aim

The aim of this study is to know the type of anemia and analyze the cause of anemia so as to provide proper treatment to the patient and to rule out other diseases which can be present with macrocytic blood.

III. Materials And Methods

This is a retrospective study from January 2016 to January 2018. Bone marrow examination was carried out. All details of the patients, hematological profile and peripheral blood film examination were taken.

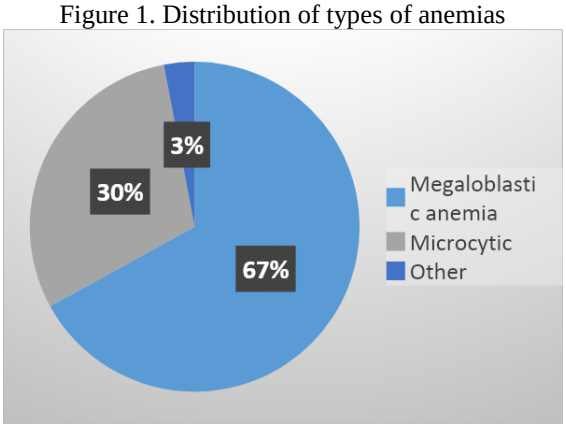
IV. Results

Total 36 cases were analyzed based on PBS, the details of which are shown in Table 1. The patient age group ranged from 15-70years. Out of 36 patients 22 were male and 14 female and majority of the cases were found between 21-70 years. Out of 36 cases, 17 (47%) had low vitamin B_{12} levels.

Table 1. Peripheral blood smear findings

Peripheral blood smear	No. of Cases	Percentage
Pancytopenia	12	34%
Bicytopenia	3	9%
Dimorphic anemia	7	19%
Macrocytic anemia	14	38%
Total	36	100%

Figure 1. Distribution of types of anemias



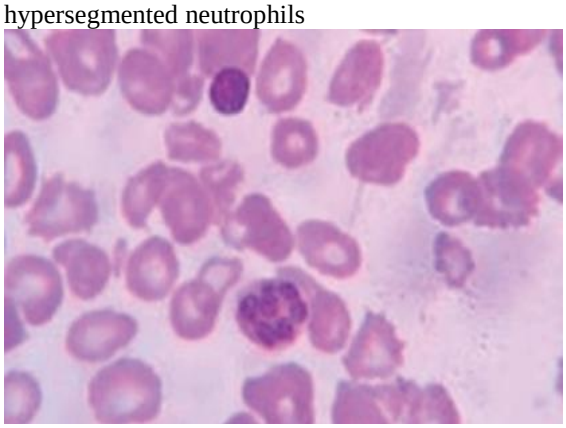
Though its name suggests a disorder limited to red cells and erythroid hyperplasia is a prominent feature, this disorder affects all cell lines. Indeed, the immature appearance of megaloblastic nuclei and occasionally intense myeloid proliferation in the marrow has led to a misdiagnosis of leukemia in rare cases. The morphologic hallmark is nuclear-cytoplasmic dissociation, which is the best appreciated in precursor cells in the bone marrow aspirate [2].

Table 2. Age distribution

Age group (years)	Male	Female	Total
11-20	0	2	2%
21-30	6	2	8%
31-40	4	2	6%
41-50	5	2	7%
51-60	2	3	5%
61-70	5	2	7%
71-80	0	1	1%
Total	22	14	100%

Megaloblastic nuclei are larger than normoblastic nuclei, and their chromatin appears abnormally dispersed due to its retarded condensation .Giant band forms and metamyelocytes with unusually large and often mishappen nuclei along with mitotic activity are typically seen.

Figure 2. Peripheral blood smear showing hypersegmented neutrophils



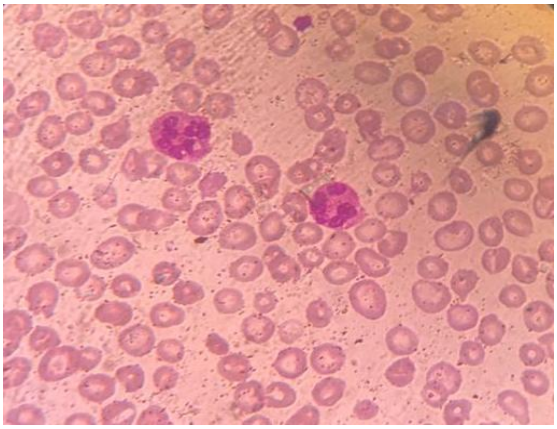


Figure 3. Peripheral blood smear showing hypersegmented neutrophils

Figure 4. At 100 x Bone marrow aspiration smear showing megaloblasts with open sieve like chromatin

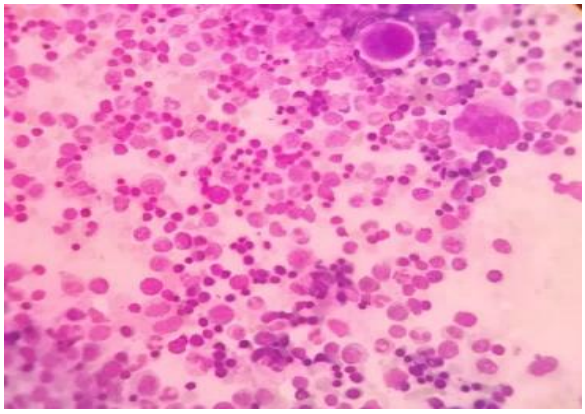
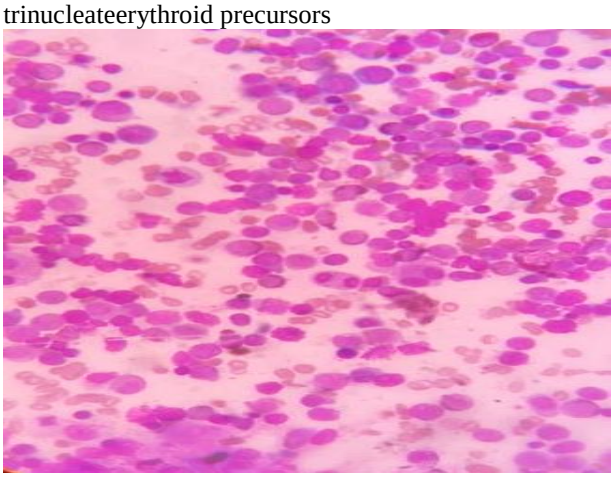


Figure 5. MDS-Erythroid precursors showing megaloblastoid nuclear chromatin and trinucleateerythroid precursors



As megaloblastic anemia progresses, neutropenia and thrombocytopenia develop. These can be severe in advanced cases but are uncommon when anemia is mild. Some studies show that 40% of normal Indian subjects with normal hemograms were cobalamindeficient[3].

V. Discussion

Megaloblastic anemia is a distinct type of anemia sharing common features of defects in DNA synthesis that affects rapidly dividing cells in bone marrow leading to macrocytosis and cytopenias. The prevelance of megaloblastic anemia due to nutritional deficiency, expected to be more common in vegetarian than non-vegetarian. [4] Peripheral smear with predominantly macrocytic anemia with predominantly macrocytic anemia with hypersegmented neutrophils seen in 38% of cases [5] Bone marrow aspirate mostly cellular showed megaloblasts with varying degree of dyserythropoiesis with few giant forms of metamyelocytes also found by masrat et al. [6].

In our study, out of 36 patients , 25 patients of megaloblastic anemia showed hypersegmented neutrophils on peripheral blood. Macrocytes were seen in all the cases of megaloblastic anemia on peripheral blood. Normoblastic picture was observed on PBF which correlated with bone marrow aspiration which showed hypocellular marrow in patients of aplastic anemia and drug induced aplastic anemia.[7]

VI. Conclusion

Megaloblastic anemia is one of the common causes of undiagnosed anemia. A correct diagnosis and prompt therapy leads to a complete and eventful recovery. For patients with macrocytic anemia, it is mandatory to do serum Vit B_{12} assay along with bone marrow study because two important findings in megaloblastic anemia is reduced Vit B_{12} levels and significant degree of dyserythropoiesis .Vit B_{12} gives us important clue to differentiate between megaloblastic anemia and myelodysplastic syndrome.

References

[1]. Antony AC. Vegetarianism and vitamin B-12 (cobalamin) deficiency. Am J ClinNutr 2003;78:3-6. [PUBMED] .

[2]. Srikanth S. Megaloblastic anemia - A clinical spectrum and a hematological profile: The day-to-day public health problem. Med J DY PatilUniv 2016;9:307-10

[3]. Khanduri U, Sharma A, Joshi A. Occult cobalamin and folate deficiency in Indians. Natl Med J India 2005;18:182-3. Singh T. Atlas and text of Hematology. 4th edition 2018;P 95-110:P315-30

[4]. Momin M, Reddy KM, Prusty BSK, Aluri A, Clinical, hematological and bone marrow aspiration evaluation in megaloblastic anemia- study of 80 cases in a tertiary care hospital in Telangana, Int. J. Curr. Res. Biol. Med., 2017, 2(8): 1-7.

[5]. Raina JS, Kundal R, Puri P et al. Correlation between different blood investigations- peripheral blood film and bone marrow findings in cases of pancytopenia, International Journal of Research and review. 2020; 7(1): 47-53

[6]. Kulkarni NS, Patil AS, Karachi SD.Study of pancytopenia in a tertiary care hospital in north Karnataka. International journal of medical research and health sciences 2017;6(3):61-67.

[7]. Agarwal P, Shams A, Prakash P, Kumar H, Nigam A. Evaluation of pancytopenia in adults through haematological parameters and bone marrow studies. Indian journal of pathology and oncology.2018;5(4):548-53.