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RATE OF PREVALENCE OF VARIOUS REASONS OF PANCYTOPENIA AND DETECTION OF DEFICIENCY OF VITAMIN-B12 AMONG PATIENTS

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Abstract:
Objectives: *To determine the rate of prevalence of various causes for pancytopenia and to identify the frequency of deficiency of Vitamin-B12 in the patients suffering from pancytopenia.*
Methodology: *This prospective research work carried out in Rural Health Center Roda, Khushab and the duration of this study was from April 2019 to September of 2019. We included 88 patients after complete examination and getting detailed history. We recorded all the information on a Performa. We interpreted the outcomes of aspiration and trephine biopsies in light of history, medical assessments and findings of peripheral blood.*
Results: *Among 88 patients suffering from pancytopenia, majority of the patients (40.9%) were identified with MA (Megaloblastic Anemia), out of which 77.77% patients were present with deficiency of Vitamin-B12. Aplastic anemia (AA) was present in 31.88% (n: 28) patients followed by some other less frequent reasons.*
Conclusion: *In majority of the patients, there was presence of Megaloblastic Anemia. All these patients were suffering from pancytopenia on initial assessments and most of these patients were present with the Vitamin-B deficiency.*
KEY WORDS: *Aplastic Anemia, Pancytopenia, Megaloblastic Anemia, Aplastic, Vitamin B12.*

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INTRODUCTION:

Cytopenia is a decrease in the amount of any of 3 types of peripheral blood cell. A decrease in all these 3 components of cell is pancytopenia and this situation involves leucopoenia, anemia and thrombocytopenia [1]. In the start, mild abnormality in the function of marrow may go unidentified and there is appearance of pancytopenia in time of stress or enhanced demand as infection or bleeding. With increase in severity, the count of the peripheral blood reduces even in normal condition. Basic inquiries in a suspected patient of pancytopenia include complete count of blood with film of peripheral blood and count of reticulocyte. There is indication of the examination of the bone marrow in all the patients of pancytopenia but the basic reason is not clear.

MA (Megaloblastic Anemia) is identified as the most common reason of the pancytopenia in the whole world. The diagnosis of Megaloblastic Anemia needs only complete count of blood, peripheral blood smear and cytology of bone marrow, which is much cost-effective. There is strong association of the nutritional factors, Vitamin-B12 deficiency, recurring infection and folate with the Megaloblastic Anemia [2]. Megaloblastic Anemia and Aplastic Anemia are most common reason of this complication. [3]. Previous research works confirmed that measurement of the myeloperoxidase index may assist in the differentiation of Megaloblastic Anemia from Aplastic anemia [4]. There is enhanced concern about the outcomes of deficiencies of Vitamin-B12 and folic acid on the heath, which includes Megaloblastic Anemia [5]. Increased methylmalonic acid have been discovered to be sensitive indicators of the diet having deficiency of Vitamin-B12 [6].

Current research works focused on the intermittent supplementation of Vitamin-B12 as well as identifying bio-availability of Vitamin-B12 in agitated vegetarian foods so as to determine the suitable diet to decrease or mitigate the deficiency. It is very difficult to pick up the deficiency of Vitamin-B12 clinically as it appears with unclear complaints like reduced capacity of mental and physical work, decreases attention, loss of memory and low mood and irritability [7]. The rationale of this research work was to determine the rate of prevalence of various reasons for pancytopenia and to detect the frequency of deficiency of Vitamin-B12 in these patients.

MATERIAL AND METHODS:

This research work carried out in Rural Health Center Roda, Khushab from April 2019 to September 2019. A sum of 88 patients were the participants of this research work. All these patients fulfilled the inclusion criteria of the research work. The selection of the patients carried out through random sampling. We recorded the detailed history which comprise the questions on dietary habits with particular focus on the use of the animal products like eggs, meat, milk, vomiting, nausea, pain in abdomen cavity, bulky stools, presence of worms in stool, any comorbid diseases and detailed examination also carried out and results were collected on a Performa. We excluded the patients on chemotherapy. The count of blood before the transfusion carried out with the help of automated blood analyzer. We also obtained the manual smear. Differential count of leukocyte and morphology of the red cells carried out manually by blood smear's staining with the help of Giemsa stains.

We also detected the serum for red blood cells folate and levels of Vitamin-B12. We also obtained the count of reticulocyte and performed the hepatitis serology. Interpretation of results of aspiration and trephine biopsies carried out in light of detailed history, clinical assessment and findings of peripheral blood testing. We performed the examination of bone marrow in 60 patients but in remaining patients it could not be carried out because these patients were either ill or fulfilling some other criteria of diagnosis. SPSS V. 20 was use for the statistical analysis of the collected information.

RESULTS:

Total 88 patients were the participants of this research work. The range of the age of the patients were 15 to 60 years with an average age of 32.60 years. The average age was 26.60 years for the patients in which we detected Aplastic anemia and average age was 38.60 years for the patients suffering from Megaloblastic Anemia. Most of the patients (59.0%) were females. Aplastic anemia was present in 20 out of 28 male patients. Among 88 patients, 40.9% (n: 36) patients were suffering from Megaloblastic Anemia, out of which 77.77% (n: 28) patients were present with deficiency of Vitamin-B12 and 22.33% (n: 8) patients were present with folate deficiency. Among the patients suffering from deficiency of Vitamin-B12, 78.57% (n: 22) patients were present with history of insufficient intake of products of animal with a mainly fruit and vegetable-based diet, 10.71% (n: 3) patients stated use of anti-ulcer medications over a long duration, 7.14% (n: 2) patients were present with illeal resection because of subacute obstruction of intestines because of TB of abdomen whereas 3.57% (n: 1) patient stated the malabsorption syndrome in past.

Aplastic anemia was recorded in 31.88% (n: 28) patients, out of them 17.0% (n: 5) patients were present with past history of intake of drugs. We

recorded the acute myeloid leukemia in 9.99% (n: 8) patients. 6.81% (n: 6) patients were present with hypersplenism, whereas we found the chronic malaria in 4.55% (n: 4) patients. We also detected more 4 patients with myelodysplastic syndrome, whereas we were unable to find any cause in 2 patients (Table-1).

Table-I: Etiology of Pancytopenia

Etiology	No.	Percent
Megaloblastic Anemia	36	40.9
Aplastic Anemia	28	31.8
Acute Leukemia	8	9.9
Hypersplenism	6	6.8
Chronic Malaria	4	4.5
Myelodysplastic syndrome	4	4.5
None	2	2.7

Weakness and pallor were most frequent symptoms in 98.0% followed by breath shortness in 88.0%, abdominal pain in 56.0%, mass in abdomen in 54.0%, pains in bones in 44.0%, petechial hemorrhages in 36.0%, jaundice in 30.0%, edema in 24.0%, lymphadenopathy in 10.0%, and ascites in 5.0% patients (Table-2).

Table-II: Clinical features of Pancytopenia (%)

Clinical Features	Percent
Pallor	98
Weakness	98
Shortness of Breath	88
Abdominal Pain	56
Mass in Abdomen	54
Bone Pain	44
Petechial Hemorrhages	36
Jaundice	30
Edema	24
Lymphadenopathy	10
Ascites	5

DISCUSSION:

In current research work, we detected that Megaloblastic Anemia was the most frequent reason of pancytopenia as 40.90%. It shows variation in prevalence rate according to different research works from 38.0 to 72.0% [8-11]. In one research works performed in Malaysia, there was presence of pancytopenia in 64.0% patients suffering from Megaloblastic Anemia [12]. The prevalence of pancytopenia is not common in the patients of Megaloblastic Anemia in the countries of west as only 13.70% patients were detected in one research work conducted in USA [7]. Majority of the patients were present with adverse dietary habits. High incidence of nutritional anemias in regions of sub-continents are considered as the main reason of high rate of occurrence of Megaloblastic Anemia. Among the anemias due to nutrition, the most prevalence is deficiency of Vitmain-B12 as compared to the deficiency of folate in our country Pakistan [13], our current research work also reported the similar findings.

The 2nd most frequent reason of pancytopenia in this current research work was aplastic anemia (31.80% patients) whereas its variation is from 38.0% to 41.0% in other similar research works [11, 14, 15]. It was again much higher than the regions of west [16,17. Aplastic anemia is more common in Orient as compared to countries of west because of the environmental factors [18,19]. Additionally, easy availability of OTCMs (Over The Counter Medications) in the countries of Asia particularly in the countries which are under development could be implicated in very high frequency of Aplastic anemia as some research works from Thailand confirmed these findings [20,21,22]. The 3rd most common reason of pancytopenia was acute leukemia in this research work which is also similar with the findings of research work performed by Savage [23,24] who stated that most common reason of pancytopenia was Megaloblastic Anemia followed by Aplastic anemia, acute leukemia, acquired immune deficiency syndrome and hypersplenism.

CONCLUSIONS:

In this research work, majority of the patients present with pancytopenia were suffering from Megaloblastic Anemia due to the deficiency of Vitamin-B12, in some patients because of the deficiency of folate, whereas Aplastic anemia came 2nd number followed by Acute Leukemia and hypersplenism. The deficiency of Vitamin-B12 because of the vegetarianism is rising and it also leads to the hyper-homocysteinemia. This deficiency of Vitamin-B12 can lead to many complications in human body. There is need of further research work on large sample size to consolidate the findings of this research work.

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