FREQUENCY OF MEGALOBLASTIC ANAEMIA AMONG PATIENTS WITH VARIOUS HAEMATOLOGICAL DISORDERS AFTER BONE MARROW EXAMINATION IN PESHAWAR (A TERTIARY-CARE HOSPITAL STUDY)

Huma Riaz[1], Munawar Ali Shah[1], Ihsan Ullah[2]

ABSTRACT

Objective: The main aim of this study was to find the frequency of Megaloblastic anaemia in patients with different haematological disorders referred to our hospital for bone marrow examination, and to study the frequency of Megaloblastic anaemia in various age groups in both male and female patients.

Methodology: A cross-sectional retrospective study was conducted on the patient's records from January 2012 to December 2012 at haematology unit, department of pathology MTI Lady Reading Hospital Peshawar. A total of 368 patient's records were included in the study whose bone marrow examination was conducted to confirm their haematological disorders. Data were analysed and percentages haematologically confirmed Megaloblastic anaemia were calculated in different age groups for both genders.

Results: Out of three hundred and sixty-eight patients diagnosed with various haematological disorders, 59 (16%) of all were found to be Megaloblastic anaemia.17 (29%) out of 59 Megaloblastic anaemia patients were reported in 01-10 years of age group, followed by 12 (20%)within11-20 years of age group. Out of 59 Megaloblastic anaemia cases, 34 (57%) were males while 24(40%) were females with male to female ratio of 1.45: 1. In elderly population, age group ranging from 71-80 years, there were 05(45%) out of 11 patients with Megaloblastic anaemia which showed its high frequency in this age but no cases Megaloblastic anaemic were reported in age groups from 21-70 years during this one year of study.

Conclusion: The frequency of Megaloblastic anaemia in our population is 16% among patients having different haematological disorders with its highest occurrence rates at the both extremes of age. It is also concluded from this study that the frequency of Megaloblastic anaemia is higher in male patients with haematological disorders as compared to females.

Key words: Bone marrow examination, Haematological disorders, Megaloblastic anaemia

INTRODUCTION

Bone marrow examination is an important tool for the diagnosis of various haematological disorders such as Megaloblastic anaemia. Bone marrow examination is also applied to follow up prognosis of many haematological disorders and sometimes, it may be the only means to diagnose a variety of haematological and non-haematological conditions and subsequently monitor the efficacy of different therapies. A disturbance of any of the primary blood element is reflected much earlier and changes due to the disturbance are more conspicuous in bone marrow than the peripheral blood examination[1].

The bone marrow examination usually confirms a clinically suspected disease[2]. However, before bone marrow aspiration, it is recommended to take a detailed medical history of the patient, perform a thorough clinical evaluation and peripheral blood examination to ascertain any suspected cytopenias such as anaemia[3]. Bone marrow examination is performed to find the cause of cytopenias presented during peripheral blood examination. The commonest cytopenia is in the form of anaemia, affecting almost two billion people worldwide, mainly women and children[4]. Anaemia caused by nutritional deficiencies e.g. Megaloblastic anaemia, is prevalent in considerably large population worldwide, especially among low socio-economic groups[5].

Megaloblastic anaemia is a commonly prevalent anaemia in clinical practice in the developing countries including Pakistan[6]. Main etiological causes of Megaloblastic anaemia include deficiency of Vitamin B12 and folate[4-5]. Vitamin B12 present as Cobalamin is derived from animal source of food as it is not synthesized

[1] Department of Pathology, MTI Lady Reading Hospital Peshawar, Pakistan.
[2] Department of Pathology, Khyber Medical University Peshawar, Pakistan

Address for correspondence:
Dr. Huma Riaz
Assistant Professor Haematology, Department of Pathology,
MTI Lady Reading Hospital Peshawar, Pakistan
Email address:humariaz82@gmail.com
Contact number: 0093209013328

by the human's cells while folate is derived from the botanical sources[3,6]. Deficiency of these vital vitamins have serious implications on the human health. The spectrum of clinical presentation and disease associated with vitamin B12 deficiency display a wide range from a mildly symptomatic anaemia to a life-threatening pancytopenia or myelopathy[7]. Folate deficiency during pregnancy can result into neural tube defects and various other developmental disorders in the foetus[8].

Megaloblastic anaemias are a heterogeneous group of disorders that have common blood abnormalities. The different blood cells isolated anaemia or pancytopenia patients have characteristic large oval erythrocytes, hyper segmented neutrophils and abnormal large platelets. Bone marrow RBC precursors also have abnormally high nuclear to cytoplasmic ratio and abnormal megakaryocytes. Nuclear maturation is delayed while cytoplasmic development is normal[6]. These characteristic morphologies are due to the deficiencies of Vitamin B12 and Folate that are crucial for the synthesis of Pyrimidine and Purine nitrogenous bases during the replication of DNA. The deficiency of B12 and Folate lead to impaired DNA synthesis specially in erythropoiesis – the main of cause of Megaloblastic anaemia[5,6]. The diagnosis and treatment of megaloblastic anaemia is critical as it is a treatable and reversible with proper diet and supplements. If it is untreated then it can lead to bone marrow failure, demyelinating nervous system disease in adult and in foetus it can lead to neural tube defects among other congenital abnormalities[2,7]

A study conducted in Khyber teaching hospital Peshawar by Munir et al. in 2015, to calculate the frequency of Megaloblastic anaemia reported a 16.6% megaloblastic anaemia out of all the other haematological disorders among patients displayed the clinical symptoms and referred for the bone marrow examination[6]. This study was primarily focused to calculate the frequencies of all disorders, both haematological and non-haematological after bone marrow examination, but they did not calculate the frequencies of different haematological disorders including megaloblastic anaemia among various age groups and in both genders.

Keeping these facts in view, the present study intends to observe the frequency of megaloblastic anaemia in patients with suspected haematological disorders when they were referred for the bone marrow examination after displayed clinical symptoms. This study was conducted in a tertiary care hospital of Peshawar and was focused on the frequencies of Megaloblastic anaemia among various age groups and in both genders to provide the clinicians a better knowledge about its prevalence. Furthermore, this information will be useful for the government to plan and direct proper resources for the treatment of this disorder in the general population.

MATERIALS AND METHODS

This is a cross-sectional retrospective descriptive study was conducted at haematology unit, Department of pathology of Lady Reading Hospital, MTI Peshawar over a period of one year from January 2012 to December 2012. A retrospective analysis of the data of patients who underwent bone marrow examination was performed. A total of 368 patient's records were studied who had clinical symptoms and were referred for the bone marrow examination and their data were analysed.

The diagnoses of the 368 patients had been recorded and confirmed after detailed microscopic examination of smears of peripheral blood, reticulocyte count and smears of bone marrow. The diagnoses had also been confirmed with morphology of different cells.

From the recorded patients' data, the frequency of the megaloblastic anaemia was calculated in the different age groups. A total of eight groups were formed and each age group consisted of patients records of ten years e.g. birth-10, 11-20, 21-30, 31-40, 41-50, 51-60, 61-70 and 71-80 years respectively. Frequencies and percentages of Megaloblastic anaemia and its distribution among all age groups and both genders were calculated.

RESULTS

A total of 368 patients' records were included in this study. Out of the 368 patients who had diagnosed with various haematological disorders, 59(16 %) turned out to be megaloblastic anaemia while the rest 309 (84 %) had other haematological disorders as shown in Table 1.

Among a total of 59 megaloblastic anaemia patients, the largest number e.g. 17 (29%) were from (birth -10 years) age group, followed by 12 (20%) patients from (11-20 years) age group. 08 (14%) patients were from (51-60 years) age group, while (61-70 years and 71-80 years) age groups had 05(8%) patients each. Age groups (21-30 years) and (41-50 years) had 04(7%) patients while 03(5%) were in age group (31-40 years) as shown in Table 2.

Out of 59 diagnosed megaloblastic anaemia patients, 35 (40%) were males and 24 (40%) were females with male to female ratio of 1.45: 1 as shown in the Tables 3.

DISCUSSION

Haematological disorders are quite prevalent in general population and the diagnoses of such disorders are confirmed by total blood count and bone marrow examinations[4,9]. In this study, frequency of megaloblastic anaemia was calculated in patients referred for the bone marrow examination for haematological disorders on the basis of their clinical examination. Megaloblastic

Table 1: Disease distribution frequency table (n= 368)

Disease	Frequency	Percentage
Megaloblastic Anaemia	59	16
Other haemato-logical disorders	309	84
Total	368	100.0

Table 2: Frequencies of Megaloblastic Anaemia in different age groups

Age group (Years)	Megaloblastic Anemia
Birth-10	17 (29%)
11-20	12 (20%)
21-30	4 (7%)
31-40	3 (5%)
41-50	4 (7%)
51-60	8 (14%)
61-70	5 (8%)
70-80	5 (8%)
Total	59

Table 3: Gender-wise distribution of the megaloblastic anemia (n = 59)

Gender	Megaloblastic anaemia
Male	35 (60%)
Female	24 (40%)
Total	59

anaemia was found in 16% out of all haematological disorders that were confirmed during this one year of study duration. The findings of our study are consistent with another study conducted at Khyber teaching hospital, Peshawar, in 2015, where megaloblastic anaemia was 16.6% of all haematological disorders[6].

In a similar study conducted in Peshawar, megaloblastic anaemia was 27% of the haematological disorders and it was prevalent in all age groups and in both genders[11]. In another study the frequency of megaloblastic anaemia was recorded as high as 57.7% of the total cases who underwent bone marrow examination in DI Khan in 2006[9]. In all these studies, only frequency of megaloblastic anaemia was calculated with no information about its frequency in different age groups and in both genders, hence we calculated its frequencies in different age groups and both genders and shown that children and elderly population are more susceptible to this disorder.

Malnutrition is of major causes of nutritional deficiency induced anaemia, megaloblastic anaemia, in the underdeveloped countries, where it reflects the low socioeconomic status and poor health condition of the society. Nutritional deficiency induced megaloblastic anaemia is one of the leading etiological cause of pancytopenia among general population particularly paediatric age group[9,10]. Our findings also suggest that the children are more prone to this disorder. Vitamin B12 deficiency in infants is the second most common phenomena while the maternal dietary deficiency is most common occurrence in the developing countries. These deficiencies were reported in the infants who are exclusively breast fed by strict vegetarian's mothers[7,10]. Vitamin B 12 is derived from animal sources of food and in developing country such as Pakistan people below poverty line cannot afford food such as meat from the animal origins. The lack of consumption of vitamin B12 affects children, women in child bearing age and elderly population. Hence the prevalence of the megaloblastic anaemia is higher in these groups[10,11] as shown in our study from birth-10 years age group. In the elderly population with 71-80 age group 5 out of only 11 patients had megaloblastic anaemia; which is about 45% of the patients at this age group.

Pakistan has fertile land where green vegetables, source of Folic acid, can be relatively grown easily and people can consume these vegetables to get enough folic acid. However, because of the poor economic conditions, lack of proper education that impart awareness, lack of health facilities and basic hygiene maintenance as well as poor sanitations are all exposing general population to multiple factors which may cause nutritional deficiency including folic acid. The other contributing factors may include chronic diarrhoea, worm's infestations, malabsorption and poor eating habits[12]. People particularly elderly population and woman having children should be educated to make them aware about the importance of Vitamin B12 and Folic acid so that the prevalence of megaloblastic anaemia can be reduced.

CONCLUSION

Megaloblastic anaemia, caused by Vitamin B12 and Folic acid deficiencies, was found to be 16 % in patients with various haematological disorders and it was prevalent in all age groups and both the genders. The worst affected group were children from birth- 10 years age group followed by teenagers in 11- 20 years age group. The children and teenagers' bodies grow rapidly demand more nutrients and balanced diet. Hence it likely that children and teenagers in developing countries will have Vitamin B12 and Folic acid deficiency that may make them susceptible for the development of megaloblastic anaemia. This disorder is indeed more prevalent in the developing countries particularly in children. In these countries, the older population is also more likely poor and do not have any income and consequently are more likely to have Vitamin B12 and Folic acid deficiency and consequently have more chances to develop megaloblastic anaemia.

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