

Study of Various Morphological Types of Anaemia in Patients With rheumatoid Arthritis and Comparison of Serum Ferritin with Bonemarrow Iron Stores in These Patients.

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Abstract

Background: Anemia is a common extra-articular manifestation in rheumatoid arthritis patients. Its severity roughly parallels the activity of the disease 1-2. Chronic disease and iron deficiency are considered to be the most significant causes of anemia 3-5. Anemia of chronic disease is usually confused with iron deficiency anemia due to the low level of iron in blood in both forms of anemia. **Subjects and Methods:** This study was conducted in Department Of Medicine, C. U. Shah Medical College, Gujarat, India. 68 total number of population were included in this study. The duration of study was over a period of six month. **Results:** In our study, 68 total numbers of cases were included. Among all cases 58.8 % were male & 41.2% were female. In the present study, 41.2% cases were belongs to 31-40 age group followed by 41-50(35.2%), <30 (11.7%) & >50 (11.7%) age group. This study suggested type of anemia which was found 76.5% Normocytic Normochromic followed by Microcytic Hypochromic 23.5%. **Conclusion:** Therefore, it can be concluded from the present study that normocytic normochromic anemia is the most common morphological type of anemia in patients with rheumatoid arthritis. And there is a positive correlation between serum ferritin and BMIS in RA patients presenting with anemia. The results of this study also revealed that serum ferritin is an useful index of iron stores in rheumatoid arthritis.

Keywords: Serum Ferritin, Rheumatoid Arthritis, Bone Marrow Iron Store.

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Introduction

Anemia is a common extra-articular manifestation in rheumatoid arthritis patients. Its severity roughly parallels the activity of the disease.^[1-2] Chronic disease and iron deficiency are considered to be the most significant causes of anemia.^[3-5] Anemia of chronic disease is usually confused with iron deficiency anemia due to the low level of iron in blood in both forms of anemia. Circulation of iron in blood is necessary for RBC production. Iron deficiency anemia means depletion of stored iron in the body's tissues. Whereas, in chronic disease anemia, iron stores in bone marrow are normal or high. Though, normal iron stores in bone marrow, yet there is low level of iron occurs in anemia of chronic disease. The reason behind this is that inflammatory and chronic diseases interfere with the body's ability to use stored iron and absorb iron from the diet. In rheumatoid arthritis patients, anemia of chronic disease is part of a hematological stress syndrome. It is induced by the release of several cytokines in response to cellular injury caused by inflammation. Cytokines could cause excessive macrophage sequestration of iron and iron binding protein, increased splenic destruction of red cells, and suppressed

erythropoietin production in the kidneys and action in the marrow. Anemia is normocytic normochromic in 60% to 70% and microcytic hypochromic in 30% to 40% of cases in anemia of chronic disease.^[6] The useful index of iron stores or of iron deficiency is serum ferritin. Generally, 1 microgram/liter serum ferritin roughly corresponds to about 8 mg of storage iron. But ferritin is also an acute phase protein. Inflammation and infections increase its synthesis and produce high serum levels. Thus, mostly in chronic disease, ferritin is not reliable for estimating bone marrow iron deficiency. Though, for the acute phase response, if we use the correct levels of serum ferritin, we could still use it for estimating of iron stores in bone marrow of patients with anemia of chronic disease.^[7] The aim of this study was to study the various morphological types of anemia in patients with rheumatoid arthritis and also to correlate serum ferritin with bone marrow iron stores (BMIS) in patients with rheumatoid arthritis.

Subjects and Methods

Study Area

This study was conducted in Department Of Medicine, C.

U. Shah Medical College, and Gujarat, India.

Study Population

68 total number of population were included in this study.

Study Duration

The duration of study was over a period of six month.

Sample Collection

Patients who presented with anaemia and suffering from RA were taken up for the study. Blood samples and bone marrow aspiration were done after taking consent. History and clinical details of the patients was recorded. Haemoglobin Estimation was done using the automated cell counter cymthaemoglobin method.

Peripheral Blood Film

It was stained using Leishmans stain. Red cell indices comprising of mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH), mean corpuscular haemoglobin concentration (MCHC) were estimated using automated cell counter. Bone marrow aspiration was done from posterior superior iliac spine under complete aseptic conditions using Salah's aspiration needle. Smears were stained with Leishman/Giemsa stain for assessment of cellularity and morphological details. Perls' Prussian blue staining was done on one slide for estimation for estimation of marrow iron stores.

Data Analysis

Data were analyzed by using Microsoft excel.

Results

In our study, 68 total numbers of cases were included. Among all cases 58.8 % were male & 41.2% were female. In the present study, 41.2% cases were belongs to 31-40 age group followed by 41-50(35.2%), <30 (11.7%) & >50 (11.7%) age group. This study suggested type of anemia which was found 76.5% Normocytic Normochromic followed by Microcytic Hypochromic 23.5%. Mean of RBCs indices showed in table no. 5. Our study found that 55.8% cases had 9-9.9 gm/dl Hb followed by 8-8.9 & >10. 85.3% cases had normal or increased & 14.7% decreased bone marrow iron storage. Grading of bone marrow iron storage showed in table 7.

Table 1: Distribution of Cases According to Gender.

Gender	No. Of Cases	Percentage
Male	28	41.2%
Female	40	58.8%
Total	68	100%

Table 2: Distribution of Cases According to Age.

Age	No. of Cases	Percentage
<30	8	11.7%
31-40	28	41.2%
41-50	24	35.2%
>50	8	11.7%
Total	68	100%

Table 3: Distribution of Cases According To Anemia.

Type of Anemia	No. Of Cases	Percentage
Normocytic Normochromic	52	76.5%
Microcytic Hypochromic	16	23.5%
Macrocytic Normochromic	0	0%
Dimorphic Anemia	0	0%
Total	68	100%

Table 4: Distribution of Cases According To Mean of Indices

Indices	Mean
MCV(fl.)	85.1
MCH(pg.)	28.5
MCHC(gm/dl)	32.9

Table 5: Distribution of Cases According To Hb

Hb (Gm/Dl)	No. Of Cases	Percentage
8-8.9	18	26.4%
9-9.9	38	55.8%
>10	12	17.6%
TOTAL	68	100%

Table 6: Distribution of Cases According To Bone Marrow Storage.

Bone marrow iron stores grade	No. Of Cases	Percentage
DECREASED	10	14.7%
Normal Or Increased	58	85.3%
Total	68	100%

Table 7: Distribution of Cases According To Grading Of Bone Marrow Iron Storage.

Grading Of Bone Marrow Iron Storage	No. Of Cases	Percentage
Grade 0	8	11.7%
Grade 1	2	2.9%
Grade 2	12	17.6%
Grade 3	12	17.6%
Grade 4	10	14.7%
Grade 5	16	23.5%
Grade 6	8	11.7%
TOTAL	68	100%

Discussion

This study was carried out in post graduate department of pathology, Acharya Shri Chander College of Medical Sciences and Hospital Sidhra, Jammu over a period of one year. 34 patients of rheumatoid arthritis presenting with anemia were studied in the present study. The results of this study showed that normocytic normochromic anaemia was most common morphological type of anemia. It was found in 76.5% of patients followed in frequency by microcytic hypochromic in 23.5% patients. Similar findings were found in study by Vreugdenhil et al 1994. They evaluated erythrocyte and serological parameters in 44 anemic rheumatoid arthritis patients and found out that the anemia was 60% in normocytic normochromic and 30% in hypochromic normocytic patients. In normal subjects, serum ferritin concentration correlates well with iron stores. In this study, the relationship of serum ferritin concentration indicates a similar association with body stores. This also observed a positive correlation between serum ferritin and BMIS (0.539; p=0.001) in all 34 rheumatoid

arthritis patients. These findings are supported by the study of Porter et al in 1994^[8].

They observed 101 patients of rheumatoid arthritis with anemia. They found that 93% of patients with ferritin <50ng/ml were iron deficient on bone marrow examination and 91% of patients with ferritin >100ng/ml were iron replete on bone marrow examination. Shroff et al 1991^[9] revealed that there was a strong positive correlation between serum ferritin levels and marrow iron stores ($r = +0.08$, $p < 0.001$) in 30 rheumatoid arthritis patients. Palermo et al 1986^[10] assessed bone marrow aspirate from the sternum of 40 patients with rheumatoid arthritis with anemia. They showed that in these patients serum ferritin correlated with other indices of iron stores and disease activity.

Conclusion

Therefore, it can be concluded from the present study that normocytic normochromic anemia is the most common morphological type of anemia in patients with rheumatoid arthritis. And there is a positive correlation between serum ferritin and BMIS in RA patients presenting with anemia. The results of this study also revealed that serum ferritin is an useful index of iron stores in rheumatoid arthritis. Higher than expected values of serum ferritin may be found in active disease. If corrected for the acute phase response, serum ferritin concentrations could be used to estimate the iron stores in patients of rheumatoid arthritis.

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