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Clinical Evaluation of Anemia in Elderly Patients- A Hospital based Observational Study

By Dr. Jyoti Vora, Dr. Tehsim Memon, Dr. Pratik Akhani & Dr. Harsh Oza

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Clinical Evaluation of Anemia in Elderly Patients- A Hospital based Observational Study

Dr. Jyoti Vora [α], Dr. Tehsim Memon [σ], Dr. Pratik Akhani [ρ] & Dr. Harsh Oza [ω]

Abstract- Anemia is a common concern in geriatric age group (more than 60 years of age) and can lead to more severe complications than anemia in younger adults. WHO criteria determine anemia when the hemoglobin level is < 13g/dl in male and < 12 g/dl in female, respectively. This decrease in oxygen carrying capacity is a common problem in older people and can have significant morbidity and mortality. Because anemia is a sign, not a diagnosis, a complete evaluation is necessary to identify the underlying cause. The purpose of this study was to evaluate the clinical profile, the characteristics of different hematological types and the etiological profile of anemia in elderly patients, which in turn can lead to early detection of such patients, their early treatment, which would improve the overall outcome & quality of life. A Hospital based observational study was conducted in which 110 PATIENTS above the age of 60 years with anemia were included. Clinical profile with laboratory studies and diagnostic tests to fix the etiology were studied. Majority of these patients had normocytic blood picture of anemia even though iron deficiency anemia was the commonest cause among them.

I. Introduction

Anemia is a common concern in geriatric age group and can lead to more severe complications than anemia in younger adults and can greatly hamper the quality of life [1]. All the types of anemia are known to occur in this age group. However anemia should not be accepted as an inevitable consequence of ageing. [2] 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. [3] Multiple pathophysiologic abnormalities in a single elderly patient with anemia are well known. Micronutrient deficiencies as a cause of anemia have been repeatedly documented in the elderly. They are thought to be due, among other factors, to lower energy requirements of the elderly which lead to reduced food intake.[4] Suboptimal iron, folic acid and vitamin B12 status has been shown to impair cognitive function and immune status [5]. It is, therefore, essential to be aware of the coexistence of anemia in elderly, although the presenting manifestation may be for a different reason. It, therefore, becomes all the more important to look for severity of anemia, type of anemia, possible etiologies and appropriate correction. Untreated geriatric anemia is associated with greater risk of death, co-morbidities, and impaired functional status [6]. Similar data for Indian geriatric population are sparse and hence this study was undertaken to determine the prevalence, patterns and causes of anemia.

It is easy to overlook anemia in the elderly, since symptoms such as fatigue, weakness, shortness of breath may be due to the ageing process itself but the decrease of hemoglobin and simultaneous increased degree of anemia with age is not necessarily a result of normal ageing [1,7] . So anemia should not be accepted as an inevitable consequence of ageing. WHO criteria determine anemia to be present when the hemoglobin level is < 13g/dl in a man and < 12 g/dl in a woman [2]. Therefore, we have studied the proportion and the morphological patterns of anemia in elderly patients attending in a tertiary care hospital.

II. Materials & Methods

A hospital based observational study of 110 patients was carried out on patients aged 60 years and above (either sex) presenting with anemia. Patients fulfilling the WHO criteria of anemia (hemoglobin (Hb) <13 gm% in males, Hb<12gm% in females) [2] were included in this study. Their detailed history, complete general, physical examination and systemic review of the patients were undertaken. The following hematological investigations were carried out for all the patients - Hb, Total Leucocyte Count (TLC), Differential Leucocyte Count (DLC), Erythrocytic Sedimentation Rate (ESR), Platelet Count, Mean Corpuscular Volume (MCV), Mean Corpuscular Hemoglobin Concentration (MCHC), Mean Corpuscular Hemoglobin (MCH), Packed Cell Volume (PCV), and peripheral smear for blood picture. Other investigations like Stool for Occult blood, blood urea, Liver function tests, serum ferritin, serum Iron, serum B12 level, imaging studies, Bone Marrow biopsy and Endoscopic studies & ANA Profile (as and when needed) were also done. Statistical analysis was done by using instant graph pad and mean. Patterns of anemia were classified based on RBC indices and further correlated by peripheral smear. Microcytic anemia was defined as MCV below 80 fl, normocytic as MCV between 80 and 100 fl and macrocytic anemia by an MCV above 100 fl. Dimorphic anemia are suspected when RDW is more than its normal range (11-15%) and then correlated by

Author α σ ρ ω: Department of Medicine, Smt NHL Municipal Medical College, Ahmedabad-380006, Gujarat, India.
e-mail: tehsimemon@gmail.com

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peripheral smear. IDA was defined when serum iron level <50ug/dl in females & <60 ug/dl im males and serum ferritin level <45ng/ml.

III. Result

The age in the present study ranged from 60 to 96, with the mean age being 68.04. The maximum number of patients were in the age group between 60 and 75, comprising 85% of the study population. The number of males (57%) with anemia were higher than that of the females (43%) with anemia. Of the 110 patients, the commonest symptom was easy fatiguabilty (in 74.54%), followed by Abdominal Distension (22%), and the commonest sign was pallor (in 92.72%) followed by pedal edema (in 20%). The examination of peripheral smear in this study showed Normocytic Normochromic anemia to be the commonest (50.9%) pattern, followed by microcytic hypochromic (40.9.%). Out of the various etiologies of anemia, the commonest in our study was Iron Deficiency Anemia (due to low socioeconomic status and poor dietary patterns) followed by Anemia of Chronic Inflammation.

Table 1: Distribution of male and female patients according to age group & severity of anemia

	No. of Males(%)	No. of Females(%)	Total no. of Patients (%)
Age group			
60-70	50 (52.63)	45 (47.36)	95 (86.3)
71-80	10 (83.3)	2(16.6)	12 (10.90)
>80	3 (100)	0 (00)	3 (2.73)
Total no. of patients (%)	63 (52.27)	47(43.73)	110 (100)
Severity of Anemia			
MILD(10-12 gm%)	18 (56.25)	14 (43.7)	32
MODERATE (7-9.9 gm%)	25 (55.50)	20 (44.4)	45
SEVERE (<7 gm%)	20 (60.60)	13 (39.40)	33
Total no. of patients (%)	63 (57.27)	47 (42.72)	110

Of the 110 patients studied 95 patients [86.36 %] fall in the age group of 60 to 70 years, out of which 50 (52.63%) were males & 45 (47.36%) were females. Out of 110, 12 patients [10.90%] fall in the age group 0f 71 – 80 years, out of which 10 (83.3%) were males & 2 (16.6%) were females. And out of 110, 3 patients fall in the age group of > 80 years, which included only males. Of the 110 cases studied total 63 patients (52.27%) were men and 47 patients (43.73%) were women.

Based on the WHO criteria, [8,9] anemia can be classified into mild anemia with hemoglobin level between 10-12 gm/dl, moderate anemia with hemoglobin level between 7 and 9.9 gm/dl and severe with hemoglobin level less than 7 gm/dl. Of the 110 cases studied 32 had mild anemia out of which 18 were men and 14 women, 45 had moderate anemia of which 25 were men and 20 were women and 33 had severe anemia of which 20 were men and 13 were women.

Table 2: Etiology of Anemia

Diagnosis	No. of Patients	%
Iron Deficiency Anemia	46	41.81
Anemia of Chronic Inflammation	35	31.81
Unexplained Anemia of Elderly	14	12.72
Anemia of Chronic Kidney Disease	11	10.00
B12 or Folate deficiency Anemia	4	3.63

Among the causes for anemia, Iron Deficiency Anemia *(IDA)* was the commonest constituting 41.81% of the cases followed by Anemia of Chronic Inflammation *(ACI)* which constituted 31.81 % of the cases. The next common cause for anemia was Unexplained anemia of elderly *(UAE)* (12.72%) and then anemia of chronic kidney disease *(A- CKD)* (10.%).

Table 3: Mean values of hematological parameters in various types of anemia (pathological).

	Number	Hb (gm %)	MCV (fl)	MCH (pg)	MCHC (%)	Number of patients (%)
NcNc anemia	56	8.5	78.10	26.3	32.7	56 (50.9)
McHc anemia	45	8.3	69.08	25.7	31.8	45 (40.90)
Dimorphic Anemia	5	7.7	77.64	24.7	29.6	5 (4.54)
Macrocytic Anemia	4	8.5	74.8	24.5	33.2	4 (3.63)

The mean values of RBC indices in normocytic normochromic *(NcNc)* anemia is as follows: Mean Cell Volume *(MCV)* 78.1 fl, Mean Corpuscular Hemoglobin *(MCH)* 26. 3 pg/cell, Mean Cell Hemoglobin Concentration *(MCHC)* 32.7%, in microcytic hypochromic anemia *(McHc)* is as follows: MCV- 69.08 fl, MCH 25.7 pg/cell,

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MCHC 31.8%, in Dimorphic Anemia is as follows: MCV-77.64 fl, MCH-25.7pg, MCHC-29.6%, and in Macrocytic anemia is MCV 82.9 fl, MCH 27.1pg/cell, MCHC 37.2%.

Table 4: Correlation of Peripheral Smear Findings in Number of Patients with the Intensity of Anemia

	Erythrocyte			WBC			Platelet		
	NC NC	MC HC	Dimorphic	Normal	Leucocytosis	Leucopenia	Normal	Thrombo-Cytopenia	Thrombo-Cytosis
Mild Anemia	18	11	1	27	0	6	25	4	3
Moderate Anemia	24	20	1	26	4	13	36	6	3
Severe Anemia	14	16	3	27	3	5	20	9	4
Total	56	47	5	80	7	24	81	19	10

Normocytic normochromic erythrocytes is seen in a total of 56 patients out of which 18 were mildly anemic patients, 24 were moderately anemic patients and 14 were severely anemic patients. Microcytic hypochromic erythrocytes were found in a total of 47 patients of whom 11 were mildly anemic, 20 were moderately anemic and 16 were severely anemic patients. Dimorphic blood picture was seen totally 5 patients of whom 1 were mildly anemic, 1 was moderately anemic and 3 were severely anemic patients.

Normal WBC counts were seen in 27 mildly anemic, 26 moderately anemic and 27 severely anemic patients whereas leucocytosis was seen 0 mildly anemic, 4 moderately anemic, 3 severely anemia and leucopenia was seen 6 mildly anemic, 13 moderately and 5 severely anemic patients.

Platelet counts were normal in 81 patients of whom 25 were mildly anemic, 36 were moderately anemic and 20 were severely anemic. Thrombocytopenia was present in 19 patients out of which 4 were mildly, 6 were moderately and 9 severely anemic group. Thrombocytosis was seen in 10 patients of which 3 were mildly anemic, 3 patient was moderately anemic and 4 patient was severely anemic.

Table 5: Mean value of haematological parameters in various type of anemia

Heamatological Parameters	*IDA*	*ACD*	*A-CKD*	*UAE*
Mean Hb (g/Dl)	7.9	8.2	9.1	9.5
Mean MCV (fl)	79.5	77.9	81.6	75.2
Mean MCH (pg/RBC)	25.7	26.1	28.1	25.6
Mean MCHC (%)	31.5	33.2	32.1	32.2
FERRITIN (ug/L)	69.3	147.5	182.9	94.12
IRON (ug/L)	43.9	49.3	47.3	47.4
TIBC (Total Iron Binding Capacity)	358.9	331.5	302.1	306.3

The average levels of Hb (Hemoglobin) among the IDA, ACI, A- CKD and UAE was 7.9 gm/dl, 8.2gm/dl, 9.1 gm/dl and 9.5 gm/dl respectively. The average of MCV, MCH and MCHC in IDA was found to be 79.5fl, 25.7 hb/cell and 31.5% where as in Anemia of Chronic Inflammation it was seen to be 77.9fl, 26.1pg and 33.2%. In A-CKD average MCV was 81.6 fl, MCH was 28.1pg and MCHC was 32.1 % and in UAE it was 75.2 fl, 25.6pg and 32.2%.

The average levels of Ferritin among the IDA, ACI, A- CKD and UAE was 69.3µg/L, 147.5µg/L, 182.9µg/L and 94.12µg/L respectively. The average of Iron in IDA was found to be 43.9µg/L, where as in Anemia of Chronic Inflammation it was seen to be 49.3µg/L. In A-CKD average Iron was 47.3µg/L, and in UAE it was 47.4µg/L.

IV. Discussion

This study, conducted in a tertiary hospital, included 110 old age persons with anemia (hemoglobin less than 13 gm/dl in men and less than 12 gm/dl in women).

With regard to the various clinical features of anemia in old age in this study, the most common symptom was easy fatiguability which was seen in 74.54% of patients followed by abdominal distension seen in 22 % and palpitations in 9.09% of patients. These features corroborate closely with the results of the study by *A Bhasin et al*[1]. The clinical signs seen in this study was pallor in 92.72%, pedal edema in 20%, glossitis in 11.81%, koilonychia in 7.27%, splenomegaly in 6.36% and hepatomegaly in 5.45% and All the clinical signs were of higher incidence than that seen by *A Bhasin et al*[1] except pedal edema which was similar in incidence.

Regarding the age, the age in the present study population ranged from 60 to 96 years with the mean age being 68.04. This mean age is similar to the studies conducted by *Amit A Bhasin et al*[1], slightly lower than that seen in study by *Tettamanti M et al*[10] and *SR Srivastava et al*[11]. In the present study the maximum numbers of patients were in the age group between 60 and 75 years comprising 85 % of the study population and this is similar to the study by *Tettamanti M et al*[10]. The number of men (57%) with anemia is higher than

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that of women (43%) with anemia in the present study and this similar to the studies conducted by *Kaur et al*[5] and different from those by *Tettamanti M et al*[10] and *SR Srivastava et al*[11], in which the percentage of women with anemia was found to be higher.

Table 6: Comparison of peripheral smear findings in the present study with other studies

Peripheral smear	SR			
	Present Study (n=110)	Kaur et Al [10] (n=100)	Srivastava et al [9] (n=654)	Tettamanti M et al [8] (n=11608)
NCNC Anemia	50.9%	56%	69.80%	16.90%
MCHC Anemia	40.90%	34%	11.60%	72.30%
Dimorphic Anemia	4.5%	8%	4.44%	-

The examination of peripheral smears in this study showed normocytic normochromic anemia to be the commonest seen in 50.9% of the patients which is similar to the study by *Kaur et al*[5] and lower than that seen in *Tettamanti M et al*[10], and higher than that seen by *SR Srivastava et al*[11]. This is due to most anemia of chronic inflammation are normocytic. This is followed by microcytic hypochromic anemia which was found in 40.90% of patients which is slightly higher than that seen in the study by *Kaur et al*[5] and significantly higher than that seen in study by *SR Srivastava et al*[11],*Tettamanti M et al*[10]. Dimorphic anemia was seen in 4.5% of patients in this study which is slightly lower than that seen in study by *Kaur et al*[5].

Table 7: Comparison of etiology of anemia in the present study with other studies

	IDA	ACD	Unexplained Anemia	A- CKD	Megaloblastic Anemia
Present Study	41.81%	31.81%	12.72%	10.00%	3.63%
NHANES III[11]	14%	20%	34%	8%	14%
Tettamanti M Et al[8]	16%	17.40%	26.40%	15%	10.10%

Regarding the various etiologies for anemia the commonest cause in the present study was iron deficiency anemia which differed from other studies like National Health and Nutrition Examination Survey *(NHANES III)*[12], *Tettamanti M et al*[10], which show Unexplained Anemia to be the commonest cause. This is due to different dietary patterns and low socioeconomic status of patients in our study. The second most common cause for anemia in the present study was Anemia of Chronic Inflammation followed by anemia due to chronic kidney disease and unexplained anemia.

Regarding the iron parameters in normocytic normochromic anemia it was 114.2 μg/dl, in microcytic hypochromic anemia the ferritin values had a mean value of 58.6μg/dl, in dimorphic anemia it was 30.21 μg/dl which varied from other studies.

Of the 46 patients with iron deficiency anemia only 34 patients had peripheral smear showing the characteristic microcytic hypochromic picture even though the iron studies showed values suggestive of iron deficiency. Of the 46 patients only 6 patients had history of GI bleed. Hence chronic blood loss could not be attributed to the iron deficiency and the deficiency is probably due to nutritional causes since almost all of the persons in the study population belong to the low socioeconomic status.

While studies suggest that vitamin B12 (cobalamin) deficiency is the cause of anemia in 5–10% of elderly patients, the actual prevalence of vitamin B12 deficiency is likely to be much higher.[13] Vitamin *B12 deficiency is difficult to detect in the elderly. First, the symptoms and signs of vitamin B12 deficiency are not reliably present in the elderly. Only about 60% of such patients are anemic*. In addition, neurologic symptoms of B12 deficiency can develop before the patient becomes anemic.[14] *Second, although this anemia is usually macrocytic and megaloblastic, it can be normocytic or even microcytic. Third, serum B12 levels do not reliably reflect tissue B12 deficiency*. Up to 30% of patients with low-normal serum vitamin B12 levels have anemia and neurological disease.[15]

V. Conclusion

This study showed that the commonest cause for anemia among elderly patients is iron deficiency anemia followed by anemia due to chronic disease and both of these are mainly associated with the advanced age. Thus, anemia can be an important marker in the investigation of health in older adults. And also the study showed that anemia in elderly can be asymptomatic which is incidentally stumbled upon when one is evaluated for other symptoms. Not many clinical signs are consistent with anemia except for pallor even which can be absent in cases of mild anemia.

Even though iron deficiency anemia is the commonest cause the peripheral smear studies in this study showed that normocytic normochromic picture was the commonest even when MCV levels were suggestive of microcytic anemia.

Geriatric anemia is a disease that often goes unreported hence every effort should be made to

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identify the disease and evaluate the cause and it should not be ignored as merely being a part of ageing or due to nutritional deficiency and blanket treatment with hematinics should be avoided.

Acronyms

ACI- Anemia of chronic inflammation.

MCH- Mean Corpuscular Hemoglobin.

MCV- Mean Corpuscular Volume.

MCHC- Mean Cell Hemoglobin Concentration.

McHc ANEMIA - Microcytic Hypochromic ANEMIA.

NcNc- Normocytic Normochromic.

NHANES- National Health and Nutrition Examination Survey.

UAE/UA- Unexplained anemia of elderly.

WHO- World Health Organisatlon.

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