Original Article ▮

CLINICAL EVALUATION OF ANEMIA IN GERIATRIC PATIENTS - A CROSS SECTIONAL STUDY.CONDUCTED AT TERTIARY CARE HOSPITAL

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ABSTRACT

Introduction: Anemia in the elderly (age>65 years) is defined as a hemoglobin concentration below 12 gm/dl and 13gm/dl in women and men respectively. This decrease in oxygen carrying capacity can lead to overall decline in physical quality of life, disability and hospitalization at higher rates than those without anemia. In elderly population anemia is often taken as one of the age related changes, which is not a correct approach as anemia can never be a normal physiological phenomenon. In order to highlight this problem we conducted a cross section study of elderly population coming to medicine department for various medical ailments.

Methods: After taking informed written consent, patients were subjected to a detailed history, thorough clinical examination and various relevant investigations including bone marrow examination and radiological means.

Result: 42 patients (70%) were male and 18 patients (30%) were female. Maximum number of patients, 24 (40%) were in the age group 65-69 years. Out of which 15 (62.5%) were male and 9 (37.5%) were female.

Conclusion: Among all the patients (irrespective of age groups and types of anemia), ACD was found to be most common (41.67%), followed by IDA (35%), MDS (5%), Megaloblastic anemia (3.34%), myelofibrosis and haemolytic anemia (3.34% each) and aplastic anemia (1.67%).

Key words: Anemia, Elderly, Hemoglobin, Chronic disease, Blood picture

Acronyms:

ACD: anemia of chronic disease;	IDA: iron deficiency anemia;	CLD: chronic liver disease;
MCHC:microcytic hypochromic;	NCNC: normocytic normochromic;	CLL: chronic lymphoid leukemia ;
MCV: mean corpuscular volume;	CA: carcinoma	UTI: urinary tract infection
LGI : lower gastrointestinal;	UGI: Upper gastrointestinal	CML: chronic myeloid leukemia
MCHC: mean corpuscular hemoglobin concentration;	Hb: hemoglobin	
MCH: mean corpuscular hemoglobin;	CRF: chronic renal failure	

INTRODUCTION

Anemia refers to a state in which the level of hemoglobin in the blood is below the normal range appropriate for age and sex. Anemia in the elderly (age>65 years) is defined as a hemoglobin concentration below 12 gm/dl in women and below 13gm/dl in men. Older persons with anemia suffer disability, physical decline and hospitalization at higher rates than those without anemia. [1, 2]

The percentage of elderly population (> 65 years) in India is 4.8% (4.4% males and 5.3% females). [3,4] Anemia can never be considered normal in old age. There are 3 major classes of anemia namely Marrow production defects (Hypo-proliferation), Red cell maturation

defects (Ineffective erythropoiesis) and Decreased red cell survival (Blood loss/ hemolysis).[5,6] Acquired Sideroblastic, Anemia of chronic disease and Myelodysplastic syndromes are seen more often in elderly.[7, 8] The most common causes of anemia in the elderly are chronic disease and iron deficiency. Vitamin B_{12} deficiency, folate deficiency, gastrointestinal bleeding and myelodysplastic syndrome are among other causes of anemia in the elderly. Serum ferritin is the most useful test to differentiate iron deficiency anemia from anemia of chronic disease. The serum methyl-malonic acid level may be useful for diagnosis of vitamin B_{12} deficiency. Vitamin B_{12} deficiency is effectively treated with oral vitamin B_{12} supplementation. Folate deficiency is treated with 1 mg of folic acid daily [9]. Parameters such as serum albumin, transferrin, transferrin saturation, cholesterol, cholinesterase, vitamin B12, folic acid, zinc, and absolute lymphocyte count are useful to assess the nutritional status.[9] More than two-thirds of anemia in the elderly can be attributed to two major causes, nutritional deficiencies, and anemia of chronic disease. As many as 33% of geriatric anemia's remain unexplained and their pathogenesis remains speculative.[11]Conjunctival pallor is a reliable sign and its presence should prompt clinician to order blood tests for anemia.[12]

In the Indian context, where the health services are still inadequate for a major chunk of the population, a systematic study is required to understand the pattern and prevalence of anemia in the elderly age group. Despite extensive search of literature we were not able to find any study showing the pattern of anemia in elderly population from India, more so from the state of Uttarakhand. Thus the present study was planned to study the patternand cause of anemia in elderly in order to properly diagnose and manage these cases.

MATERIALS AND METHODS

This study was conducted in geriatric patients attending medical outpatient department (OPD) or admitted in medical wards at HIMS, Dehradun over a period of 12 months after taking written informed consent and clearance from institutional ethical committee. (IEC) .Catchment area of hospital includes Garhwal region of Uttarakhand, SharanpurDistt. and adjoining areas of Western Uttar Pradesh. Inclusion criteria include all patients above 65 years of age with anemia, as per WHO criteria[13].Anemia in the elderly (age>65 years) is defined as a hemoglobin concentration below 12 gm/dl in women and below 13 gm/dl in men.Exclusion criteria include patients not willing to undergo the study. All patients were subjected to a detailed history, thorough clinical examination and investigations according to working Performa.

Investigations includes- Hemoglobin, Total red blood cell (TRBC) per mm³), Total leukocyte count- using Neubaeur's chamber (TLC). Differential leucocytes count (DLC). Platelet Count (Lac/ mm³), Packed cell volume, (hematocrit) by Wintrobes method (PCV), Mean corpuscular volume (MCV), Mean corpuscular hemoglobin (MCH) (%), Mean corpuscular hemoglobin concentration (MCHC) (pg), ESR (Erythrocyte sedimentation rate), Reticulocyte Count, General Blood Picture (GBP) for assessment of abnormal red cells morphology and platelet morphology and count, Chest X-ray, Urine (R/M), Blood sugar, Stool-routine, microscopic and culture sensitivity, USG- abdomen, Bone Marrow examination (The posterior iliac crest used for both marrow aspiration and biopsy under anesthesia)

Table 1: **Distribution of male and female patients according to age group, severity and type of anemia**

	Male (n=42) (%)	Female (n=18) (%)	Total (n=60) (%)	OR (95%CI)	P-Value
Age group					
65-69	15 (35.71)	09 (50.00)	24 (40.00)		
70-74	17 (40.47)	06 (33.33)	23 (38.33)		
75-79	07 (16.67)	02 (11.11)	09 (15.00)		
≥80	03 (07.14)	01 (05.55)	04 (06.66)		
Severity of anemia (gm %)					
Mild (≥ 10 Hb)	05 (11.90)	06 (33.33)	11 (18.33)	0.27 (.6-1025)	0.109
Moderate (7 – 9.9 Hb)	19 (45.23)	09 (50.00)	28 (46.67)	0.83 (.24-2.86)	0.95
Severe (< 7 Hb)	18 (42.85)	03 (16.66)	21 (35.00)	3.75 (.83-19.2)	0.09
Type of anemia					
MCHC	15 (35.71)	09 (50.00)	24 (40.00)	0.56 (.16-1.96)	0.45
NCNC	22 (52.38)	08 (44.44)	30 (50.00)	1.38 (.40-4.82)	0.77
Macrocytic + macronormocytic	05 (11.90)	01 (05.55)	06 (10.00)	2.30 (.23-56.1)	0.77

Table 2: Mean value of haematological parameters in various types of anemia

Haematological parameters	MCHC (n=24)	NCNC (n=30)	Macrocytic + macro-normocytic (n=6)
Hb (gm %)	7.33 ± 2.28	8.42 ± 1.91	7.3± 1.59
MCV (fl)	68.68 ± 9.60	85.17± 7.4	100.05± 10.33
MCH (pg)	21.88 ± 3.97	29.64± 3.20	33.6± 4.65
MCHC (gm/dl)	32.29 ± 2.88	34.58± 2.31	34.71± 2.6
S. Ferritin (μ/l)	70.58±183.66	424.67±391.48	261.33± 148.86

For hematological parameters values given in Wintrobe´s clinical hematology were taken as standard. The mean ferritin value for normal adult men is 92-95µg/L, and for women approx. 35µg/L[14] Serum Ferritin was determined quantitatively by immunometric enzyme immunoassay using the ORG 5FE Ferritin kit.

Anemia was classified as mild, moderate or severe based on the hemoglobin levels according to WHO criteria[15]: Mild anemia: 10 gm% to below cut off level, Moderate: 7- <10 gm% and Severe: < 7 gm%.Patients with microcytic anemia (MCV <80) were evaluated on the basis of serum ferritin levels. Patients with serum ferritin levels < 45 µg/l were included in iron deficiency anemia and more than 100 were considered to be in category of anemia of chronic disease. In patients with serum ferritin level between 45 and 100, bone marrow iron stores were studied and patients with low bone marrow iron stores were classified as IDA and those with normal or high marrow iron stores were classified as Anemia of Chronic Disease. (ACD).[16] Data collected and presented in form of number/ percentage for qualitative variables and mean with standard deviation for continuous variables.

RESULTS

Out of 60 study subjects 40% were in the age group of 65-69 years, followed by 38.33% 70-74 years, 15% 75-79 years and 6.66% 80 years and above. Maximum number of elderly (46.67%) had moderate type of anemia.

Maximum numbers of elderly (50%) were having NCNC anemia followed by MCHC 40.40% and Macrocytic + macronormocytic 10%.

Table (2) shows that mean value of hemoglobin (8.42±1.91) and serum ferritin (424.67±391.48) was more in NCNC group than MCHC and Macrocytic group. Mean value of MCV, MCH and MCHC was more in macrocytic group.

Above table (3) shows that number of patients (87.5%) was more in Iron deficiency anemia as compared to Anemia of chronic disease (12.5%). The number of patients (73.34%) was more in anemia of chronic disease than myelofibrosis, aplastic anemia, hemolytic anemia and unexplained anemias.

Table 3: Distribution of patients according tomorphologic types and etiological causes of anemia in all categories

Type and Etiology of anemia	Patients (n=60)
MCHC	
IDA	21
ACD	3
NCNC	
ACD	22
Myelofibrosis	2
Aplastic Anaemia	1
Haemolytic Anaemia	1
Unexplained Anaemia	4
Macrocytic	
Megaloblastic Anaemia	2
Myelodysplastic Syndrome	3
Haemolytic Anaemia	1

Table 4: Mean values of hematological parameters in various types of anemia (pathological).

Haematological Parameters	Iron Deficiency Anaemia (Mean ± SD)	Anaemia Of Chronic Disease (Mean ± SD)	Megaloblastic (Mean ± SD)
Hb (g/dl)	7.1 ± 2.29	8.44 ± 1.65	7 ± 0.14
MCV (fl)	67.94 ± 9.48	83.2 ± 8.74	107.65 ± 7.28
MCH (pg)	21.52 ± 3.9	28.7 ± 3.82	37.75 ± 1.90
MCHC (%)	32.21 ± 2.95	34.2 ± 2.6	35.1 ± 0.56
S. Ferritin	17.38 ± 11.75	504 ± 411.49	116 ± 5.65

As shown in table (4) mean value of MCV, MCH, MCHC and serum ferritin was less in Iron deficiency anemia whereas mean value of hemoglobin was less in megaloblastic anemia.

Majority of patients with IDA had GI blood loss as the cause of anemia. Out of 12 patients with UGI cause of blood loss, erosive gastritis, duodenal ulcer was found in 3 (25%) patients. 2 (16.6%) had duodenitis and Ca esophagus. 1 (8.3%) was found to have Ca stomach and 1 (8.3%) had a benign esophageal polyp. Of the 5 patients with LGI blood loss, 2 (40%) had worm infestation and 1 of each diverticulitis, colitis and anal fissure with hemorrhoids was found.

Of the total 25 patients with ACD, 14 (56%) had anemia due to non-malignant causes whereas 11 (44%) had ACD due to malignant cause. Above table shows that the most common cause of ACD was Hematological malignancy (40%), followed by CRF (20%) and other causes.

Table 5: Distribution of patients according to various etiological causes of anaemia

Causes	Patients (n=60) (%)
ACD	25 (41.67)
IDA	21 (35)
Megaloblastic	2 (3.34)
Myelodysplastic Syndrome	3 (05)
Myelofibrosis	2 (3.37)
Aplastic Anaemia	1 (1.67)
Haemolytic Anaemia	2 (3.37)
Unexplained	4 (6.67)

Table 6 –Distribution of patients with IDA and ACD according to cause

Causes	Patients
IDA (n=21)	
GI Blood Loss	16
Lower GI	11
Upper GI	4
Both	1
Nutritional	05
ACD (n=25)	
Hematological Malignancy	10
CRF	05
RA	01
Hypothyroidism	01
Pulmonary T.B	04
CLD	02
UTI	01
Ca Kidney	01

DISCUSSION

Of the total 60 patients, the total number of patients in age group 65-69 years was highest (40%)may be due to presence of larger number of individuals of this age group in our country.Majority of patients (46.67%) had moderate anemia, while around 35% of the patients had severe anemia. This may be due to poor nutritional status of our patients andinability to seek medical advice.

In our study, normocytic anemia was the most prevalentaccounting for 50% of all the cases. In a study by Ania et al.[16] among males anemia was microcytic in 14% , normocytic in 83%, and macrocytic in 3%, and in women it was microcytic in 16%, normocytic in 80%, and macrocytic in 4% of cases. Hence our study closely tallies with this study, depicting normocytic anemia being the most common in males.

Chernetskyet al.[17] has shown that most common anemia ischronic disease (65.6%). Anemia primarily found due to Iron, VitB12 or folate deficiency was found to be only 4%. Whereas in our study, a significant proportion of the cases accounted for this, being 38% of all the cases. This difference may be due todifference in the dietbetweentwo populations. Guralniket al.[18] revealed that 16.6%had only iron deficiency, 6.4% had folate deficiencyand 5.9%had B12 deficiency. Our findings corroborates with this study. Gordon et al.[19] have shown that serum ferritin is the best test to distinguish those with iron deficiency from those who were not iron deficient.In our study, 37% of the totalhad absent to reduced iron stores with 32%having normal iron stores. Lipschitz et al.[20] and Cash et al.[21] have shown that ACD is the most common form of anemia in the elderly and so wasinour study, 25 (42%).

Overall our results were comparable to a study conducted by Joostenet al.[22] in which ACD was the most common cause of anemia in 178patients accounting for 35% cases.

In microcytic hypochromic anemia group, iron deficiency was the most common type (about 87%), followed by anemia of chronic disease (12.5%).UGI en-doscopy and / or colonoscopy were performed in all 21 cases of IDA. According to etiological cause of IDA, 16 patients were detected to have GI blood loss whereas in 5 cases ofIDAno lesion could be detected.

In the study by Cobanet al.[23] the prevalence of anemia was found to be 25% (n=347) in the study population, and 30.5% (n=106) of these patients had IDA.They revealed history of smoking and/or NSAIDs in 42 (76%) patients with UGI lesions. Hence our study also corroborates with the findings.

Aniaet al.[24] reported that in 17% of patients admitted, no underlying cause for the anemia found. This can be explained partly by an incomplete diagnostic evaluation. Guralniket al.[18] found that in about33% cases, pathogenesis remains speculative. Potential explanations could be low testosterone, occult inflammation, and reduced hematopoietic reserve. Artzet al.[25] showed that 14% to 50% of anemic elderly had no obvious underlying cause. In our studyunexplained anemias constituted only 7%. These results are comparable to a study done by Joostenet al.[22] where anemia of chronic disease was the most common cause.

CONCLUSION:

This study concluded that all types of anemias are seen in elderly individuals with highest proportion of normocytic normochromic anemia. Chronic disease was responsible for more cases of anemia than iron deficiency. However etiologicalanalysis indicate that it is critical to comprehensively evaluate the etiology andtreat anemia in this population and not to consider anemia a natural consequence ofageing.

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