Original Research Article

Pattern of anemia in elderly patients

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ABSTRACT

Background: Anemia is one of the common significant factors responsible for the morbidity and mortality in elderly patients of age 60 years and above. The present was done with the aim to assess the consequences of anemia, and potential etiologies that increase risk of adverse events in geriatric population.

Methods: This was a prospective observational study conducted at the department of pathology at Pt. Jawaharlal Nehru Medical College and associated Dr. B. R. A. M. Hospital, Raipur, Chhattisgarh, during the period from December 2011 to December 2012. A total of 150 patients with hemoglobin <12 gm% in female and <13 gm% in male satisfying the WHO criteria of anemia (hemoglobin (Hb) were included in the study. Detailed laboratory investigation of haemoglobin and relevant diagnostic tests were done in all the patients to identify the etiology.

Results: The prevalence rate of anemia was 68.67%. Proportion of anemia in males was 56.6% and in females it was 43.4%.Fatigue was the most common symptom found in 87.88 % of patients. Overall mean MCV values in the study population were 80.12±10.71 (fL). Most of the patients were mild anaemic (45.3%). Normocytic-normochromic type of anemia was the most common type constituting 64%.

Conclusions: There are no specific clinical guidelines to manage geriatric anemia at present. It is clear that anemia in the elderly should be evaluated, and the underlying cause should be identified at the earliest and treated whenever possible.

Keywords: Anemia, Etiology, Geriatrics

INTRODUCTION

Anemia is very common in geriatric age group.[1] For many years, anemia in older persons was not considered a serious clinical condition by many physicians. It was instead thought to be either an insignificant finding in an otherwise healthy patient, or a comorbidity that compounded the complexity of managing a patient with other disease.[2]

Using World Health Organization criteria (established in 1968),hemoglobin (Hb) is <13g/dl and HCT is <0.39 (39%) in male and, Hb is <12 g/dl and HCT is <0.36 (36%) in females, the prevalence is found to range from 8 to 44%, with the highest prevalence in men of 85 years of age and older. Population based studies in Great Britain have reported prevalence ranging from 5% to 25%.[1]

The condition of anemia is overlooked in elderly patients as the common symptoms of anemia such as fatigue, weakness, shortness of breath are usually been attributed to the ageing process.[3] Other co-morbid conditions such as diabetes, hypertension, renal disease and malignancies may worsen the anemic condition. Anemia may also exert an adverse effect on depressive state and decreased cognitive ability. Increasing functional deterioration is

associated with decreasing hemoglobin concentration in an inverse and linear manner. Thus, the finding of even mild anemia in an elderly nursing home patient may be a good reason to pursue the cause and consider an intervention.[4,5]

The current study was done with the aim to discuss the rationale for increased awareness of anemia, the consequences of anemia, and potential etiologies that increase risk of adverse events in elder population.

METHODS

The present study was a prospective observational study conducted at the department of pathology at Pt. Jawaharlal Nehru Medical College and associated Dr. B.R.A.M. Hospital, Raipur Chhattisgarh, during the period from December 2011 to December 2012. After getting approval from Institutional ethics committee and getting informed consent from the patient's elderly patients aged 60 years and above attending the clinical pathology and haematology section for routine investigations were selected for the study.

All elderly patients (age >60 years) of both sexes with Hb <12gm% in female and <13 gm% in male satisfying the WHO criteria of anemia (estimation of Hb) were included in the study.[6] Exclusion criteria were patients with history of acute blood loss (e.g. surgery or severe trauma), recent blood transfusion history or patients on chemotherapy or radiotherapy.

All the patients were clearly explained about the nature and purpose of the study. A detailed history of anemia and its symptoms (such as fatigue, weakness, shortness of breath, palpitation) were elicited. History taking including family history, medical history, and lifestyle data were obtained by interview. Blood pressure, height, and weight were measured. Patients were also analysed based upon underlying co morbid conditions, dietary habits, medication usage and presence of parasites and blood in the stool. Then blood sampling was conducted. The study protocol was prepared as per the procedure adopted by Bhasin et al, for determining the characteristics of anaemia in elderly patients.[7]

The following initial investigations were carried out in all patients starting from Hb, total leukocyte count (TLC), differential leukocyte count (DLC), erythrocyte sedimentation rate (ESR), mean corpuscular volume (MCV), mean corpuscular hemoglobin concentration (MCHC), mean corpuscular hemoglobin (MCH) and packed cell volume (PCV), reticulocyte count, platelet count, peripheral smear and solubility test (keeping in mind high prevalence of SCA screening).

Taking into consideration absolute values and peripheral blood smear, anemia was classified into different morphology. According to the World Health Organization (WHO) criteria, anemia was defined as a hemoglobin level of less than 13 g/dl in men and less than 12 g/dl in women. Mean corpuscular volume (MCV) was used to classify the anemia as microcytic (<80 fl), normocytic (80–100 fl), or macrocytic (>100 fl). Iron deficiency anemia (IDA) was defined by serum ferritin level, using a cut off of 12 ng/ml. All the patients were classified according to the severity of anemia. They were classified into mild grade (Hb>10 gm/dl), moderate grade (Hb between 7-10 gm/dl) and severe grade (Hb<7 gm/dl), and Mild anemia was further defined as a hemoglobin concentration of 100-130 g/l in men and 100–120 g/l in women.

Further etiological classification was done with the help of other biochemical and radiological investigations as per directed by patients' clinical profile and morphological type of anemia. Depending on the results of these studies further specialized laboratory procedures were carried out as per feasibility to arrive at a definitive diagnosis, such as bone marrow examination, hemoglobin electrophoresis, serum ferritin, vitamin B12 and folate assay, stool for ova cyst and occult blood etc. Serum ferritin assay was done in patients showing microcytic hypochromic blood picture.

Bone marrow studies (aspiration/biopsy) were carried out in patients with blood smear showing immature white cells or nucleated red cells, indeterminate status of iron stores and unexplained progressive or unresponsive anemia. Vitamin B_{12} and folate assays were done for dimorphic and macrocytic anemia or in patients with normocytic blood picture in whom no other cause could be found.

Additional investigations as indicated for detection of underlying cause including chest X-ray, ultrasonography (USG) of abdomen and pelvis, stool for parasites and occult blood, serum electrophoresis, tissue biopsy, imaging-computed tomography (CT)/magnetic resonance imaging (MRI), anti-nuclear antibodies (ANAs), upper GI endoscopy and colonoscopy were also recorded. Patients were also evaluated for an underlying malignancy if there was suspicion of the same, based on clinical symptoms, laboratory parameters or imaging studies. Hence, patients were classified according to the underlying etiology. All the data was collected, analysed and presented in number and percentages using Microsoft excel.

RESULTS

A total population of 6360 elderly patients was screened for anemia during the study period. Among them, 4368 were found to be anaemic. Overall prevalence of anemia in elderly patients was 68.67%, observed in the present study. Out of the total 4368 anaemic elderly patients, 150 patients admitted in medicine ward were studied further to know the existing pattern of anemia. In the present study, age of the study population ranged from 60 years to 94 years. The maximum numbers (109) of the patients

were in the age group 60-69 years. Among them 55.96% were males and 44.03% were females (Table 1).

Table 1: Age and sex wise distribution of study participants.

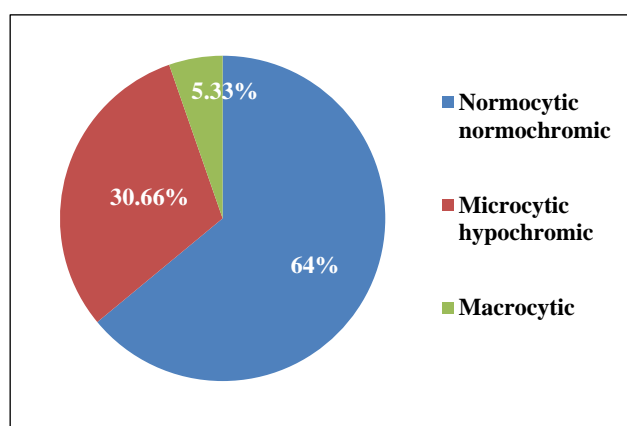| Age (in years)	Sex				Total
	Male		Female		
	N	%	N	%	
60-69	61	55.96	48	44.03	109
70-79	23	60.52	15	39.47	38
Above 80	01	33.33	02	66.66	03
Total	85	56.6	65	43.4	150
>100 (macrocytic)	08	5.33	105.57±4.739		
Total		150	100	80.12±10.71	

Figure 1: Morphological patterns of anemia.

Table 2: Distribution of study participants as per the clinical patterns of anaemia.

Variables	Anaemic patients		Mean value of Hb (in gm/dl)
	N	%	
Hemoglobin values (in gm/dl)			
Lower limit of normal-10 (mild anemia)	63	45.33	11.09±0.706
7-10 (moderate anemia)	57	33.33	8.83±.88
<7 (severe anemia)	30	21.33	5.33±1.178
Total	150	100	9.08±2.309
Mean MCV(in fl)			
<80 (microcytic)	46	30.66	71.1±13.26
80-100 (normocytic)	96	64.00	88.01±5.32

Based on the data of laboratory investigations, all the patients were classified according to the severity of anemia (Table 2). Out of total 150 patients, 45.33% were mildly anaemic, 33.33% were moderately anaemic and 21.33 were severely anaemic. Overall mean MCV values in the study population were 80.12±10.71fl.Maximum numbers of elderly patients (n=96) were having the mean MCV value of 88.01±5.32 fl.

According to peripheral smear findings the most common type of anemia was normocytic-normochromic which was seen in 96 (64%) elder patients (Figure 1).

Table 3: Symptoms and signs of anemia in study population.

Clinical features	Peripheral smear findings				Total
	Pancytopenia	Normocytic normochromic	Microcytic hypochromic	Macrocytic	
Symptoms					
Fatigue	2	5	38	6	131
Exertionl dyspnea	1	25	18	4	48
Palpitation		18	10	2	30
Anorexia	1	10	15	5	31
Weight-loss		12	18	3	33
Signs					
Pallor	1	72	42	8	123
Edema		30	9	2	41
Tachycardia	1	40	18	3	62
Lymphadenopathy		2	1		3

Out of the 150 patients, 46 had underlying microcytic-hypochromic anemia. Of them, 25 (54.34%) patients showed positive stool occult blood test.

Twenty one patients had absolute iron deficiency having serum ferritin values less than 20 ng/ml. Twenty patients had no iron deficiency having serum ferritin values more

than 100 ng/ml. Five patients had serum ferritin values in between (20-100 ng/ml).

Majority of the patients (22) had iron deficiency anemia, which was followed by anemia of chronic disease with 21 cases. No cause could be identified in two patients and one patient had anemia due to acute blood loss. Most common cause of iron deficiency was found to be due to chronic blood loss through the gastrointestinal tract (N=9), followed by underlying malignancy (n=1) and nutritional deficiency (n=1). No cause could be identified in one patient.

For detailed gastrointestinal evaluation, gastrointestinal endoscopy and colonoscopy was done in selected patients. The most common finding observed by endoscopy was varices followed by active peptic ulcer. Upper GI endoscopy was normal in five patients. On colonoscopy, haemorrhoids were detected in two patients and anal fissures were detected in one patient.

Table 4: Distribution of microcytic hypochromic anaemic patients according to clinical investigations (n=46).

Investigations	Numbers of patients (N)	Percentages (%)
Stool occult blood test		
Positive test	25	54.3
Negative test	21	45.6
Ferritin value		
Ferritin (<20 ng/ml)	21	45.6
Ferritin (20-100 ng/ml)	05	11.1
Ferritin (>100 ng/ml)	20	44.4
Underlying etiology		
Iron deficiency anemia	22	47.8
Anemia of chronic disease	21	45.6
No underlying cause identified	2	4.34
Acute blood loss	1	2.17
Underlying causes		
Chronic blood loss	19	41.3
Malignancy	1	2.17
Nutritional	1	2.17
No cause identified	1	2.17
Upper GI endoscopic findings		
Varices	6	13.0
No abnormality detected	5	10.8
Active peptic ulcer	4	8.69
Active antral gastritis	3	6.52
H. pylori induced gastritis	1	2.17
Colonoscopic findings		
Hemorrhoids	2	4.34
Anal fissures	1	2.17

Normocytic-normochromic anaemic patients

Majority of the normocytic normochromic patients, had anemia of chronic disease (n=94). No cause was identified in two patients. The most common cause of anemia of chronic disease was found to be an underlying renal disease in 58 patients followed by tuberculosis in 12 cases, consolidation in 9, cardiac disorders in 4, liver disorders in 4, acute infections 4, osteoarthritis 1, and rheumatoid arthritis in 1 patient and malignancy in 2 patients.

Table 5: Distribution of patients as per underlying etiology in normocytic normochromic anaemic patients (n=94).

Underlying diseases	Numbers of patients (N)	Percentages (%)
Renal diseases	58	61.7
Tuberculosis	12	12.7
Consolidation	9	9.57
Cardiac disorders	4	4.25
Liver disorders	4	4.25
Acute infections	4	4.25
Malignancy	2	2.12
Osteoarthritis	1	1.06
Rheumatoid arthritis	1	1.06

Macrocytic anemia

Out of the total 150 patients, 8 patients were of macrocytic anemia. Analysis of the underlying co-morbid diseases and infections was done in this group. Out of the eight patients 5 were of liver diseases. There was one patient each of vitamin B_{12} deficiency, myelodysplastic syndrome, and irritable bowel syndrome.

Underlying diseases	Numbers of patients (N)	Percentages (%)
Liver disorders	5	62.5
Vit. B_{12} deficiency.	1	12.5
Myelodysplastic syndrome	1	12.5
Irritable bowel syndrome.	1	12.5

Serum ferritin levels were estimated in all the patients having a macrocytic blood picture. It was found that all the patients had values more than 100 ng/ml. None of the patients had stool occult blood test positive.

Co-morbid disease conditions

Diabetes mellitus

A total 40 out of the 150 anaemic patients were diabetic. Most of the patients were in the age group of 60-69 years. Thirty four out of the 40 patients had normocytic-

normochromic blood picture based on the peripheral smear finding, and 6 patients had microcytic-hypochromic blood picture. Out of the total 40 patients, 29 patients were on some form of the treatment for diabetes.

Renal disease

Sixty two out of the total 150 patients had an underlying renal disease. 47 patients had normocytic-normochromic blood picture and 15 had microcytic-hypochromic blood picture. The range of serum creatinine was from 1.5 to 16.2 mg/dl. The most common underlying etiology for the renal failure was diabetes mellitus in 30 patients followed by hypertension, and prolonged NSAIDs use.

Malignancy

Four percent (4%) of the patients had an underlying malignancy. Normocytic-normochromic anemia was the most common blood picture in patients having an underlying malignancy. Two patients were pancytopenic, in whom one was associated with microcytic-hypochromic type of blood picture and another one was associated with normocytic- normochromic type of blood picture.

DISCUSSION

In the present study all the elderly patients aged 60 years and above attending the clinical pathology and haematology section for routine investigations were screened for presence of anemia according to WHO criteria of anemia (Hb<13 g/dl in male and, Hb<12 g/dl in female). The overall prevalence of anemia was found to be 68.67%predominantly in males than in females. This was in consistent with the findings of Shrivastava et al.[7] The findings in the present series are found to be lower than those of Ghosh et al.[8] In his study the prevalence rate of anemia in elderly population was 89.5%.

In the present study the maximum numbers of anaemic patients were found to be in age group of 60-69 years with the mean age 65.62 years. This was closely corroborates to the reports of William et al, and Kim et al.[9,10]This study does not corroborate to that of Choi et al, and Tettamanti et al.[11,12] In all these studies the maximum numbers of elderly anaemic were found in the age group 70-79 years.

In the present study, the male to female ratio of elderly anaemic was 1.3:1. Signifies that anemia was more prevalent in males as compared to females. This finding closely corroborates to that of Ramachandra et al.[13] Shavelle et al, and Tay et al, found equal number of male and female elderly anaemic cases in their study.[2,14] In another study by Choi et al the total number of elderly anaemic females were found to be more as compared to total number of males.[11]

In our series, the mean haemoglobin level in the study geriatric population was 9.08±2.309 g/dl. This was similar to the reports of Ghosh et al study which showed high prevalence of anemia because of low socio-economic conditions and undernutrition.[8]

In present study out of the total 150 patients the 45.33% were mildly anaemic, 33.33% were moderately anaemic and 21.33% were severely anaemic. Therefore, in the present study the maximum number of patients had mild degree of anemia. This finding is consistent with Shavelle et al, and Tettamanti et al.[2,12]

Macrocytic anemia is described as anemia with MCV>100 fl. MCV increases slightly with increasing age but usually not enough to produce significant macrocytosis. The common disorders that produce macrocytosis are megaloblastic anaemias due to either vitamin B12 or folate deficiency. In the present series the mean MCV finding was of 80.12±10.7 fl. Kim et al study showed mean MCV of 95.9±4.9 fl for men and 92.4±3.8 fl for women.[10] Choi et al showed mean MCV of 96.6±5.1 fl in men and 94.5±4.5 fl in women.[11] Mean MCV finding of present study was lower as compared to both above mentioned studies and higher than Rockey et al, study that showed mean MCV of 71.5±10.0 in elderly anaemic patients.[15] Therefore it shows that on the basis of MCV normocytic-normochromic anemia was the most common pattern in the present study.

In the present study majority of anemia cases were normocytic-normochromic anemia in 64% patients, followed by microcytic-hypochromic anemia in 30.66% patients, and macrocytic anemia in 5.33% patients. The most common pattern of anemia in the present study was normocytic–normochromic type. This finding closely corroborates to those of study by Bhasin which was also a hospital based study done on 100 anaemic elderly patients in South India.[1]

The underlying etiology of anemia in present study was anemia of chronic disorders (ACD) accounted for 76.66% (115/150) cases, iron deficiency anemia (IDA) was observed in 22/150, MDS in 1 case, vitamin B12 deficiency in 1 case, and in remaining 16/150 cases (including two pancytopenic cases) no underlying etiology (UA-unexplained anemia) was identified. These results were consistent with the studies by Kim et aland Choi et al.[10,11] The main etiology of anemia in these studies was found to be ACD, and underlying causes of chronic diseases were, diabetes, hypertension, tuberculosis, liver disorders, arthritis, heart failure, malignancies, and renal insufficiency.

As the high prevalence of iron deficiency anemia (IDA) signifying a potential gastrointestinal tract lesion that leads to chronic blood loss through the GI tract. In present study, among the elderly patients with IDA, an upper GI lesion found in 63.3% of the patients (most common finding was varices followed by active peptic

ulcer and active antralgastritis) and a colonic lesion was found in 2% of the patients which is in agreement with study of Rockey et al.[15] The present study is also comparable to Bhasin et al study, in which an upper GI lesion was found in 78.6% of the iron deficient patients.[1]

Bone marrow evaluation has been considered the criterion standard for iron deficiency. However, in addition to cost and inconvenience, bone marrow examinations can be highly misleading and may require up to 7-9 aspirate smears to confidently prove iron stores are absent. Thus, serum ferritin remains the standard test to exclude iron deficiency in the elderly.

In present study 21 of the total 46 (microcytic-hypochromic group) patients were classified as absolute iron deficient (serum ferritin was <20 ng/ml), 22 were classified as anemia of chronic disease (serum ferritin was >20 ng/ml in these cases) and in rest of the 5 patients serum ferritin was in the range of 20-100 ng/ml. This finding is consistent with Bhasin et al.[1]

CONCLUSION

The study concludes that it is very important to evaluate the prevalence and type of anemia in geriatric population. Undergoing blood routine investigations regularly helps in identification of the anemic condition and timely intervention of which in turn helps in improvement of overall outcome and quality of life in elderly population.

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