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Prevalence and pattern of anemia in elderly- A hospital based study

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Abstract

Anemia in the elderly is an extremely common problem that is associated with increased mortality and poorer health-related quality of life, regardless of the underlying cause of the low hemoglobin. A cross sectional study was conducted in the Department of Pathology, Assam Medical College and Hospital, Dibrugarh, in collaboration with the Department of Medicine. The purpose of this study was to study the prevalence of elderly patients with anemia and to study the pattern of anemia in such patients as well as the closest possible etiological profile. Prevalence calculated was 77%. Hundred patients above the age of 60 years were included for studying the pattern of anemia. Clinical profile with laboratory studies of Hemoglobin and diagnostic tests were done to know the etiology. Majority of patients had normocytic blood picture constituting 53%, microcytic 26%, macrocytic/dimorphic 13% and pancytopenia in 8%. Anemia of chronic disease was the commonest cause of anemia followed by iron deficiency anemia. 53/100 patients had normocytic blood picture. 45 out of 53 patients had serum ferritin levels more than 100ng/ml. 13/26 of cases showing microcytic anemia had ferritin levels <20ng/ml and 5/26 had no evidence of iron deficiency have ferritin values >100ng/ml. None of the cases with macrocytic anemia and pancytopenia had serum ferritin values <100ng/ml. This shows that serum ferritin closely correlates with iron stores. Absence of iron capable of being stained by pearls stain is considered to be a reliable parameter of iron deficiency. Serum ferritin together with pearls stain in bone marrow is considered to be a reliable parameter of iron deficiency anemia. Confirming the type of anemia is critical to direct the investigation for profiling the etiology since it is well known that the treatment of anemia goes a long way in improving the overall outcome and quality of life.

Keywords: Anemia, Geriatric, iron deficiency, Anemia of chronic disease, Etiology

Introduction

The life expectancy and the quality of life of the elderly have improved dramatically in recent decades. Global aging is occurring at a record breaking rate. The world health organisation reports that by 2050, one fifth of the global population will be adults 65years and older.¹

The 85 and older age group is the fastest growing segment of the elderly population. The elderly can be roughly divided into three age categories:

- (1) The young-old age : 65–74 years
- (2) The old-old age : 74–84 years
- (3) The very old age : 85 years and older

With increase in the aging population, the incidence of age related health conditions also is likely to increase. Anemia is common in the elderly and can have significantly more severe complications than anemia in younger adults. All the types of anemia are known to occur in this age group.²A recent review of studies of anemia in elderly patients (BMC Geriatrics, 2008) confirms that, hemoglobin levels decline with age and anemia is considered to be an important health problem among older individuals. It affects 1 in every 7 or 8 person over 65 yrs living in the community. In older people admitted to hospital or nursing homes anemia is even more common, affecting almost 1 in 2.²Anemia is defined as a reduction in the number of circulating red blood cells, or the hemoglobin concentration in the blood. World Health Organization (WHO) defined it as a hemoglobin (Hb) level <13 g/dL in men and <12 g/dL in women.³Anemia in the elderly is an extremely common problem that is associated with increased mortality and poorer health-related quality of life, regardless of the underlying cause of the low hemoglobin. It is also easy to overlook anemia in the elderly since such symptoms as fatigue, weakness, or shortness of breath may be attributed to the aging process itself. However, anemia should not be accepted as an inevitable consequence of aging. Anemia in the elderly can occur in both acute and chronic settings. Multiple pathophysiologic abnormalities in a single elderly patient with anemia are

well known. It is essential therefore that the treating physician is aware of the coexistence of anemia in elderly, although the presenting manifestation may be for a different reason. It becomes therefore pertinent all the more to look for severity of anemia, type of anemia, possible etiologies and appropriate correction. Untreated geriatric anemia is associated with greater risk of death, greater risk of comorbidities, and impaired functional status.⁴ Despite the high prevalence of anemia in the elderly and the increasing size of the geriatric population, few studies have examined the effects of anemia on elderly patients.

Aims and Objectives

To calculate the prevalence of anemia in elderly patients attending Assam medical college and hospital.

To study the patterns of anemia in elderly patients.

Materials and Methods

Across sectional study was conducted in the Department of Pathology, Assam Medical College and Hospital, Dibrugarh in collaboration with the Department of Medicine . Irrespective of sex, all the cases of anemia alone or as a part of anemia and pancytopenia are included. During this period of one year, total of 100 cases were enrolled. A complete general physical examination and systemic review of the patients was undertaken.

Selection of cases:

Inclusion Criteria:

- Patients of either sex.
- Patients 60 years or more.
- Patients with anemia (Hb< 13 in males, Hb<12 in females).

Exclusion Criteria:

- Patients with a history of recent transfusion.
- Patients who have undergone major surgical procedure in the past 3 months.
- Patients who are on haematinics.

Method of collection of data:

The following investigations were carried out for all the patients.

- (1) Hemoglobin, Total Count, Differential Count, Erythrocyte Sedimentation Rate (ESR), Platelet Count, Packed Cell Volume (PCV).
- (2) Mean Corpuscular Volume (MCV), Mean Corpuscular Hemoglobin Concentration (MCHC), Mean Corpuscular Hemoglobin (MCH).
- (3) Reticulocyte Count, Peripheral Smear for Blood Picture.
- (4) Stool Occult Blood
- (5) Serum Ferritin

- (6) Bone marrow studies (aspiration/biopsy) were carried out in patients with Blood Smear showing immature white cells or nucleated red cells or Indeterminate status of iron stores unexplained progressive or unresponsive anemia.
- (7) Additional investigations as indicated for detection of underlying cause. (Upper G.I endoscopy, tissue biopsy, imaging - USG/CT/Chest X-ray).

Results

2150 visitors had attended the Outpatient Department of Medicine during the study period from September 2009 to August 2010. The number of males are more as compared to females of the same age groups.

Table 1 Distribution of the study subjects according to age and sex

Age group (in years)	Total (n)	Male (n)	Percentage (%)	Female (n)	Percentage (%)
60-69	1455	815	56.01	640	43.99
70-79	426	222	52.11	204	47.89
>80	269	167	62.08	102	37.92
Total	2150	1204	56.00	946	44.00

Table 2 Distribution of prevalence in study subjects according to sex

Sex	Anemia yes	Anemia no	Total(n)	Prevalence
Male	846	358	1204	70.27
female	812	134	946	85.84
Total	1658	492	2150	77.12

In this study the prevalence of anemic patients 1658 (77%) among the patients attending Assam Medical College and Hospital, Dibrugarh.

we observe that the prevalence in male is 70% and in female is 86%.

Table 3 Distribution of prevalence in study subjects according to age

Age group (in years)	Anemia yes	Anemia no	Total (n)	Prevalence (%)
60-69	1086	369	1455	74.64
70-79	342	84	426	80.28
>80	230	39	269	85.50
Total	1658	492	2150	77.12

The prevalence of anemia increase as age increase. Its 86% in age group of 80 years and above which was more as compared to age group 60—69 years and 70—79 years.

Pattern of anemia.

In our study 100 comorbid patients admitted in the wards were selected for the study of pattern of anemia as per inclusion and exclusion criteria .

Table 4 Distribution of anemic subjects according to age and sex

Age group (in years)	Male (n)	Female (n)	Total (n)
60-69	38	27	65
70-79	17	08	25
>80	07	03	10
Total	62	38	100

The age and gender wise distribution of the patients. It shows that the maximum number of

the patients were found in the age group 60—69 years.

Table 5 Distribution of patients of microcytic anemia according to sex.

Gender	Number (n)	Percentage (%)
Male	15	57.69
female	11	42.31
Total	26	100.00

26 patients of the total of 100 patients had underlying microcytic anemia. Out of the 26 patients, 15 were males and 11 were females.

Table 6 Distribution of serum ferritin levels in microcytic anemic subjects

PBS	<20ng/ml	20-100ng/ml	>100ng/ml	Total
Microcytic hypochromic	13	08	05	26
Percentage%	50%	31%	19%	100%

Total of 13/26 had seen ferritin values <2 0ng/ml of 5 patients had no evidence of Iron deficiency having ferritin values >100ng/ml.

Table 7 Etiology in microcytic anemia

Etiology	Frequency (n)	Percentage (%)
Iron deficiency anemia	19	73.08
Anemia in chronic disease	05	19.23
Megaloblastic anemia	00	00.00
Unexplained anemia	02	07.69
Total	26	100.00

Majority have Iron Deficiency Anemia (73.08%) followed by Anemia in Chronic Disease

(19.23%).3/5 patients of ACD had tuberculosis and 2/5 had chronic renal disease.

Table 8 Distribution of patients of normocytic anemia according to sex.

Gender	Number (n)	Percentage (%)
Male	38	71.70
Female	15	28.30
Total	53	100.00

53 patients of the total of 100 patients had normocytic anemia. Out of the 53 patients, 71.7% were males and 28.3% were females.

Table 9 Distribution of serum ferritin level in normocytic anaemic subjects

Peripheral smear	<20ng/ml	20-100ng/ml	>100ng/ml	Total
Normocytic anemia	0	08	45	53
Percentage (%)	0.00	15.09	84.90	100.00

None of the patients had serum ferritin values less than 20ng/ml.

Table 10 Distribution of underlying etiology in normocytic anemia

Etiology	Frequency (n)	Percentage (%)
Anemia of chronic disease	48	90.57
Iron deficiency anemia	03	5.66
Megaloblastic anemia	00	00.00
Unexplained anemia	02	03.77
Total	53	100.00

Majority have Anemia of Chronic Disease (90.57%) followed by Iron Deficiency Anemia (5.66%) and Unexplained Anemia (3.77%). Out of 48 cases of anemia of chronic disease, 12 were

cases of leukaemia followed by liver disease, plasma cell dyscrasia, pulmonary disease, renal disease, lymphoma and rheumatoid arthritis.

Table 11 Distribution of subjects of macrocytic/dimorphic anemia according to sex

Gender	Number (n)	Percentage (%)
Male	07	53.85
Female	06	46.15
Total	13	100.00

13 patients of the total of 100 patients had macrocytic anemia. Out of the 13 patients, 53.85% were males and 46.15% were females.

Table 12 Distribution of serum ferritin level in macrocytic/dimorphic anaemic subjects

Peripheral smear	<20ng/ml	20-100ng/ml	>100ng/ml	Total
Dimorphic/macrocytic	00	02	11	13
Percentage (%)	0.00	15.38	84.62	100.00

Serum ferritin levels were estimated in all the patients having a macrocytic/ dimorphic blood

picture. It was found that 11/13 of the patients had values more than 100ng/ml.

Table 13 Underlying etiology in dimorphic/ macrocytic anemic subjects

Etiology	Frequency (n)	Percentage (%)
Anemia in chronic disease	03	23.08
Iron deficiency anemia	00	0.00
Megaloblastic anemia	10	76.92
Unexplained anemia	00	0.00
Total	13	100.00

Majority have Megaloblastic Anemia (76.92%) followed by Anemia in Chronic Disease (23.08%). All the 3 patients of anemia of chronic

disease showing macrocytic picture had underlying liver disease.

Table 14 Underlying etiology in pancytopenic subjects

Etiology	Frequency (n)	Percentage (%)
Megaloblastic anemia	02	25.00
Hypersplenism	03	37.50
Multiple myeloma	01	12.50
Aplastic anemia	02	25.00
Total	08	100.00

3 out of 8 cases had hypersplenism followed by megaloblastic anemia, aplastic anemia and multiple myeloma. In all cases seen ferritin > 100ng/ml , 4/8 had HTN and Diabetes.

Discussion

This study was undertaken to calculate the prevalence and to document the pattern of anemia.

Bach V et al study revealed that the prevalence of anemia was significantly correlated with advanced age and male sex. In our study the prevalence of anemia is also significantly correlated with advanced age.⁵

Aithal K et al study revealed that Normocytic anemia is the commonest pattern of anemia (42%) in elderly and anemia of chronic disease (40%) the commonest cause of anemia. In our study Normocytic anemia is the commonest pattern of anemia (53%) in elderly and anemia of chronic disease the commonest cause (56%).⁶

Choi CW et al study found that the Hemoglobin levels were significantly lower in subjects ‡80 years old. The overall prevalence of anemia in this study group was 13.6% (171/1,254). In our study prevalence is 77% which is higher as compared to above study. In our study the prevalence of anemia is also significantly correlated with advanced age.⁷

Tettamanti M et al study found that the estimated prevalence in the entire population was 11.1%. Anemia was mostly normocytic (72.3%), while microcytosis was present in 16.9% anemic individuals. In our study prevalence is 77% which is higher as compared to above study. In our study Normocytic anemia is the commonest pattern of anemia (53%) in elderly and microcytosis was present in 26% of anemic subjects.⁸

NHANES-III of WHO 23 study revealed prevalence of anemia in 11% of men and 10.2% of women aged 65 years and older. In this hospital prevalence of anemia calculated was 70% in males and 86% in females which is higher as compared to above study. The higher prevalence of anemia among women was related to multiple pregnancies, nutritional imbalance, mensuration and other gynaecological problems.⁹ According to WHO Report (2000)¹⁰, prevalence of anemia in older individuals is about 50% in developed countries and 12% in developing countries. In our study prevalence is 77% which is higher as compared to above study.

In our study prevalence of anemia in males was less as compared to females in contrast to Guralink JM et al¹¹ whose study showed that 11.0% of men and 10.2% of women 60 year and above are anemic.

In our study, normocytic anemia was the most prevalent anemia accounting for 53% of all the cases. Elis et al¹² have shown that most common anemia in elderly is normocytic normochromic type. In order of type of anemia our study corroborates with this study.

In our study, 38 (61.29%) males had normocytic anemia, and 15 (24.19%) had microcytic anemia and 7 (11.29%) had macrocytic anemia, and as compared to women who had 15 (39.47%) normocytic and 11 (28.94%) microcytic and 6 (15.78%) had macrocytic anemia. In our study 56% of all the cases were anemia of chronic disease. Ania et al¹³ diagnosed anemia in 36% of males, being microcytic in 14%, normocytic in 83%, and macrocytic in 3%, as compared to 44% of women, which was microcytic in 16%, normocytic in 80%, and macrocytic in 4% of

cases. Hence our study closely tallies with this study. Normocytic anaemia being the more commonest among both males and females.

Chernetsky et al¹⁰ has shown that most common anemia is anemia of chronic disease (65.6%). In our study 56% of all the cases were anemia of chronic disease.

In our study, only 4% of patients had no obvious underlying cause. Artz et al¹⁴ showed that 14% to 50% of anemic elderly had no obvious underlying cause. In our study, 22% had IDA, 10% B12 / folate deficiency.

In our study 22 % had Iron deficiency anemia, 10% B12/ folate deficiency. Guralink J M et al¹¹ revealed that 16.6% of the patients had only iron deficiency, 6.4% had folate deficiency only and 5.9% of the patients had B12 deficiency.

In our study, 13% of the total patients had depleted iron stores. Milman et al¹⁵ has shown that 2.4% of anemic elderly had values < 15 µgm/l (depleted iron stores). 3.5% had values >30 µgm/l. (small iron stores), 94.1% had values >30 µgm/l.

Finch CA in this study found that serum ferritin is the most useful test for diagnosing iron-deficiency anemia. Low serum ferritin (eg, <12 ng/mL) is highly specific for iron-deficiency anemia.¹⁶ In our study 50% of the cases with microcytic anaemia shows ferritin levels <20ng/ml, 31% shows level between 20 – 100ng/ml and 19% shows >10ng/ml. (84.9%) of cases showing normocytic anaemia had ferritin levels >100ng/ml. none of the cases having macrocytic anaemia and pancytopenia had serum ferritin values < 100ng/ml. hence this shows that serum ferritin closely correlates with the iron stores. In our study 12/22 (54.5 %) cases of iron deficiency had serum ferritin levels <20ng/ml. 10/12 cases (83.33%) had depleted iron stores with bone marrow aspirations were stained with pearls stain. In megaloblastic anemia, Prussian blue pussian blue staining of the bonemarrow shows an increased in size and number of iron granules in erythroid precursors.

Ishtiaq O et al¹⁷ (2002) in their study on patterns of pancytopenia patients has shown that megaloblastic anemia (39%), hypersplenism (19%) and aplastic anemia (8%) are the common causes of pancytopenia. Hypersplenism had a slightly higher mean age. In our study, among pancytopenic cases 2 had megaloblastic anemia, 3 had hypersplenism, 2 had aplastic anemia and 1 was a case of multiple myeloma showing that hypersplenism had a higher mean age.

Conclusion

Anemia is a significant common association in the elderly and its prevalence in the present study was 77%. Prevalence in females (86%) was more than males (70%). All the types of anemias are seen, namely normocytic in 53%, microcytic in 26%, macrocytic/dimorphic in 13% and anemia associated with pancytopenia in 8% of the patients. Anemia of chronic disease was more prevalent in elderly with normal or increased marrow iron content which shows no sex difference. Iron deficiency anemia is the next common cause of anemia in elderly followed by megaloblastic anemia. Pancytopenia is not an uncommon hematological problem encountered in clinical practice and should be suspected on clinical grounds when a patient presents with unexplained anemia, prolonged fever and tendency to bleed. In all cases of pancytopenia hypersplenism secondary to portal hypertension (cirrhosis) was the common diagnosis. Serum ferritin is the earliest marker to decrease with iron depletion and therefore this assay is useful in exposing the disappearance of iron stores before the onset of anemia. Serum ferritin is not only a non invasive means, but also the most superior and practical diagnostic test for the outline clinical evaluation of patients with suspected iron deficiency. It is critical to evaluate the etiology and treat anemia in addition to symptomatic treatment to improve the outcome.

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