



A CLINICO-PATHOLOGICAL STUDY OF ANEMIA IN GERIATRIC AGE GROUP

Pathology

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ABSTRACT

Anemia in geriatric age (>60 years) is one of the major health problem in India and other countries around the globe. It causes increased morbidity, mortality and also affects quality of life. Symptoms associated with anemia like shortness of breath, fatigability due to anemia could also be attributed to aging process, therefore anemia is often easily overlooked in elderly.

Clinico-haematological patterns and morphological types of anemia in geriatric age (>60 years) are manifold, hence this study was done to determine them and to know more about the associated disorders.

The present study was conducted in a tertiary care center of South India for two years. 1000 patients who were 60 years and above and clinically diagnosed as anemic were included in this study. Routine haematological investigations including peripheral blood smear examination and complete hemogram were done. Special investigations were done whenever required.

Female population was the most affected geriatric population with most of them belonging to 60-69 years of age. The most common cause of anemia was found to be anemia of chronic disease.

Despite modern diagnostic advances, anemia in geriatric patients still remains under-reported and inadequately investigated, necessitating evaluation of even mild anaemias. Prompt diagnosis and definite categorization helps in appropriate management of anaemias.

KEYWORDS

Anemia Of Chronic Disease, Elderly, Anemia In Geriatric

INTRODUCTION

Anemia in geriatric age (>60 years) is one of the major health problem in India and many other countries around the globe. It causes increase in mortality as well as morbidity and also affects quality of life.

Symptoms associated with anemia like shortness of breath, fatigability due to anemia could also be attributed to aging process, anemia is often easily overlooked in the elderly. Anemia is an important sign that mainly indicates a serious underlying pathology. [1]

The reported prevalence of anemia in the elderly is 2.9%–51% and correlates with advanced age and multiple related conditions, including iron deficiency, inflammatory conditions, malignancy, and low serum erythropoietin. Thus, anemia in elderly patients is an emerging global health problem for the 21st century that negatively impacts the quality of life.[2] Aging alone itself unlikely leads to anemia. Hemoglobin levels within healthy older individuals don't change significantly from 60 to 98 years of age. Changes that occur commonly during aging increase the risk of anemia, thereby explaining the association of anemia with older age. These include reduced ability to absorb essential nutrients, decreased hematopoietic reserve, and reduced sensitivity to erythropoietin. [3]

OBJECTIVES

- To study the clinico-hematological patterns of anemia in elderly patients 60 years and above.
- To know the common etiology for anemia in geriatric population.
- To detect the morphological types of anemia prevalent amongst them.
- To know various associated disorders.

MATERIALS AND METHODS

This is a retrospective study that was conducted in the Department of Pathology of a tertiary care center in South India for a period of two years. All the patients above 60 years who were evaluated for a clinical diagnosis of anemia were included. Routine haematological investigations like Peripheral blood smear examination using Leishman's stain and Giemsa were done. Complete blood picture was done using a three part analyser. Special investigations like iron studies, reticulocyte count, and bone-marrow examination with iron store evaluation with perl's stain were done whenever required.

OBSERVATIONS AND ANALYSIS

Table 1: Age Wise Distribution Of Cases

Age group (years)	Total number (n = 1000)	Percentage (100%)
60-65	599	59.9%

66-70	200	20%
71-75	120	12%
76-80	56	5.6%
81-85	20	3.9%
85-90	5	0.5%
Total	1000	100%

Patients in our study predominantly belonged to the age group of 60-70 years.

Table 2 Relation With Symptoms And Signs

Associated factor	Total number n = 1000	Percentage (100%)
Respiratory	250	25.0%
Gastrointestinal	85	8.5%
Malignancies	110	11%
Nutritional disorders	164	16.4%
Liver	45	4.5%
Renal	54	5.4%
Non specific	292	29.2%
Total	1000	100%

In this study, non-specific symptoms were most commonly associated with anemia, followed by signs and symptoms of respiratory illness, nutritional deficiencies, malignancies, gastrointestinal diseases, renal and liver diseases.(Table 2).

In the present study, 23.6% of the patients were smokers, 25% had hypertension, 22.9% had diabetes mellitus, 16.9% had blood loss, and 10.5% were using NSAIDS.

We observed that anemia due to chronic disease (55%) was the most common type followed by iron deficiency anemia (18%), anemia due to other nutritional deficiencies (14%), anemia due to blood loss (12%), and the least common was anemia due to hemolysis (1%).

Table 3: Peripheral Blood Smear Patterns

Peripheral blood smear findings	Total number n = 1000	Percentage 100%
Normocytic Normochromic anemia	434	43.4%
Microcytic hypochromic anemia	312	31.2%
Dimorphic anemia	172	17.2%
Normocytic hypochromic anemia	62	6.2%
Macrocytic anemia	20	2%
Total	1000	100%

In the present study, it was observed that most of the patients presenting with anemia had a normocytic normochromic blood picture followed by a microcytic hypochromic blood picture, dimorphic anemia and macrocytic anemia.

DISCUSSION

In the present study, more females were found to be anemic as compared to males. similar gender wise distribution was seen in Indian studies conducted by Pathania et al[4], Amarneel et al[5], Joosten et al.[6] and Tay and Young [7]. However few other studies done by khatib et al[8] and ghandhi et al[9] showed a male preponderance. (Tables 4 and 5).

Table 4: comparative Study Of Gender Wise Distribution Of Geriatric Anemias

Gender	Present study n = 1000	Abhishek Pathania et al n = 229	Amarneel et al n = 42	Khatib et al n = 256	Ramya et al n = 675	Joosten et al n = 178	Mathew Tay et al n = 424
Male	36.5%	36.7%	28.6%	53.9%	51%	38.8%	48.6%
Female	64.5%	63.3%	71.4%	46%	49%	61.2%	51.4%

Table 5 Comparative Study Of Age Groups

Age group (years)	Present study n=1000	Amarneel et al n = 42	Nisha et al n = 826	Kiran et al n = 100	Geisel et al n = 388
50-59	-	-	18.3%	-	-
60-70	79.9%	61.25%	44%	70%	13.9%
71-80	17.6%	27.5%	26.8%	23%	40.2%
81-90	4.4%	11.25%	10.8%	7%	46%

Bold indicates majority of cases.

In the present study, patients in the age group of 60–70 years were maximally affected, which is in concurrence with the studies by Amarneel et al.[5]

Nisha et al[10], and Kiran et al.[11] whereas in a study done by Geisel et al[12] patients in the age group of 81–90 years were maximally affected (Table 5).

Table 6: Comparative Study Of Contributory Causes Resulting In Anemia

Cause of Anemia	Present study n = 1000	Nisha et al n = 500	Guyatt et al n = 259	Joosten et al n = 178	Tay et al n = 424
Iron deficiency anemia	18%	12.2%	36.3%	15%	13%
Anemia of chronic disease	55%	48.9%	43.6%	41.5%	29.3%
Nutritional anemia	14%	6.9%	8.10%	5.5%	13%
Blood loss	12%	8.5%	—	7.0%	—
Hematological malignancy	0.8%	18.5%	2.70%	11%	0.7%
Others	0.2%	5%	9.3%	20%	44%

Bold Indicates Majority Of Cases.

Anemia of chronic disease was seen to be the most common underlying cause of anaemia. This finding is consistent with the observations of Guyatt et al. [13], Nisha et al., [10] and Joosten et al [6], who found that anemia of chronic disease was the most common cause of anaemia, followed by iron deficiency anaemia. In the current study, chronic myeloid leukaemia was found in 10 (0.8 percent) of the patients with haematological malignancy, which matches Kiran et al [11] findings of 1 percent. Chronic leukaemia and lymphoproliferative disorder were found in 0.4 percent of the participants, which is lower than the 9.7% reported by Nisha et al [10] and the 2.2 percent reported by Vijay Tailak et al [14] in their studies. In the present study myelodysplastic syndrome was seen in 5 (0.4%) subjects, which is concurrent with the study done by Vijay Tailak et al [14] showing 1.4% of subjects with myelodysplastic syndrome.

A hyperinflammatory condition is present in at least one-third of anaemic individuals over 65 years old. The pathophysiological pathways that underpin are numerous, overlap, and vary in severity among people. To begin with, inadequate Erythropoietin (Epo) production and a muted response of erythroid progenitors to Epo are important underlying factors. TNF, IL1, and TGF have all been shown to have a direct negative effect on the proliferation and differentiation of erythroid progenitor cells. [15] Body composition and alterations of energy metabolism have been reported to regulate erythropoiesis in the geriatric population.

Secondly, an enhanced uptake and retention of iron (in the form of senescent/damaged erythrocytes) within the reticuloendothelial system, leading to an iron-restricted erythropoiesis, is an important factor driving the development of AI.

Hepcidin, an antibacterial acute phase protein generated primarily from the liver, inhibits both duodenal iron absorption and iron release from macrophages. The interaction of hepcidin with the transmembrane protein ferroportin, the only known iron exporter in mammals, can explain these results. This results in iron restriction, with an accompanying increase in ferritin levels and decrease in transferrin saturation (TSAT), resulting in a relative iron deficient erythropoiesis in macrophages, which have a general turnover of approximately 20–25 mg of iron per day as a result of being recycled from senescent red blood cells (RBCs).

Hepcidin levels have been found higher in cancer patients, autoimmune diseases, CKD and also in older patients (age-related rise due to reduced levels of estrogen and testosterone).

Third, eryptosis, or the phagocytosis of aged erythrocytes driven by alterations in their plasma membrane, is frequently mentioned as another milestone in the evolution of anemia. RBC counts and Hb levels drop significantly faster in certain conditions, such as inflammation, than can be explained by a pure reduction in RBC production and Hb synthesis. In fact, phosphatidylserine translocation to the membrane surface is the first step in this process. [16] It allows macrophages to swallow erythrocytes and eliminate them from circulation. Phosphatidylserine presenting erythrocytes are substantially more common in older patients than with younger patients. Other studies have found that illnesses that are frequent in older people, such as dehydration, diabetes, and chronic heart disease, can impact RBC stability.

Table 7: Comparative Study Of Grading Of Anemia

Grade of Anemia	Present study n = 1000	Abhishek Pathania et al n = 229	Nisha TR et al n = 826	Joosten et al n = 178
Mild (10–12 gm/dl)	42.3%	47.60	68.8%	29.2%
Moderate (7–10 gm/dl)	54.6%	47.16	26.3%	57.9%
Severe (<7 gm/dl)	3.1%	5.24	4.9%	12.9%

Bold indicates majority of cases.

In the present study, the highest number of subjects are with moderate degree (Grade II) of anemia. This finding is in concurrence with the study by Joosten et al. [6] Our result differs from the studies conducted by Abhishek Pathania et al [4] and Nisha TR et al [9] in which the majority of the elderly had mild anemia (Grade I).

Anemia is a prevalent ailment among the elderly that has been associated to poor clinical outcomes. Despite the fact that it is a critical issue that must be addressed urgently, especially in industrialised and developing countries, it is frequently overlooked or ignored due to the more important and demanding diseases that affect the elderly.

In elderly persons with a high prevalence of anaemia, determining the haemoglobin threshold and the condition that causes anaemia is difficult. This is a critical flaw because even mild anemia can jeopardise a patient's well-being and survival, regardless of the underlying cause. [17]

Anemia due to chronic diseases is the most common form of geriatric anemia as observed in the present study. This study is concurrent with the study by Mauro Tettamanti et al [18] (Table 7).

Table 8: Comparative Study Of Associated Co-morbidities

Associated Comorbidities	Present study	Kiran et al n = 100	Tay et al n = 23	Geisel et al n = 83
GI Disorder	8.5%	—	8.69%	15.66
Liver	4.5%	20%	21.73%	—
Renal	5.4%	50%	—	56.6%
Respiratory	25.0%	16.5%	34.8%	—
Malignancy	11%	1%	34.8%	12.04
Orthopaedic	10.1%	12.5	—	15.7

Bold indicates majority of cases.

In the present study respiratory disease is associated in most of the subjects (25.0%), which correlates with the study conducted by Tay (34.8%). Similar findings were also noted by Tay et al in respective to gastrointestinal causes. In hematological malignancy, chronic myeloid leukemia was present in 10 (0.8%) subjects in the present study and correlates with Kiran et al in which 1% was noted. Chronic leukemia and lymphoproliferative disorder was noted in 0.5%, which differs from the study conducted by Nisha et al⁹ having 9.7% and Vijay Tailak et al¹³ having 2.2% of chronic leukemia and lymphoproliferative disorder. In this study myelodysplastic syndrome is present in 4 (0.3%) subjects concurrent with the study done by Vijay Tailak et al having 1.4% of subjects with myelodysplastic syndrome.

CONCLUSION

Despite multiple advances in diagnosis and with a plethora of laboratory investigations, geriatric anemia still remains under-reported and inadequately investigated, especially when mild, thereby necessitating its evaluation in this vulnerable population. Weakness and fatigue are non-specific symptoms which are attributed to the aging process. These symptoms should not be ignored as they point out to the presence of anemia and these patients should be investigated for the same. Improved definitions of anemia in this geriatric population and more detailed investigations like bone marrow aspiration and biopsy also help to define the subtypes of anemia, thereby facilitating prompt diagnosis.

Conflicts Of Interest

Nothing to disclose.

REFERENCES

- [1]. Stauder R, Valent P, Theurl I. Anemia at older age: Etiologies, clinical implications, and management. *Blood*. 2018;131:505–14.
- [2]. Halawi R, Moukhadder H, Taher A. Anemia in the elderly: a consequence of aging? *Expert Rev Hematol*. 2017;10:327–35.
- [3]. Guralnik Jack M, Eisenstaedt RS, Ferrucci Luigi. Prevalence of anemia in persons 65 years and older adults. *Blood*. 2004;104:2263–2269.
- [4]. Pathania, A, Haldar, Partha, Kan Gupta, Sanjeev & Pandav, ChandrakantS & Bachani, Damodar. (2019). Prevalence of anemia among elderly persons residing in old age homes in national capital territory, Delhi, India. *Indian Journal of Public Health*. 63. 288. 10.4103/ijph.IJPH.412_18.
- [5]. Amarnieel S, Sheth N. Pattern of anemia in elderly age group. *IJSRR*. 2015;49(2):51–56.
- [6]. Joosten E, Pelemans W, Hiele M, Noyyen J. Prevalence and causes of anemia in a geriatric hospitalized population. *Gerontology*. 1992;38:111–7.
- [7]. Mathew Rong JT, Yong YO. Prevalence and risk factors of anaemia in older hospitalized patients. *Singapore Health Care*. 2011;20(2):71–9.
- [8]. Khatib WM, Bisht TV, Gosavi AN. Clinopathological profile of anemia in elderly- A one year study; IOSR-JDMS Volume 15, issue 9 (September 2016) PP 85-87.
- [9]. Gandhi R, Selvaraj N, Mourougessine V, Rajeshwari. Study of prevalence and morphological patterns of anaemia in adult and geriatric population: A hospital-based study. *J Evolution Med Dent Sci*. 2016;5(69):5041–5044.
- [10]. Nisha TR, Rajan GN, Prasad PH. Evaluation of anemia in patients aged 55 years and above in a tertiary care setting in North Kerala. *J Evolution Med Dent Sci*. 2017;69(48):3694–3697.
- [11]. Aithal Kiran, Meti Kirankumar, Jain Sathvik. A study of anemia in elderly patients admitted at tertiary center. *Sch J App Med Sci*. 2017;5(4D):1483–86.
- [12]. Geisel Tabea, Martin Julia, Schulze Bettina, Schaefer Roland, Bach Matthias, Virgin Garth, Stein Jürgen. An etiologic profile of anemia in 405 geriatric patients. *Anemia*. 2014;2014:1–7.
- [13]. Guyatt GH, Pallerson C, Ali M, et al. Diagnosis of iron-deficiency anemia in elderly. *Am J Med*. 1990;88:205–9.
- [14]. Tilak V, Tilak R. Geriatric anemia- A public health crisis in hematology. *Indian J Prev Soc Med*. 2012;43(2):153–157.
- [15]. Gomes AC, Gomes MS. Hematopoietic niches, erythropoiesis and anemia of chronic infection. *Exp Hematol*. 2016;44(2):85–91.
- [16]. Theurl I, Hilgendorf I, Nairz M, et al. On-demand erythrocyte disposal and iron recycling requires transient macrophages in the liver. *Nat Med*. 2016;22(8):945–951.
- [17]. Steensma DP, Tefferi A. Anemia in the elderly: How should we define it, when does it matter and which can be done? *Mayo Clin Proc*. 2007;82(8):958–66.
- [18]. Tettamanti M, Lucca U, Gandhini F, et al. Prevalence, incidence and kinds of mild anemia within the elderly; the Health and anemia population-based study. *Haematologica*. 2010;95(11):1849–56.