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Patterns of Geriatric Anemia – A Clinicopathological Study

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Abstract

Background: Anemia is a common condition in elderly especially in hospitalized geriatric patients and is known to be associated with increased morbidity and mortality. The UN agreed cut off to refer to the older population is 60years and above. Anemia in the elderly is defined as a haemoglobin concentration below12 gm/dl in women and below 13gm/dl in men. **Objectives:** To study the grade and patterns of anemia in Geriatric age group of both sex with clinicopathological correlation. **Materials and Methods**: It is a Prospective study of 2 years from May 2018 to April 2020 carried out in KIMS, Hubbali. A statistically significant sample size was 400. **Results**: Among the total geriatric cases of 400, males were 233 (58.25%) and females were 167 (41.75%). In which majority of them were in the age group between 60-69 years that is 237 (59.25%) cases, followed by 121 (30.25%) cases, 38 (9.5%) cases and 4 (1%) cases were in the age group between 70-79 years, 80-89 and above 90 years respectively. The study showed that majority of the cases belonged to the Grade 1 anemia (69.25%). On smear examination most common morphological pattern was Normocytic Normochromic Anemia (75%), followed by Microcytic Hypochromic Anemia (18%). On clinical history correlation, majority of them were asymptomatic 52% and 38% of cases presented with fatigue. **Conclusion**: The study concludes that diagnosing different morphological patterns of geriatric anemia and its clinical correlation helps in reducing the morbidity and mortality of geriatrics related to anemia and also facilitate the clinicians to improve the treatment protocols and prophylactic therapy.

Keywords: Geriatrics; Patterns; Anemia

1 Background

Anemia is commonly seen with increase in the age of the population. In elderly patients, anemia of any degree contributes significantly to morbidity and mortality and has a significant effect on the quality of life. Iron deficiency is frequently seen in elderly, Vitamin B12

deficiency, Folate deficiency, Myelodysplastic syndrome (MDS) are among other causes of anemia in elderly population. Anemia of chronic disease causes are chronic kidney disease, cirrhosis of liver, tuberculosis, and osteoarthritis.[1]

The percentage of marrow space occupied by the hematopoietic tissue declines from 90% at birth to a level of approximately 50% at age 30 years and 30% at age 70 years.[2]

2 Introduction

Anemia is defined as a reduction in the hemoglobin concentration of the blood below normal for age and sex. WHO criteria: Haemoglobin <12 gm/dl in women and <13gm/dl in men.

The UN agreed cut off to refer to the older population is 60+ years.[3]

The prevalence of anemia increases with advancing age. In Indian population the prevalence varies between 6% and 30% among males and 10% and 20% among female.

Table 1. Hemoglobin level grading

Severity	Hemoglobin level
Grade 0	>12 gm/dl
Grade 1 (Mild)	10-12 gm/dl
Grade 2 (moderate)	7-10 gm/dl
Grade 3 (severe)	< 7 gm/dl

Morphologic classification subdivides anemia into:

- Normocytic Normochromic anemia (NNA): MCV between 80fl -100fl.
- Microcytic anemia (MHA): MCV below 80fl.
- Macrocytic anemia (MA): MCV above 100fl.
- Dimorphic anemia (DA): normal MCV but a raised RDW.

One of the largest surveys, that is the third US National Health and Nutritional Examination Survey (NHANES 111), indicated that 10.2% of women and 11% of men > 65 years of age were anemic.[4]

Sathiya Narayanan S et al., study on geriatrics highlighted that prevalence of anemia among elderly is high in rural areas and often they are under reported, so routine screening for anemia and to know appropriate underlying etiology for the same is recommended.[5]

2.1 Aims and Objectives

1. To study the Degree of anemia in Geriatric age group of both sex.
2. To correlate with peripheral blood smear pattern of anemia in both sex.
3. To study the clinical conditions responsible / associated with Geriatric anemia.

3 Materials and Methods

- **Inclusion criteria**:

All men and women aged 60 years and above.

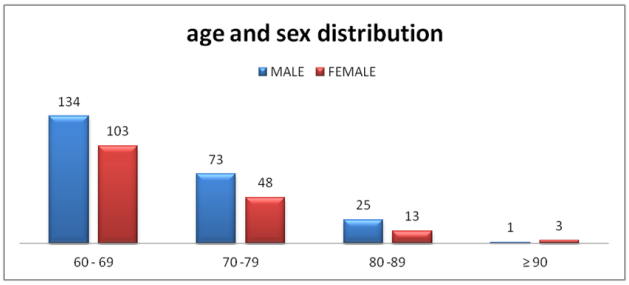
- **Exclusion criteria**:

1. Clotted blood sample and inadequate blood sample.
2. All men and women aged less than 60 years.

- **Type of study and period**: Prospective two years study (from May 2018 to April 2020).
- **Sample size and statistical analysis:** Considering 95% confidence limit with 5% of confidence interval, prevalence of anemia is 67.08%[5]. So minimum sample size is 340. Present study included 400 as sample size.
- **Statistical analysis:** Data was entered into Microsoft excel data sheet and analyzed using SPSS 22 version software. One sample or two sample t test with mean and standard deviation was done for the significance of the data.
- **Graphical representation of data**: MS Excel and MS word was used to obtain various graphs.
- **P value** (probability that the result is true) of <0.05 was considered as statistically significant after considering all the rules of the tests.
- **Collection of data**: After the informed consent, under aseptic precaution blood sample was taken into EDTA tube, then sample were analysed for CBC by using SYSMEX XN-350 series hematology autoanalysers later peripheral smears were made and stained with Leishman stain. Brief clinical details were collected.

4 Results

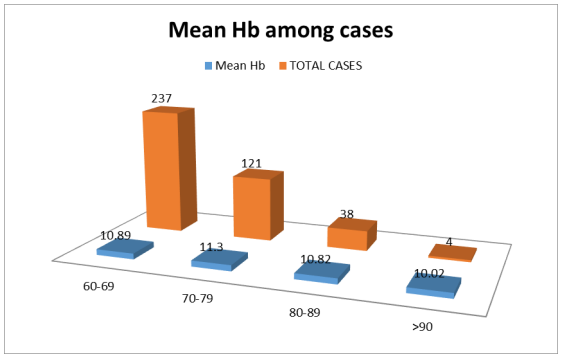
The present study includes 400 elderly patients aged 60 years and above conducted in the Department of Pathology, Karnataka Institute of Medical Sciences, Hubballi.



Graph 1: **Graph depicting combined age and sex distribution of cases**

The present study showed male predominance of about 58.25% (233) cases majority of cases between age group 60-69 years (237 cases) with and females population comprised around 41.75% (167) cases (Graph 1).

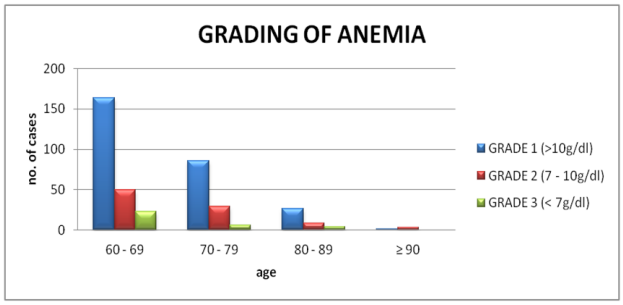
In the present study mean haemoglobin (Hb) is low in 8th decade (10.82) and 4 cases in 9th decade showed minimum Hb of 8.7 gm% (Graph 2).



Graph 2: **Summary of mean hemoglobin among the ages**

4.1 Grading of anemia

The study showed that 277 cases belong to grade 1 anemia (69.25%) and 90 cases (22.5%) were of grade 2 anemia. Only few that is 33 cases (8.25%) showed grade 3 anemia (Graph 3).



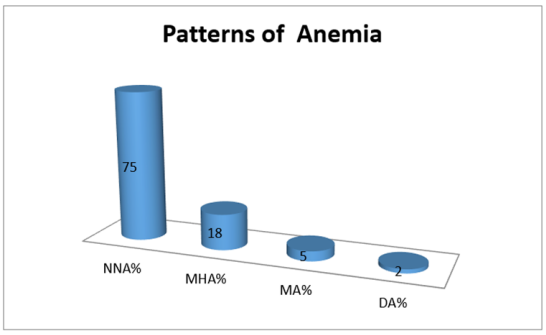
Graph 3: **Graph depicting grading of anemia among the cases**

Most common pattern of geriatric anemia was Normocytic Normochromic (74%) followed by microcytic hypochromic (Figure 1) (17.25%). Macrocytic anemia (Figure 2) was 5% and Dimorphic anemia was 2% (Graph 4).

Fatigue was the common clinical presentation. Most common cause of geriatric anemia was nutritional deficiency, also seen were anemia of chronic disease and unexplained anemia (Table 2).

5 Discussion

Geriatric anemia is a risk factor for many clinical conditions and its poor outcome, elderly females are commonly affected. Decreased Hemoglobin concentration is a powerful prognostic marker for multiple adverse outcomes in the elderly group. Anemia in elderly will be seen in coexistence with other disease. The study of different morphological patterns of anemia



Graph 4: **Graph depicting patterns of anemia among the cases**

Table 2. Depicting the statistical summary of clinical symptoms

Symptoms	Cases	Percentage %
Asymtomatic	208	52
Fatigue	152	38
Blood loss	18	4.5
Chronic infection/disease	14	3.5
Loss of weight/appetite	8	2
Total	400	

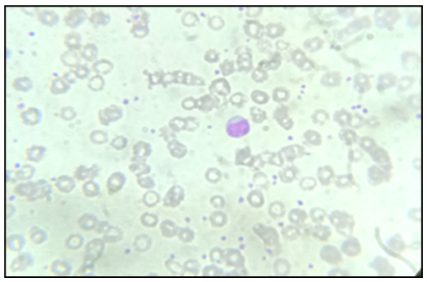


Fig 1. Microcytic hypochromic anemia, Leishman stain (40X)

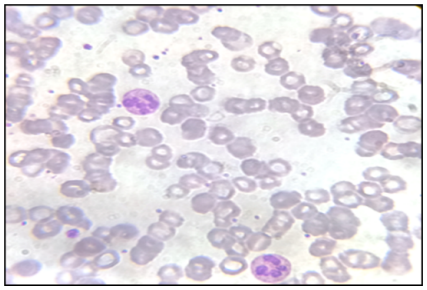


Fig 2. Macrocytic blood picture with hypersegmented neutrophil Leishman stain (40X)

Table 6. Comparative study of grading of anemia among the geriatrics

Grade of anemia	Present study	V Gangadharan et al.[8]	Jain Vet et al.[12]	Raina et al.[4]
Mild degree	69.25%	40%	45.33%	72.6%

on peripheral blood smear also helps in guiding etiology of anemia. Our study found normocytic normochromic as the common pattern of anemia.

The present study found that maximum cases were between 60-69 years, which was also concurrence with the other studies done by Aithal et al. and Mathew et al. (Table 3).

Table 3. Comparative study of maximally affected age group among geriatrics

Age (years)	Present study	K. Aithal et al.[2]	Mathew Rony et al.[6]
60-69	59.25%	70%	47.3%

The present study has got maximum male population 233 cases and females were 167 cases which was similar to many other studies done by Bach et al. and Gangadharan et al. But study done by Sgnaolin V et al. showed maximum female patients (Table 4).

Table 4. Comparative study of sex distribution among geriatrics

Sex	Present study	Bach et al.[7]	Vandana Gangadharan et al.[8]	Kaya et al.[9]	Sgnaolin V et al.[10]
Male	58.25%	23.4%	54%	62.11%	29.3%
Female	41.75%	11.8%	46%	37.89%	70.7%

Mean haemoglobin was found to be low in geriatrics in the present study, which was consistent with other studies. Reduced haemoglobin in the elderly population is associated with many other comorbidities (Table 5).

Table 5. Comparative study of mean hemoglobin among the geriatrics

	Present study	N. Hilal et al.[11]	Jain V et al.[12]
Mean haemoglobin (gm%)	10.91	9	9.08

Grading of anemia helps in the prediction of outcome and therapeutic intervention among the patients. The present studies observed that majority of the geriatrics belong to mild degree of anemia (Table 6).

In the present study most common pattern was Normocytic Normochromic anemia (NNA) 75% followed by microcytic hypochromic anemia (MHA) 18%.

Vandana Gangadharan et al.[8] study showed that maximum cases 59% were between 60-69 , with male predominance of 54% showed grade one type of mild anemia in 40% of cases showing predominance of Normocytic Normochromic anemia. The present study also showed maximum cases of 59.25% between 60-69years with male predominance 58.25% having mild degree of anemia 69.25% having Normocytic Normochromic anemia pattern on the peripheral blood smear 75% cases (Table 7).

Table 7. Discussion among other authors for patterns of anemia

Authors	NNA (%)	MHA (%)	MA (%)	DA (%)
V Gangadharan et al.[8]	73	16	03	08
Singh R et al.[13]	37.68	31.88	4.35	8.70
S R Shrivastava et al.[14]	78.05	11.6	6.02	4.24
Present Study	74.25	17.25	05	1.50

Guralnik JM et al.[15] study also showed that unexplained/asymptomatic cause for the geriatric anemia was the major symptom which is also seen in the present study (Table 2).

6 Conclusion

India is a developing country, prevalence of anemia are more common probably because of low socioeconomic status or lack of knowledge about nutrition. The study concludes that diagnosing different morphological patterns of geriatric anemia and its clinical correlation helps in reducing the morbidity and mortality of geriatrics related to anemia and also facilitates the clinicians to improve the treatment protocols and prophylactic therapy.

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