South African Family Practice 2015; 57(5):297–299
http://dx.doi.org/10.1080/20786190.2015.1071538

S Afr Fam Pract
ISSN 2078-6190 EISSN 2078-6204

RESEARCH

Retrospective analysis of the prevalence and causes of anaemia in hospitalised elderly patients

Anna M van Staden[a]* and Dirk JV Weich[a]

[a]*Faculty of Health Sciences, Department of Internal Medicine, University of the Free State, Bloemfontein, South Africa*
**Corresponding author, email: gninmvs@ufs.ac.za*

Introduction: Anaemia is common in the elderly. Little is known regarding anaemia in hospitalised elderly patients in South Africa. A retrospective study determined the prevalence and causes of anaemia in elderly patients hospitalised for acute medical problems.
Methods: Patients with anaemia were identified from the computerised database of a geriatric unit. Laboratory tests and clinical information on these patients were reviewed to determine the cause of the anaemia defined according to the WHO criteria (haemoglobin level ≤ 12 g/l for women and ≤ 13 g/l men).
Results: Of 759 consecutive geriatric patients, 236 (31.1%) were anaemic. The majority (n = 150; 63.6%) were female, with a mean age of 82.2 years. The male patients had a mean age of 80.8 years. The mean haemoglobin values were 10.7 g/l and 10.2 g/l for male and female patients, respectively. In 96 (40.7%) patients, the cause of anaemia could not be determined. Of the remaining 140 patients, 25.7% had anaemia of chronic disorders, 24.3% had iron deficiency anaemia and 13.6% had multiple causes.
Conclusion: Approximately one-third of hospitalised elderly patients were anaemic on admission, although many were not adequately investigated. Chronic disorders and iron deficiency were the most common causes of anaemia.

Keywords: anaemia, causes, elderly patients, hospitalised, retrospective

Introduction

Anaemia is a common problem in elderly patients that usually develops gradually, allowing the body to adapt. Its effects can be life threatening, particularly as part of various co-morbidities in geriatric patients, and it is therefore a difficult diagnostic and therapeutic dilemma for medical practitioners. In South Africa, the prevalence of anaemia was 13.9% in non-institutionalised subjects older than 64 years,[1] although no study has yet been done on the prevalence and causes of anaemia in elderly hospitalised patients in this country. Anaemia is an important sign of disease and an evaluation is almost always warranted to determine the underlying cause. It has been shown that anaemia defined according to the WHO criteria (haemoglobin level ≤ 13 g/dl in men and ≤ 12 g/dl in women) is associated with increased mortality in elderly community residents.[2]

The aim of this retrospective study was to determine the prevalence and causes of anaemia in elderly patients hospitalised for acute medical problems in Universitas Academic Hospital, a tertiary healthcare facility in Bloemfontein, South Africa.

Methods

During a study period from January 1999 to July 2003, 791 consecutive patients were admitted to be hospitalised in the acute geriatric ward of Universitas Hospital (1 395 m above sea level). Patients' data were captured in a computerised database. Haemoglobin investigations were performed in 759 of these elderly patients. Of these 759 patients, a group with anaemia was identified. For patients admitted more than once, only data from the first admission were considered. The laboratory tests (full blood count, urea and electrolytes, serum iron level, serum transferrin, transferrin saturation, serum ferritin, serum vitamin B_{12} level, erythrocyte folate concentration and bone marrow examination) and clinical information on these patients were reviewed to determine the cause of the anaemia. Anaemia was defined according to the WHO criteria (haemoglobin of ≤ 12 g/dl for women and < 13 g/dl for men).[2]

Iron deficiency was accepted as the cause of anaemia if the serum ferritin level was below 18 µg/l, or less than 45 µg/l in combination with a transferrin saturation of 8%,[3] or when no iron was detected in a bone marrow aspirate. The criteria of Cartwright and Lee[4] were slightly modified to identify anaemia of chronic disorders, which included low serum iron (less than 13 µmol/l), low transferrin (less than 2 g/l), transferrin saturation 10–25% and serum ferritin level above 100 µg/l,[5] or the condition was diagnosed on bone marrow aspiration. If the results of the iron study tests were abnormal but did not fit all the criteria of either iron deficiency anaemia or anaemia of chronic disorders, the results were deemed equivocal.

Vitamin B_{12} deficiency anaemia was diagnosed if the serum vitamin B_{12} level was low (less than 211 ng/l), associated with macrocytosis (mean corpuscular haemoglobin > 98 fl). Folate deficiency anaemia was diagnosed if the erythrocyte folate level was low (less than 186 µg/l) combined with macrocytosis. The diagnosis of haematological malignant conditions was based on examinations of the bone marrow aspirate and biopsy. Renal disease was accepted as the cause of anaemia if the patient was known to have chronic renal failure, or had small kidneys on ultrasound examination and the results of the iron studies, serum vitamin B_{12} levels and erythrocyte folate levels were normal.

Approval to conduct the study was obtained from the Ethics Committee of the Faculty of Health Sciences, University of the Free State (UFS), Bloemfontein (reference number 153/99).

Results

According to information from the computerised database, anaemia was the main reason for admission in 20.5% (162/791) of the patients admitted to the Geriatric Unit during the study period. For 759 (96.0%) of these patients, haemoglobin readings were available. Patients with no information on haemoglobin level were excluded.

Female patients represented 67.7% (n = 514) of the total group of patients included in the study. The mean age of male (n = 245) and female (n = 514) patients was 79.9 years and 81.4 years, respectively. The distribution of the haemoglobin levels of these patients (n = 759) is shown in Figure 1.

Two hundred and thirty-six (31.1%) patients were found to be anaemic, of which 150 (63.6%) were female with a mean age of 82.1 years (range 65–96 years) and 86 (36.4%) male, with a mean age of 80.8 years (range 65–97 years). The mean haemoglobin value of the anaemic men was 10.7 ± 2 g/dL (median 11.0 g/dl) and that of the women was 10.2 ± 1.8 g/dl (median 10.6 g/dl). The distribution of the haemoglobin levels of the anaemic patients (n = 236) is shown in Figure 2.

No mean corpuscular volume (MCV) values were recorded for two patients. As shown in Table 1, the majority of the 236 geriatric patients with information on MCV values had normocytic anaemia (n = 158; 66.9%). In 96 (40.7%) of the anaemic patients, insufficient special investigations were performed to determine a cause of anaemia. The underlying cause of anaemia could therefore be determined in 140 patients with complete special investigations, of whom 36 (25.7%) and 34 (24.3%), respectively, had either anaemia of chronic disorders or iron deficiency anaemia. Results with regard to the cause of anaemia are summarised in Table 1. Of the 36 patients with anaemia of chronic disorders, nine (25.0%) had a proven malignancy and eight (22.2%) patients had acute or chronic infections.

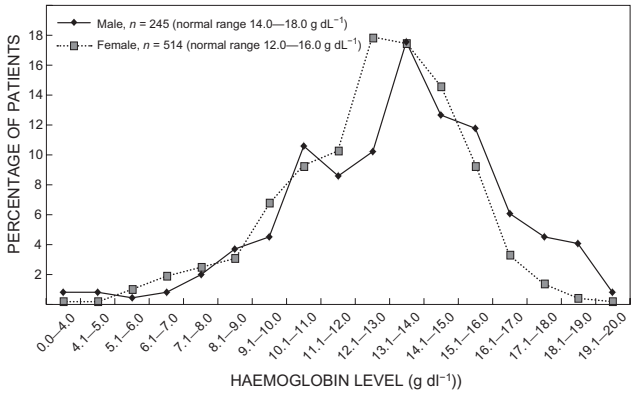

Figure 1: Distribution of haemoglobin levels of hospitalised geriatric patients (n = 759)

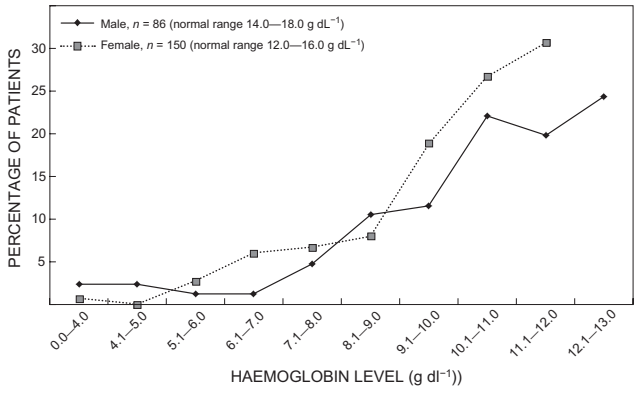

Figure 2: Distribution of haemoglobin levels of hospitalised geriatric patients with anaemia (n = 236)

Table 1: Red cell morphology and cause of anaemia in elderly hospitalised patients

	Frequency	Percentage
Red cell morphology (n = 236)		
Normocytic	158	66.9
Microcytic	54	22.9
Macrocytic	22	9.3
No results	2	0.8
Underlying cause (n = 140)		
Anaemia of chronic disorders	36	25.7
Iron deficiency	34	24.3
Vitamin B12 and folate deficiency	10	7.1
Haematologic malignancy or pre-malignancy	10	7.1
Post-haemorrhagic anaemia	9	6.4
Chronic renal failure	4	2.9
Miscellaneous haematological conditions	4	2.9
Multiple causes	19	13.6
Equivocal iron study results	14	10.0

The mortality rate in the total study group of 791 patients hospitalised in the Geriatric Unit was 16.6% (n = 131),[6] and in the anaemic group it was 18.0% (27/150) for female and 18.6% (16/86) for male patients, confirming that anaemia is associated with a slightly increased mortality rate in geriatric hospitalised patients.[2]

Discussion

Anaemia is very common in elderly hospitalised patients, with a prevalence ranging from 2.9% to 66.3%.[7–12,13] In our study, the condition was often not adequately investigated, with 40.7% of patients not having sufficient laboratory investigations to determine the specific type of anaemia. Possible causes for not pursuing these investigations could be death, obvious other serious pathology, such as metastatic carcinoma or severe dementia, and ignorance of the correct work-up of anaemia. The majority of our patients had a mild normocytic anaemia, the most likely cause in these cases being anaemia of chronic disease, which was confirmed with special investigations in 36 cases. Many patients admitted to a geriatric unit usually suffer from multiple medical conditions, and it is likely that doctors might not have thought it necessary to further investigate patients with mild normocytic anaemia, of which the cause would most likely be anaemia of chronic disorders.

The prevalence of anaemia in our study (31.1%) was higher than in similar studies done in Belgium[7] and Israel,[8] reporting a prevalence of 24% and 14.4%, respectively. Our findings were similar to results reported from studies in Iceland (36.7%)[11] and Italy (38.6%),[12] but substantially lower than studies from Germany (66.3%)[9] and France (65%).[10] This variation in the prevalence of anaemia in hospitalised elderly patients can be related to a number of factors, including the setting of the study, the health status of the studied population, the age and gender of the subject population, the criteria used to define anaemia, and ageing trends in different countries. Since anaemia defined by WHO criteria is associated with an increased mortality rate in elderly persons and is often the marker of serious underlying disease such as cancer, we feel that further investigations in anaemic elderly individuals are warranted, even in the case of mild anaemia.

Several studies on hospitalised elderly, anaemic patients found anaemia of chronic disorders and iron deficiency anaemia to be the most common causes of anaemia in this particular group of patients,[7–15] supporting the finding that in approximately 50% of patients in our study anaemia could be attributed to either one of these two causes.

We had 14 patients with equivocal iron studies where it was not possible to diagnose with certainty either iron deficiency or anaemia of chronic disorders. An example would be a finding of a ferritin value between 45 and 100 µg/l with a transferrin saturation level of less than 8%. These cases should have been assessed by means of bone marrow aspiration to distinguish between the two conditions, as the investigation and treatment of these conditions differ completely.

In conclusion, our future plan is to draft a protocol for the investigation of anaemia in elderly persons. We also recommend that a prospective study on anaemia should be done to identify and treat the underlying causes in both elderly community residents and hospitalised patients.

Acknowledgements – Dr H. Badenhorst for assistance with the evaluation of results, and Dr Daleen Struwig for technical and editorial preparation of the manuscript.

Conflict of interest – The authors do not have any financial or personal conflict of interest to declare.

References

1. Charlton KE, Kruger M, Labadarios D, et al. Iron, folate and vitamin B12 status of an elderly South African population. Eur J Clin Nutr. 1997;51:424–30.
2. Izaks GJ, Westendorp RGJ, Knook DL. The definition of anemia in older persons. JAMA. 1999;281:1714–7.
3. Guyatt GH, Patterson C, Ali M, et al. Diagnosis of iron-deficiency anemia in the elderly. Am J Med. 1990;88:205–9.
4. Cartwright GE, Lee GR. Annotation: the anaemia of chronic disorders. Br J Hem. 1971;21:147–52.
5. Speicher CE. The right test: a physician's guide to laboratory medicine. Philadelphia: W. B. Saunders Company; 1998. p. 288.
6. Van Staden AM, Weich DJV. Profile of the geriatric patient hospitalised at Universitas Hospital, South Africa. S Afr Fam Pract. 2007;49:14–14c.
7. Joosten E, Pelemans W, Hiele M, et al. Prevalence and causes of anaemia in a geriatric hospitalized population. Gerontology. 1992;38:111–7.
8. Matzner Y, Levy S, Grossowicz N, et al. Prevalence and causes of anemia in elderly hospitalized patients. Gerontology. 1979;25:113–9.
9. Geisel T, Martin J, Schulze B, et al. An etiologic profile of anaemia in 405 geriatric patients. Anaemia. 2014;933486. doi: 10.1155/2014/932486. Epub 23 February 2014.
10. Andrès E, Serraj K, Federici L, et al. Anemia in elderly patients: new insight into an old disorder. Geriatr Gerontol Int. 2013;13:519–27.
11. Ramel A, Jonsson PV, Bjornsson S, et al. Anemia, nutritional status, and inflammation in hospitalized elderly. Nutrition. 2008;24:1116–22.
12. Zamboni V, Cesari M, Zuccalà G, et al. Anemia and cognitive performance in hospitalized older patients: results from the GIFA study. Int J Geriatr Psychiatry. 2006;21:529–34.
13. Beghé C, Wilson A, Ershler WB. Prevalence and outcomes of anemia in geriatrics: a systematic review of the literature. Am J Med. 2004;116(7):3S–10.
14. Dharmarajan TS, Pais W, Norkus EP. Does anaemia matter? Anaemia, morbidity, and mortality in older adults: need for greater recognition. Geriatrics. 2005;60:22–9.
15. Smith DL. Anaemia in the elderly. Am Fam Physician. 2000;62:1565–72.

Received: 11-03-2015 Accepted: 07-07-2015