ANAEMIA IN THE HOSPITALISED ELDERLY

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ABSTRACT

A retrospective study was done to look at the various features of our elderly anaemic patients and to determine the usefulness of evaluating anaemia in this age group. Of the 151 patients admitted to one of the acute admission and rehabilitation wards of our Department from January 1990 to June 1990, 54 were anaemic. The prevalence of anaemia was significantly higher in the old old age group (⩾75 years) compared to the young old, and those from an institutional background had a significantly higher prevalence of more severe anaemia (Hb < 8g/dl). The majority of causes (66%) could be easily established with a simple work-up and deficiency-related anaemias comprised 44% of the total causes. The clinical usefulness of this work-up may also extend to the mildly anaemic group (Hb ⩾ 10g/dl) though further studies are needed to determine the level of haemoglobin when the evaluation becomes cost-effective.

Keywords: *anaemia, characteristics, elderly, evaluation, usefulness.*

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INTRODUCTION

Anaemia is a very common problem in the elderly. Various surveys have shown the prevalence to range from 6% to 30% for men and from 10% to 22% for women[1-7]. There is often the impression that there is an anaemia of senescence and that in the older patient, a mild anaemia especially is likely to reflect a physiological rather than pathological process. Consonant with this belief, suggestions have also been made that evaluation in the elderly should only begin when the anaemia is at least moderate (less than 10 g/dl), since work-up of mild anaemia may produce a poor yield of identifiable causes[8,9]. Conversely, others have stated that anaemia should always be regarded as being pathological and hence evaluated so as not to miss any underlying treatable conditions especially in their early stages[10-12].

In this descriptive study various features of our anaemic patients are reported. An attempt is also made to see whether there are indeed circumstances when the evaluation of anaemia can be more fruitful.

METHOD

Design

A retrospective study was done on all the patients admitted to one of the acute admission and rehabilitation wards of the Department of Geriatric Medicine at Tan Tock Seng Hospital during the period from January 1990 to June 1990. The patients in this ward (all 65 years and above) generally came from the lower socio-economic strata. The anaemic patients were identified (generally based on single readings of the haemoglobin value) and classified according to the severity and several features were studied, such as age and sex distributions, whether they were from an institutional background, and the underlying diagnosis of the various anaemias.

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Work-up for anaemia included the peripheral blood film and reticulocyte count, the serum ferritin or serum iron and total iron binding capacity (TIBC), serum folate and B_{12} levels, stools for occult blood and when necessary, bone marrow studies.

Definitions

Anaemia is defined as a haemoglobin level of less than 13 g/dl for males and 11.5 g/dl for females. These were according to the values set by our hospital laboratory. The World Health Organisation (WHO) criteria for the diagnosis of anaemia were initially a haemoglobin value of less than 14 g/dl in men and 12 g/dl in females[13]. A later report recommended that the defining level be reduced to 13 g/dl for males[14].

Iron-deficiency anaemia was diagnosed when the serum ferritin was decreased (normal serum ferritin: 14-50 µg/l for females and 17-230 µg/l for males), or when a decreased serum iron (normal serum iron: 11-27 µmol/l for females and 11-29 µmol/l for males) was accompanied by an increased TIBC (normal TIBC: 39-60 µmol/for females and 44-73 µmol/l for males), with the transferrin saturation being less than 15%. Diagnosis of folate and B_{12} deficiencies were made when their serum values were less than normal (normal serum folate: 8-43 nmol/l and normal serum B_{12}: 150-700 pmol/l). The anaemia of chronic disease was diagnosed when, in the presence of a chronic illness, (i) the serum ferritin was normal or elevated, or (ii) when both the serum iron and TIBC were decreased (with the transferrin saturation being in the normal range of 20% to 50%)[15].

Statistical analysis

The statistical methods employed in this study revolved around work with proportions. Thus the chi-squared test was used to determine the significance of the prevalence of anaemia amongst the young old (< 75 years) compared to the old old (⩾ 75 years) and because the numbers were small, a Fisher's exact test was used to determine the significance of the institutional background producing a more severe anaemia

RESULTS

General features

One hundred and fifty-one patients were admitted to the ward during this period. Of these, 54 (35.8%) were anaemic, with 30 (55.6%) males and 24 (44.4%) females. A total of 10 anaemic patients came from institutions (residential and nursing homes).

Age distribution

The age distribution of the anaemic patients are shown in Table

I. The prevalence of anaemia is higher in the old old age group (≥75 years) as compared to the young old (65-74 years) category. This difference, in fact, reaches statistical significance with the chi-squared test (chi-squared = 4.27, df = 1, $p < 0.05$).

Table I – Age distribution of the anaemic patients

Age categories (years)	Total no. of admissions	Anaemic patients			% of total admissions
		Males	Females	Total	
65-74	60	10	5	15	25
≥75	91	20	19	39	42.9

Severity of anaemia

Table II depicts the distribution according to the severity of anaemia. As expected, the majority had mild anaemia (defined as being 10.0 g/dl and above). The last column represents the numbers from institutional settings. It can be seen that the proportion of patients from institutions increases as the anaemia becomes more severe. This can be verified more objectively, where by forming two groups (one above and the other below a haemoglobin level of 8 g/dl), and by employing the Fisher's exact test it is seen that amongst our patients with more severe anaemia (Hb < 8), a statistically significant proportion were from an institutional background ($p < 0.02$).

Table II – Severity of anaemia and institutional background

Haemoglobin (g/dl)	Anaemic patients	
	total number	institutionalised
12.9 – 10.0 (males) 11.4 – 10.0 (females)	35	3
9.9 – 8.0	12	3
7.9 – 6.0	4	2
< 6.0	3	2

Red blood cell (RBC) size and causes

Table III shows the various diagnoses obtained under the categories of microcytic, normocytic and macrocytic anaemias. An important point that should be noted is that in this Table, the actual number of causes (and not patients) have been depicted; in some instances, individual patients had several (generally 2) causes for their anaemias. This is not surprising as elderly patients typically have multiple pathologies.

Table III – RBC size and the various causes

Causes	Microcytic Anaemias (≤ 76 fl)	Normocytic Anaemias (77-92 fl)	Macrocytic Anaemias (≤ 93 fl)
Iron deficiency	1	5	3
Folate-deficiency	1	7	6
B_{12}-deficiency	–	2	3
Chronic illness	1	6	3
Thalassaemia	1	1	–
Marrow problems	–	2	–
Undetermined	1	13	6

All the iron-deficiency anaemias in our study turned out to be secondary to bleeding from the gastro-intestinal tract (GIT). Six presented acutely with either haematemesis or malena - all were due to bleeding peptic ulcers or gastritis. The remaining three had less dramatic presentations; in fact, iron-deficiency anaemia was the first clue to the gastro-intestinal pathology in these cases (two were due to chronic gastritis and the other had carcinoma of the colon).

When anaemia was diagnosed to be secondary to chronic illness, the underlying pathologies were chronic renal failure (n=6), TB bronchiectasis (n=2), rheumatoid arthritis (n=1) and carcinoma of the lung (n=1). The 2 cases of marrow problems picked up in the study were due to polycythaemia rubra vera (myelofibrotic stage) and myelodysplasia.

Undetermined anaemias

A total of 22 undetermined anaemias were noted in this study. Because of this large proportion, they were looked at in closer detail as to the reasons why they were labelled as such.

The vast majority (n=14) of our undetermined anaemias were "undetermined" because work-up was not done as the anaemia was determined to be very mild (approximately 12.5 g/dl for males and 11.0 g/dl for females). Unfortunately the design of this study did not allow these cases to be tracked over time to ascertain their later haemoglobin status. In only one case was there a truly idiopathic anaemia when even after a bone marrow study, the diagnosis was "hypoproliferative anaemia, cause unknown". Five of our patients should have received further work-up, but they did not and thus their anaemias became "undetermined". In one instance it was considered inappropriate to work-up the anaemia further because of the patient's poor cognitive and functional state. Another patient passed away soon after admission and thus the evaluation could not be done.

Severity of anaemias and their causes

Table IV classifies the anaemia according to its severity and lists the various underlying causes in each category. Again the numbers here indicate the actual number of causes and not patients.

Needless to say, the vast majority of the undetermined anaemias fell under the mild anaemia category with none under the severe anaemia group. This is consonant with what has been written above about the undetermined anaemias.

If we assume that all the 22 cases of undetermined anaemias would have been truly idiopathic even if a full work-up had been done, it remains a fact nevertheless that the majority of causes (66%) could still be easily established. Moreover, when we aggregate the more treatable causes of anaemia (iron, folate and B_{12}-deficiencies), they constitute 44% of the total causes in Table IV. This underscores the importance of evaluating anaemia. Even amongst the mild anaemia group, iron, folate and B_{12}-deficiencies comprised 29% of the causes in that category.

Table IV – Severity of anaemia and the various causes

Causes	Mild Anaemia	Moderate Anaemia	Severe Anaemia
Iron-deficiency	4	4	1
Folate-deficiency	6	5	3
B_{12}-deficiency	1	1	3
Chronic illness	6	3	1
Thalassaemia	2	–	–
Marrow problems	1	–	–
Undetermined	18	4	–
Total	38	17	9

Mild Anaemia –Hb: 12.9 – 10 g/dl (male); Hb: 11.4 – 10 g/dl(female)
Moderate Anaemia – Hb: 9.9 - 8.0 g/dl
Severe Anaemia – Hb: < 8.0 g/dl

DISCUSSION

The prevalence of anaemia was noted to have increased significantly after 75 years of age. Workers elsewhere have also noted an increasing incidence of anaemia with increasing age[16,17] but not everybody has been able to confirm a neat trend[1]. Previous studies have also observed a greater prevalence of anaemia amongst the institutionalised elderly[8]; our data indicate that those from an institutional background tend to present with more severe anaemia.

This study has also observed a lack of classical correlation between RBC size and the specific deficiencies. Thus only one out of nine iron-deficient patients had microcytic RBCs and likewise only six out of fourteen folate deficient and three out of five vitamin B_{12} deficient patients showed macrocytic RBCs. A partial explanation may reside in the multiple concomitant pathologies that many elderly patients may be having with the final RBC size being the aggregate of all these conditions. It would therefore seem that in evaluating anaemia in the elderly, exclusion of deficiency states must not be based upon the presenting RBC size.

All the nine cases of iron-deficiency in this study were secondary to bleeding from the GIT. In the 3 instances when the more dramatic symptoms of malena or haematemesis were absent, the gastro-intestinal pathology manifested solely as iron-deficiency anaemias. Whether this means that iron-deficiency anaemias should always be worked up for an underlying GIT bleed, unfortunately the design and size of this study do not permit us to comment. However studies done elsewhere have shown bleeding from the gastro-intestinal tract to be the most important cause of iron-deficiency in the elderly[5,18]. The role of poor nutrition in causing deficiency-related anaemias (iron, folate or B_{12}) could not be directly determined in our retrospective work because this observation was not consistently recorded in the case-sheets.

Another point that this study suggests is that it can be useful to evaluate anaemia in the elderly even when it is mild. There is often the impression that there is an anaemia-of-senescence with the implication that working up the anaemia, especially when it is mild, is not necessary in the elderly.

Current consensus however is that anaemia is never a normal consequence of ageing[19] and that there is insufficient justification for asking for new age-adjusted criteria for anaemia in the elderly[11]. Animal studies quite clearly show that basal erythropoiesis is unchanged with ageing, though the reserve capacity can be compromised[20]. Moreover, anaemia has been noted to be extremely rare in very affluent and healthy elderly communities[21].

Table IV shows that under the category of mild anaemia, slightly less than half of the total causes were undetermined. Even if we assume that all these would still be idiopathic after a full work-up, the fact remains that more than half of the causes under mild anaemia could be delineated - in other words, the work-up for mild anaemia yielded a cause almost 50% of the time. Moreover more than a quarter of the causes in this category were easily treatable (iron, folate and B_{12}-deficiencies).

Some of the earlier work on mild anaemia in the elderly had focused on ambulatory, community-living subjects[9] with the observation that many were finally labelled as idiopathic cases of anaemia after the clinical work-up. This contrasts with the hospitalised group of patients in our study and this may explain our greater yield of identifiable causes since one can always expect a greater prevalence of illnesses in a hospitalised cohort. Moreover, the present study was conducted in a ward which generally had patients from a lower socio-economic group; a higher prevalence of deficiency - related anaemia are known to characterise such groups[22].

The above findings thus indicate that evaluating anaemia in the hospitalised elderly is important and suggests that this usefulness may even extend to the mildly anaemic group. But all retrospective studies, such as the present one, have their limitations. Thus it was not possible to denote accurately in this work the plasma volume or the nutritional history of the patients. Such limitations have also characterised several other published works in this area. Hence to establish more strongly the clinical usefulness of working up mild anaemia in this age group, further studies - prospectively evaluating the important determinants of anaemia and involving larger number of patients - are needed. Such studies may also help determine the level of haemoglobin at which the work-up becomes cost-effective.

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