Short Communication

We should not underestimate Vitamin B12 and folic acid deficiencies in oldest old

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ABSTRACT

Aim: It was aimed to investigate hemogram parameters, ferritin, vitamin B12 and folic acid levels of patients above age 80 who applied to the internal medicine outpatient clinic. Methods: Leukocyte, hemoglobin, platelet, ferritin, vitB12 and folic acid levels of total 200 patients (108 (54%) female and 92 (46%) male) age 80 and older were investigated retrospectively. Results: Out of 200 patients, 54 (27%) patients had normal hemogram. Hemoglobin levels of 58 (29%) cases were found normal, 138 (69%) were found low and 4 (2%) were found high. Leukocyte levels were normal in 144 (72%), leukopenia was detected in 28 (14%), and leukocytosis in 28 (14%) cases. Platelet levels of 129 (64.5%) cases were normal, 52 (26%) were assessed as thrombocytopenia and 19 (9.5%) as thrombocytosis. The deficiency anemia detected in 81 (58.7%) cases and the number of patients who has ferritin, vitB12 and folic acid deficiencies were 16 (19.7%), 27 (33.3%), and 19 (23.5%) respectively. Pancytopenia was detected in 18 (9%) patients and bicytopenia was detected in 30 (15%). Conclusion: The frequency of anemia is increased in the geriatrics population above age 80, deficiency anemia in particular. The present study is different from the literature since the most common deficiency was vitB12, following folic acid and iron deficiency. The importance of supportive treatment with vitB12 and folic acid replacement should not be underestimated in this population.

Keywords: elderly, blood count, ferritin, vitB12, folic acid deficiency

INTRODUCTION

Aging is a normal process, and a condition in which individuals gradually lose their physical and mental powers irreversibly (Bureau, 2007). The onset of old age is stated to be 65 years in the reports published by the World Health Organization (WHO) (Organization, 2008). Anemia is a common disease in elderly. Although average hemoglobin values differ from laboratory to laboratory, a working definition of anemia in the adult is a level less than the normal mean minus two standard deviations. At present, there is not a uniformly accepted definition of anemia for the older adult, with proposed definitions differing by sex, age, race, and ethnicity. Until such definitions become available, anemia should be considered when the hemoglobin is <13 g/dL in elderly men and <12 g/dL in elderly women according to WHO criteria. Older adult patients can have multiple causes of their anemia. As an example, underlying renal insufficiency, myelodysplasia, or a nutritional deficiency

Table 1. The distribution of laboratory findings

	Number (n)	The lowest	The highest	Mean	Standard deviation
Age (years)	200	80	96	82.5	2.86
Hb (g/dL)	200	3.1	18.8	10.8	2.8
Leukocytes (/microL)	200	0.7	72	7.9	6.93
Platelets ($\times 10^9$/L)	200	8	1218	258.7	173.32
Ferritin (ng/mL)	200	2.8	2000	187.5	299.81
VitB12 (pg/mL)	200	26	2000	422.2	328.85
Folate (ng/mL)	200	2.1	41.4	8.1	4.64

Table 2. The distribution of the cases according to hemoglobin, leukocyte, and platelet levels

	Low, n (%)	Normal, n (%)	High, n (%)	Total, n (%)
Hemoglobin	138 (69%)	58 (29%)	4 (2%)	200 (100%)
Leukocytes	28 (14%)	144 (72%)	28 (14%)	200 (100%)
Platelets	52 (26%)	129 (64.5%)	19 (9.5%)	200 (100%)

may blunt the ability of the patient's bone marrow to respond to hemolysis or blood loss. Accordingly, full evaluation of the anemic elderly patient may take several visits, including, for example, monitoring for response to nutrient supplementation or hormone replacement. Furthermore, the bone marrow being affected by primary and secondary diseases, as well as an age-related decrease likely in bone marrow functions should be remembered as a cause of anemia (Izaks et al., 1999). In general, diagnostic algorithms for determining the cause of anemia in older adults are similar to those for anemia found in any adult patient. Essential components of the initial evaluation include history and physical examination, complete blood count BUN, creatinine, and urinalysis, stool examination for occult blood, serum iron, total iron binding capacity (transferrin) and ferritin, serum B12 and folate levels. Evaluation of the patient's nutritional status plays an important part in the diagnostic approach to anemia in the older adult. Thus, issues such as adequacy of dietary folate, use of alcohol, and reduction of cobalamin absorption secondary to atrophic gastritis, Helicobacter pylori infection, and use of agents that suppress gastric acid production need to be assessed in some depth. In the present study, geriatric cases of 80 years and older who were referred to the hematology outpatient clinic were investigated including hemogram parameters and ferritin, vitamin B12 (vitB12), and folic acid levels.

METHODS

Totally 200 patients (108 (54%) female and 92 (46%) male) age 80 years and older who were referred to the internal medicine outpatient clinic for further investigation between October 2011 and March 2012 were included in the study. Leukocyte, hemoglobin (Hb), platelet, ferritin, vitB12, folate level of the patients were recorded

retrospectively. Hemoglobin levels <12 g/dl in women and <13 g/dl in men, leukocytes <4000/microL and platelets <150x10^9/L were considered as anemia, leukopenia, and thrombocytopenia respectively (Guralnik et al., 2004). The reference ranges were 15-150 ng/ml in women and 30-150 ng/ml in men for ferritin, 197-866 pg/ml for vitB12, and 4.6-18.7 ng/ml for folate. The cases with anemia were classified as severe, moderate and mild anemia groups according to Hb levels <7 g/dl, 7-10 g/dl, and >10 g/dl, respectively. Hemoglobin levels above 16.5 g/dl in women and 18.5 g/dl in men were considered as polycytemia (Balducci and de Gaetano, 2008; Nilsson-Ehle et al., 2000). The cases with 100-150×10^9/L platelets were considered as mild, those with 50-99×10^9/L as moderate, those with 20-49×10^9/L as severe and those with <20×10^9/L as very severe thrombocytopenia. Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) Version 17.0.

RESULTS

Mean hemoglobin, leukocyte and platelet levels of totally 200 cases included in the study were 10.8±2.8 g/dl, 7.9±6.93/microL, 258.7±173.32×10^9/L, respectively. The mean levels of ferritin, vitB12 and folic acid levels including lowest and highest values were presented in Table 1. The distribution of hemoglobin, leukocyte, and platelet levels of the cases were given in Table 2. Among the thrombocytopenic cases 26 (13%) had mild, 16 (8%) had moderate, 7 (3.5%) had severe and 3 (1.5%) had very severe thrombocytopenia. The distribution of anemic cases were presented in Table 3. Ferritin, vitB12, and folate deficiencies were found in 16 (19.7%), 27 (33.3%), and 19 (23.5%) cases respectively. Eleven (5.5%) patients had both iron and vitB12 deficiency, 5 (2.5%) patients had folate and vitB12 deficiency and 3 (1.5%)

Table 3. The distribution of the cases according to the severity of anemia

	Mild anemia	Moderate anemia	Severe anemia	Total
Female	34 (24.6%)	22 (15.9%)	9 (6.5%)	65
Male	34 (24.6%)	30 (21.7%)	9 (6.5%)	73
Total	68	52	18	138

Table 4. The distribution of deficiency anemia cases

Deficiency	Number, n (%)
Ferritin	16 (19.7%)
VitB12	27 (33.3%)
Folate	19 (23.5%)
Ferritin+VitB12	11 (13.5%)
Folate+VitB12	5 (6.3%)
Ferritin+VitB12+Folate	3 (3.7%)

patients had iron, folate and vit B12 deficiency. The distribution of the cases with deficiency anemia was presented in Table 4. While pancytopenia was detected in 18 (9%) patients, bicytopenia was detected in 30 (15%) patients in the study.

DISCUSSION

While the ratio of 65 years and older population is 7.2% in Turkey according to 2010 health statistics of the Republic of Turkey Ministry of Health, that ratio is 12.4% in the United States of America (USA). One of each five persons is estimated to be old in the USA in 2050 (Bureau, 2007; Health, 2010). Although a decline in hemoglobin level is observed in normal aging, such decline is moderate. Decreased physical function, muscle loss, osteoporosis, reduced strength, aggravation of concomitant diseases, frequent admissions to hospital and shorter life-expectancy are seen more in old patients with anemia compared to those without anemia (Penninx et al., 2003; Cesari et al., 2004; Cesari et al., 2005; Penninx et al., 2004; Penninx et al., 2005). Increases in the prevalence and incidence of anemia with age are not only contributed to age, itself, but also to increase in the prevalence of chronic diseases which may cause anemia with age (Beard et al., 1997). Anemia, as the definition of the WHO, increases five-year mortality risk 2-fold independent of age, gender, and medical condition (Izaks et al., 1999). Cytopenias, primarily anemia (69%), were detected as the most common abnormalities in this study. The single vitamin deficiencies were found in more than half of the cases with anemia, and the combined vitamin deficiency rate was 9.5%.

The most common causes of anemia in elders are gathered under the topics of iron deficiency, chronic disease anemia, chronic renal failure, vitB12 and folate deficiency, hypothyroidism, myelodysplastic syndrome and unexplained anemia. With age, decrease in iron intake due to dietary limitation, change in iron absorption, impairment in iron distribution and iron loss related to inflammatory and malign diseases increase in the patients. In conclusion, iron metabolism disorders are very common in old age (Guralnik et al., 2004). While the prevalence of iron deficiency anemia in the age group of 65-74 years is 5-10% in literature, the rate is over 20% in the elderly group 85 years and older (Cesari et al., 2004). The group study carried out in Japanese patients showed that Hb levels decreased 0,036 g/dl in women and 0,04 g/dl in men in average every year in people without any disease between 70-80 years (Beard et al., 1997). Similar findings were reported in healthy Swedish people between 70-88 years (Yamada et al., 2003). The prevalence of anemia reaches 40-50% in old people hospitalized and living in sophisticated nursing homes (Organization, 2008).

In the present study, the prevalence of anemia in the cases 80 years and older was detected as 69% which is higher than literature. It is well known that the elders have the highest risk for vitB12 deficiency and it is important to find out and treat the deficiency as vitB12 replacement therapy is usually efficient, cheap and nontoxic. Many screening studies on elders demonstrated that the prevalence of vitB12 and folic acid folic acid deficiencies in old population shown by low serum vitB12 and increased methylmalonic acid and/or homocysteine levels was quite high (10-30%) (Guralnik et al., 2004). A similar study found vitB12 deficiency in 22.2%, folic acid deficiency in 10.1%, and iron deficiency in 22.4% of the cases over 75 years (Beard et al., 1997). The present study is different from the literature since the most common deficiency was vitB12 deficiency (33.3%) following folic acid (23.5%) and iron deficiency (19.7%) anemia.

Thrombocytopenia is a common hematologic disorder in elders, but there are no definite data on real prevalence (Janu et al., 2003). The prevalence of thrombocytopenia was 26% in the present study. When it is taken into consideration that automatic counter devices may give nonrealistic lower results particularly when

there are giant platelets, it should be remembered that low platelet counts should be assessed through a well prepared peripheral blood smear. No clear data was found in literature on the leukocyte counts in elders. In the present study, leukopenia was detected in 14% of the cases and leukocytosis in 14%. An increase in the prevalence of infections secondary to a decrease in cellular and humoral immunity in old age should also be kept in mind along with leukocyte counts.

In conclusion, the frequency of anemia is increased in the geriatrics population above age 80, deficiency anemia in particular. The present study is different from the literature since the most common deficiency was vitB12 deficiency, following folic acid and iron deficiency. The importance of supportive treatment with Vitamin B12 and folic acid replacement should not be underestimated in this population.

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