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Research paper

Prevalence of anemia among elderly patients in an emergency room setting



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ABSTRACT

Purpose: Anemia is highly prevalent in geriatric patients and associated with increased morbidity, functional and cognitive decline. German prevalence data are rare and no treatment guidelines exist for the elderly. Anemia often remains unconsidered in this population. This study evaluates prevalence of anemia among geriatric patients in an emergency room (ER) setting and the performed diagnostic and therapeutic steps.

Subjects: Data of 1045 elderly patients > 70 years admitted to the ER at our university hospital between January and August 2010 were retrospectively analyzed (384 female and 474 male in-patients, 92 female and 95 male out-patients). Anemia definition: hemoglobin < 12 g/dL (female) and < 13 g/dL (male). Diagnostic and therapeutic steps, medication and hemoglobin (hb) characteristics at transfer from ER to other departments were evaluated.

Results: Among in-patients anemia was found in 54.2%, among out-patients in 36.4% ($P < 0.001$). Hb was significantly lower in anemic in-patient men ($P = 0.007$) compared to anemic out-patient men. No such difference was found among women. Anemic patients' age did not influence the hb level. There were department specific differences in hb level as well as diagnostics and therapy of anemia. Only 12% of all evaluable anemic in-patients received a non-drug anemia treatment, mostly consisting of transfusions. **Discussion/Conclusion:** More than 50% of all elderly patients suffered from anemia; less than one fifth received either anti-anemic medication or non-drug treatment; insufficiency of medical care in this study group can be assumed; close interdisciplinary cooperation with geriatrician in ER is necessary with development of diagnostic and therapeutic guidelines for anemic elderly.

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1. Introduction

Anemia is highly prevalent in geriatric patients [1,2]. With some variation in different patient cohorts, prevalence of anemia can reach 20% among independently living seniors and 40% among in-patients in hospitals [2,3]. However, most data derive from American prevalence studies [2–4], while data of anemia among geriatric patients in Germany are rare. Anemia is not an age-related disease on its own, but is a symptom with multifactorial genesis and high risk potential [5]. It directly influences mortality, morbidity, and the rate of hospitalization [5–7]. Recent literature showed that low postoperative hemoglobin (hb) levels in geriatric patients after hip fractures are associated with longer hospital

stays [8] and increased mortality in geriatric patients undergoing percutaneous coronary intervention [9]. In a recent systematic review, several studies have been identified, showing significant association between anemia and cognitive decline, as well as the incidence of dementia and reduced executive functions [10]. Although the negative impact of anemia on geriatric patients' outcome is nowadays widely acknowledged, no general guidelines exist for this patient group [11]. This leads to disputes about which patient should be treated how and when and the danger of insufficient medical care for anemic elderly patients.

The present study was intended to analyze prevalence of anemia among elderly in- and out-patients in an emergency room setting at our university hospital. Additional data was collected for analysing diagnostic and therapeutic steps, medication and patients' transfer to other departments in association with presence of anemia. To our knowledge this is the first study on this subject.

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2. Subjects/Material and methods

2.1. Location

In the interdisciplinary emergency room setting (ER) of our university hospital, about 20,000 patients are seen per year. Medical staff is working on a continual basis 24 hours per day, 7 days per week. A ward with 10 beds is attached to the ER, allowing admission and in-patient treatment at every time, because patients do not stay more than one night on this ward. They are transferred to cooperating departments as soon as possible in dependence on their medical needs.

2.2. Subjects

One thousand and forty-five patients ≥ 70 years who had data documented in the intern electronic data processing system, presented in ER at our university hospital between January and August 2010 (858 in-patients) or January and March 2010 (187 out-patients) and were included in our retrospective study. If patients presented more than one time in the aforesaid periods, each admission was considered as new case. Based on the WHO-definition of anemia with hb < 12 g/dL in women and hb < 13 g/dL in men [12], 533 patients were anemic according to their routinely checked lab results at admission (Fig. 1). In- and out-patients were analyzed separately.

2.3. Parameters

All relevant parameters were raised from ORBIS, including patient data, laboratory data, medical documentation and physicians records.

For anemic patients we extracted age, sex and basic laboratory data including hb level at admission from the electronic data system. Additionally, for anemic in-patients the following information was collected: hematologic parameters for diagnosis of anemia (serum iron, serum transferrin, transferrin saturation, serum ferritin, serum folate, serum cobalamin, reticulocytes) if determined and further diagnostic and therapeutic procedures for anemia. In-patients' medication at admission to ER was documented as well as the medical department, where the patient was transferred to from ER. Hematologic parameters for diagnosis of anemia and therapy information were collected from the electronically archived lab and physicians' records respective. In non-anemic patients no further data were raised except gender.

Statistic evaluation was performed with IBM® SPSS® Statistics, Version 21. The Mann-Whitney U-test was used to compare metric variables. Displayed descriptive statistics are absolute frequency and percentage and median with 1st and 3rd quartiles (inter-quartile range [IQR]), depending on variable type. The Chi-squared test or the Fisher's exact test were used for categorical variables. Correlation was described by Spearman rank coefficient. All statistical tests were two-sided, differences were considered significant at the $P < 0.05$ level.

The responsible ethics committee of the University Hospital Cologne has given consent to this study.

3. Results

3.1. Patients

Among the 858 in-patients, 474 (55.2%) were male and 384 (44.8%) female. Of the 187 out-patients, 95 (50.8%) were male and 92 (49.2%) female (Table 1).

3.2. Prevalence of anemia and median age

Among the in-patients, 54.2% (465/858) had anemia according to WHO-criteria with significantly more anemic men than women ($P = 0.001$): 59.5% (282/474) men versus 47.7% (183/384) women. Of the anemic in-patients, women were significantly older than men ($P = 0.003$) (Table 1).

Among the out-patients, anemia was found in 36.4% (68/187), with 44.2% (42/95) in male and 28.3% (26/92) in female out-patients. Anemia was more often found in male out-patients ($P = 0.023$). Here the difference in median age was not significant ($P = 0.226$) (Table 1).

3.3. Hemoglobin level and patients' age

In both the in- and out-patients group, the median hb concentration of female patients was significantly lower than the median hb of male patients (Table 1).

For investigation of the influence of the patients' age on the hb level, we divided the anemic in- and out-patients into five age groups (a: 70–74 years; b: 75–79 years; c: 80–84 years; d: 85–89 years; e: ≥ 90 years). Analysis of hb concentration between the age groups within the same sex by Kruskal-Wallis test revealed no significant differences for in-patients (female: $P = 0.690$; male: $P = 0.269$) or for out-patients (female: $P = 0.422$; male: $P = 0.347$).

3.4. Renal function and inflammatory parameters

Leucocyte count, serum levels of C-reactive protein (CRP), urea and creatinine were evaluated. Analysis between male and female patients revealed no sex specific difference except for creatinine among in-patients ($P = 0.002$) as well as out-patients ($P = 0.001$) with higher levels in male patients.

Comparison between in- and out-patients revealed higher levels of CRP ($P = 0.001$) and leucocytes ($P = 0.041$) among in-patients. In contrast to male patients, female in-patients had higher creatinine levels than female out-patients ($P = 0.033$). For the other parameters, no statistically significant differences were found between in- and out-patients.

3.5. Transfer

For anemic in-patients we examined the hb level (g/dL) in all departments where patients had been transferred to from ER. Departments with ≤ 3 patients were combined (oral and maxillofacial surgery, dermatology, ophthalmology, psychiatry,

Study Patients and Analyzed Data

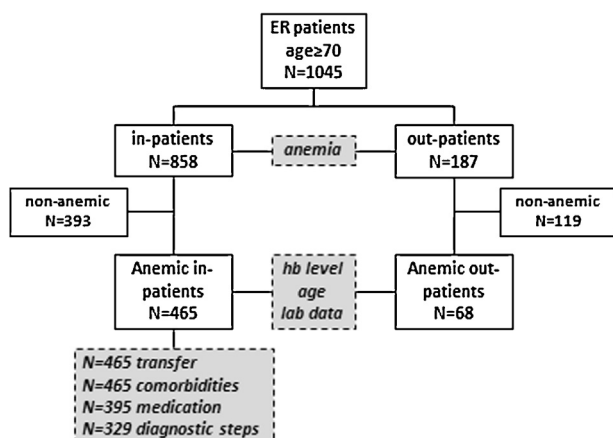


Fig. 1. Patient selection and analyzed data.

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