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Particularities of Anemia in the Elderly: Experience in a Geriatrics Department in Senegal

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Abstract

Background/Objective: Anemias are frequent conditions in geriatric practice. The etiologies are numerous, overlapping chronic and acute pathologies. it is also associated with high morbidity and mortality. In our context, few studies have addressed this issue, and none have been carried out in geriatric units with integrated geriatric dimensions. The aim of this study was to describe the particularities of anemia in old people in a geriatric short-stay service in Senegal. **Materials and methods:** This was a retrospective, descriptive study from 01 May 2019 to 31 December 2021, involving people aged 60 or over, hospitalized in the geriatrics department of Fann Hospital (Senegal) and presenting with anemia. Epidemiological, clinical and evolutionary characteristics were collected and analyzed using SPSS 24.0 software. **Results:** The prevalence of anemia was 32.3%. The mean age of our sample was 78.7 ± 8.5 years. Arterial high blood pressure (59.3%), diabetes mellitus (22.8%), prostate disease (12.3%) were the most frequent comorbidities. Clinical manifestations were dominated by physical asthenia (80%) and severe alteration of general condition (72%). The geriatric syndromes were essentially represented by the loss of Activities Daily Living (ADL) autonomy (65%), undernutrition (59%) and frailty (46%). The mean hemoglobin level was 8.4 g/dl ± 2.1. The main etiologies were infections (32.7%), chronic kidney disease (20.9%), iron deficiency (7.4%). The mean hospital stay was 8 days ± 3.7 days and the mortality rate was 19%. **Conclusion**: Anemia is a frequent occurrence in geriatric medicine, with a high morbidity and mortality rate; its expression is often atypical, with frequent geriatric syndromes; the etiologies are multiple and often interrelated, requiring an exhaustive and multidimensional approach.

Keywords

Anemia, Geriatric, Senegal

1. Introduction

The demographic and epidemiological transitions that humanity is undergoing are having a major impact on the global healthcare system. Anemias are at the crossroads of epidemiological mutations, straddling both chronic and acute pathologies. Anemia is defined as a drop in hemoglobin levels. The threshold values defined by the World Health Organization (WHO) in 1968 remain generally accepted: hemoglobin level < 130 g/dl for men and <120 g/dl for adult women [1]. Senile anemia does not exist. Anemia is the most common hematological disorder. It is a real worldwide public health problem. The highest prevalence is found in South Asia, Central Africa and West Africa [2]. Its frequency increases with age, rising from 10.3% between the ages of 17 and 49% to 26% over the age of 75 [3]. In geriatric practice, anemia can be a sign of several diseases [4]. It is a major cause of morbidity and mortality, and can worsen vital and functional prognosis, especially in the presence of associated geriatric syndromes. Unfortunately, few studies have focused on the particularities of anemia in the elderly in Africa. In Senegal, the only study on the anemia of elderly subjects was carried out in 2015 in an internal medicine department [5] and did not take into account the data from the standard geriatric assessment. It is in this context that we proposed to carry out this study in the first university geriatric service in the sub-region, with the main objective of updating the data on the issue and highlighting the dimensions of standardized geriatric assessment.

2. Material Methods

This study was carried out in the geriatric short-stay department of the University Hospital of Fann. It is located in Dakar, the capital of Senegal, which has 339,8362 residents out of a total population of 17,215,433. The capital city alone accounts for 19.7% of Senegal's population. Fann Hospital is a level 3 facility at the top of the national health pyramid, with a vocation for care, research and medical training. It has several specialized departments, making it an ideal setting for a cross-disciplinary field such as geriatrics, whose department was created in 2015. It is the first geriatric university department in the sub-region. Its activities include outpatient consultation, home visits, day hospitalization with a capacity of 3 beds and a short-stay hospitalization unit with 9 beds.

This was a retrospective, descriptive study from May 01, 2019, to December 31, 2021. We carried out the study on a population of 502 patients aged at least 60 admitted to the department during this period. Twelve patients were excluded from the study because their medical records were incomplete and unusable. A total of 162 patients met the diagnostic criteria for anemia on the basis of a drop in hemoglobin levels of less than 13 g/l in men and 12 g/l in men.

Data were collected using a data collection form, after free and informed consent had been obtained from the elderly patient or his/her legal representative. Sociodemographic, clinical and therapeutic variables were studied. Geriatric syndromes were sought almost systematically, using tools validated in the elder-

ly: Katz's Activities Daily Living (ADL) to assess functional autonomy for daily activities; Mini-nutritional assessment (MNA) for nutritional status; Geriatric Depression Scale (GDS) for mood and the Senegal test (20) to assess neurocognitive functions. Severity of anemia was defined according to the hemoglobin level: slight to moderate between 8 and 12 g/d; severe between 6 and 8 g/l and very severe below 6 g/l. Data collection and analysis were performed using SPSS 24.0 software. Quantitative variables were expressed as frequency (%) and mean with standard deviation; qualitative variables as frequency.

3. Results

3.1. General Characteristics of the Population

During the study period, 502 patients were hospitalized. One hundred and sixty-two (162) presented with anemia, representing a prevalence of 32.3%. The mean age was 78.7 ± 8.5 years, with extremes of 60 and 100 years. The 75 - 79 age group was the most represented (20.83%). There was a slight female predominance (53%), with a M/F sex ratio of 0.88 (**Table 1**). Arterial high blood pressure (59.3%), type 2 diabetes (22.8%), prostate disease (12.3%) and heart disease (5.6%) were the most frequent comorbidities. (30%) and coffee consumption (22%). The lifestyle was dominated by coffee (30%) and tea consumption (22%). Active smoking was found in 10% of patients, and only 4% of patients consumed alcohol. Poly medication with at least 5 drugs at admission was present in 22% of patients (**Table 1**). Herbal medicine made from decoctions was present in 3% of cases. Self-medication was observed in 11% of patients.

3.2. Diagnostic Features

The main reasons for hospitalization were refusal to eat (25.9%), deterioration in general condition (22.2%), cough (9.3%), confusion (7.4%) and fever (7.4%). The functional symptomatology of anemia was dominated by physical asthenia (80%), dyspnea on effort (22%), and headache (12%). General signs were mainly severe alteration of general condition (WHO stage 3 and 4) (72%) and paleness of mucous membranes (69%). Signs on physical examination were mainly tachycardia (29%), Pulmonary condensation (27.2%) and impaired consciousness (15.4%) (**Table 2**). The geriatric syndromes found were essentially loss of functional autonomy (65%), malnutrition (59%), frailty (46%), immobilization syndrome (21%), and cognitive disorders (24%), distributed as follows: mental confusion (15%), chronic major cognitive disorders (9%) (**Figure 1**).

The mean hemoglobin level found in our patients was 8.4 g/dl ± 2.1 with extremes of 3.3 and 11.9. Hematological tests revealed a normocytic anemia in 73.5% of cases. It was microcytic and macrocytic in 22.2% and 4.3% of cases respectively. Anemia was hypochromic in 22% of patients. Anemia was moderate in 44% and severe in 43%. Thirteen percent (13%) of patients had very severe anemia. Reticulocyte assays were performed in 15% of patients. In 11% of cases, it was consistent with an aregenerative anemia. Sixty-six percent (91.66%) of pa-

tients with microcytic anemia had their ferritin levels measured. Ferritin levels were reduced in 48.5% of patients. Ninety-seven percent (97.1%) of patients had positive C Reactive Protein. Alteration of renal function (GFR < 60 ml/min/1.73 m^2) was found in 37.3% of cases. Vitamin B12 assays were carried out in 3% of patients (n = 5) and were lowered. Hypo-vitamin B9 was found in 2 patients (1,2%). A bone medullogram was performed in 3% (n = 5) of the study population and presence of >20% plasmacytosis in favor of multiple myeloma was found in three patients (1.2%). (Table 2)

Table 1. General characteristics.

Variables		Numbers	Percentage (%)
Age groups Mean age: 78.7 ± 8.5 years	[60, 64]	2	2.08
	[65, 69]	15	15.62
	[70, 74]	15	15.62
	[75, 79]	20	20.83
	[80, 84]	19	19.79
	[85, 89]	16	16.66
	[90, 94]	09	9.18
	[95, 99]	02	2.08
Sex	Men	86	53
	Women	76	47
Medical history	Stroke	28	17.3
	Cancers	6	3.7
	Falls	6	3.7
Comorbiditis	Hight Blood Pressure	96	59.3
	Mellitius Diabetes	37	22.8
	Prostate Disease	20	12.3
	Heart Disease	9	5.6
	Major Cognitive Impairment	8	4.9
	Arthritis Disease	6	3.7
	Chronic Kedney Failure	3	1.9
	Asthma	2	1.2
lifestyle	Coffee Consumption	48	30
	Tea Consumption	36	22
	Smoking History	16	10
	Alcoholism	6	4
Number of medicines on admission	[1 - 2]	86	53
	[3 - 4]	58	36
	[5 - 6]	19	12
	[7 - 8]	16	10

Table 2. Clinical features.

Symptomology			Numbers	Percentages (%)
Physical signs	Functional signs	Physical asthenia	130	80%
		Effort dyspnea	36	22%
		Headaches	20	12%
		Dizziness	09	6%
		Heart palpitation	03	2%
	General symptoms	Alteration of general condition stage	117	72%
		paleness of the mucous membranes	11	69%
		Déshydratations	97	60%
		Fever	24	15%
		Oedema of the lower limbs	19	12%
		Hypoxie	18	11%
	Cardiovascular	Auscultatory tachycardia	47	29%
		Reduced peripheral pulses	15	9.3%
		Diffuse systolic heart murmur	12	7.4%
		Cardiac arrhythmia	7	4.3%
		Cardiac hepatomegaly	4	2.5%
	Osteoarticular	Joint stiffness	23	14.2%
		limb ankylosis	14	8.6%
		limitation of hip movement	05	3.1%
		Dorsal cyphosis	02	1.2%
	Respiratory	Pulmonary condensation	44	27.2%
	Neurologic	Impaired consciousness	25	15.4%
		Paraplegia	7	4.3%
		Bilateral motor deficit	6	3.7%
		Neuro-anemic syndrome	02	1.2%
	Digestive	Fecal impaction	8	4.5%
		Icterus	6	3.7%
		Abdominal tenderness	6	3.7%
		Abdominal distension	4	2.4%
		Diarrhea	3	1.9%
		Melena	3	1.9%
		Rectorrhagia	3	1.9%
		Ascites	3	1.9%
			1	0.6%
	Uro-génital	Prostate hypertrophy	3	1.9%
		Inguinal hernia	3	1.9%
		Hematuria	2	1.2%

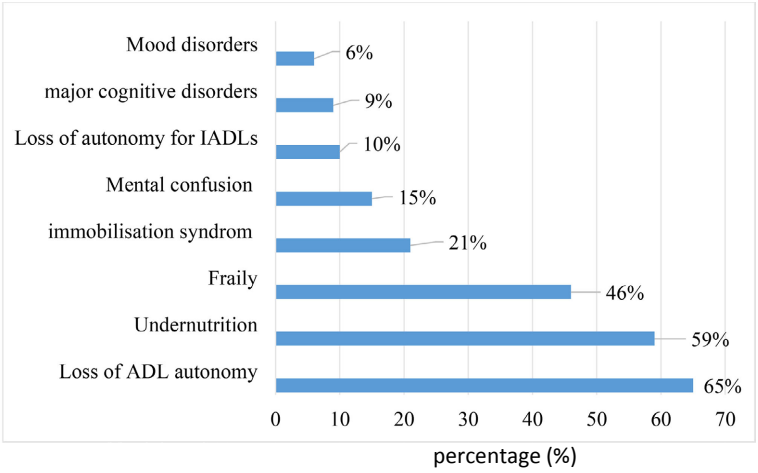

Figure 1. Distribution of geriatrics syndromes.

The main etiologies were infections (32.7%), chronic kidney disease (20.9%), martial deficiency (7.4%) and neoplasia (6.8%).In addition to etiological treatment, the mainstay of management included blood transfusion (37%), martial supplementation (23.5%), vitamin B12 (3.7%) and vitamin B9 (1.2%). (**Figure 2**) (**Table 3**)

3.3. Evolution

The mean hospital stay was 8 days ± 3.7 days (extremes 2 and 21 days). The evolution was favorable, with normalization of hemoglobin levels, regression of symptoms and return home in 72% of our patients. Nine percent (9%) of patients were transferred to other specialized services. The mortality rate was 19%.

4. Discussion

The prevalence of anemia in our study was 32.3%. Anemia is a frequent biological abnormality in geriatric medicine. Our prevalence is corroborated by several data found in the literature. In Africa, few studies are available on anemia in the geriatric setting. Bourgi *et al.* in the internal medicine department of the University Hospital of Aristide le Dantec (Dakar) reported in 2015 a prevalence of 34.2% (5), at Hôpital Général de Douala, Eveline NDT reported a prevalence of 62.2% (4). Konan MN in Côte d'Ivoire, at CHU de Treichville reported 79.56% of elderly diabetics with anemia [6]. Andrew Moore *et al.* [7], in a meta-analysis of 45 studies carried out in developed countries with a cohort of 85,409 elderly patients. Andrew Moore *et al.* [7], in a meta-analysis of 45 studies carried out in developed countries with a cohort of 85,409 elderly patients, found a prevalence of anemia of 39%. Patel, in a large study involving 21,079 patients, carried out in the United States and Italy, reported a prevalence of 40% [8]. The low prevalence of anemia in our study compared with the results of Eveline NDT *et al.* [4] n Cameroon and Konan MN *et al.* [6] in Côte d'Ivoire, both from sub-Saharan African countries, could be explained by the acute geriatric vocation of our department. Malaria is also endemic in Cameroon, unlike in Senegal, where it is in

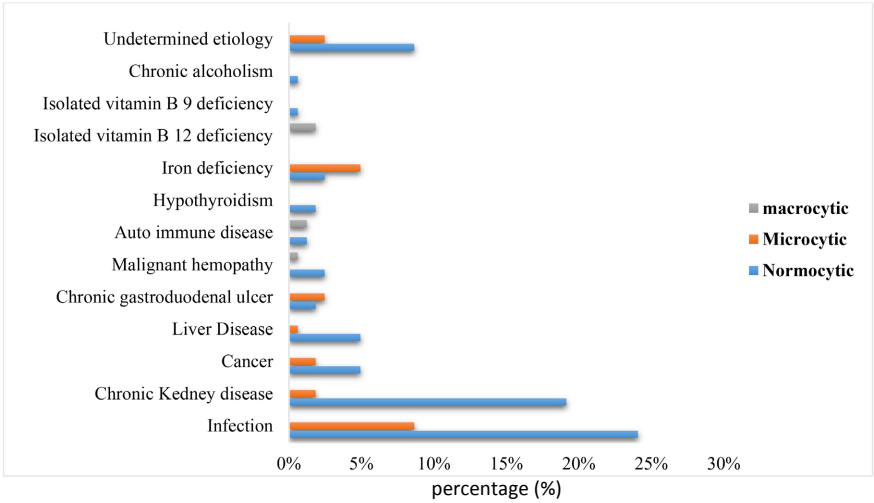

Figure 2. Distributions by etiology.

Table 3. Distribution of biological abnormalities.

Variables	Abnormalities	Pourcentage
Blood cell count	Moderate anemia	44%
	Sever anemia	43%
	Deep anemia	13%
	Normcytosis	73.5%
	Microcytosis	22.2%
	Macrocytosis	4.3%
	Normochromia	78%
	Hypochromia	22%
	A régénérative anemia	11%
	Thrombocytosis	12%
	Thrombocytopenia	24%
	hyperleukocytosis	47%
	Leucopenia	4%
	Pancytopenia	
Fonction rénale (n = 134)	Renal failure	32 %
Vitamine B12 (n = 05)	Hypo vitamine B 12	100%
Vitamine B9 (n = 03)	Hypo vitamine B 9	33.3%
ferritin levels (n = 33)	Elevated	39.4%
	Low	48.5%
CRP (n = 138)	Elevated	97.1%
Myélogramme (n = 03)		**100%**

the process of being eradicated [4]. The main geriatric syndromes frequently found were loss of functional autonomy of ADL (65%), undernutrition (59%)

and frailty (46%). Poly-medication, with at least 5 drugs taken regularly, was identified in 22% of patients. Most prescriptions were medical (89%), followed by self-medication (11%) and Herbal medicine in the form of decoctions (3%). In France, Abrar-Ahmad Zulfiqar at Rouen University Hospital (CHU de Rouen) reported, in a bi-variate analysis, poorer functional and cognitive autonomy in elderly patients with anemia: The ADL score was 1.81 with IC 95%: [1.52; 2.09] versus 3.75, IC 95%: [3.39; 4.11] for non-anaemic elderly people ($p < 0.0001$), the IADL score was 0.52, IC 95%: [0.32; 0.72] versus 1.84 IC 95%: [1.57; 2.10] for non-anemic people ($p < 0.0001$) [9]. The Women Health and Aging Study (WHAS), the Established populations for epidemiologic studies of the elderly (EPESE) and the Chianti studies all agree that anemia in people over 65 is associated with a reduction in IADL (instrumental activities of daily living) and reduced mobility. Patients with anemia had a lower rate of recovery from disability in ADL than those with normal hemoglobin levels (7.0% vs. 11.6%; $P < 0.001$) [10]. Correcting anemia in the elderly could therefore be a source of improved quality of life. With regard to frailty, the Fried score was inversely higher in patients with anemia (3.88, CI 95 [3.64; 4.12] versus non-anaemic subjects: 2.01, CI 95 [1.73; 2.30], $p < 0.0001$). Cognitive assessment with the MMS revealed no causal relationship between anemia and cognitive impairment ($p = 0.065$, odds ratio 2.64) [9].

Konan MN in Côte d'Ivoire, using the Senegal test, reported suspected cognitive impairment in 91.27% of anemic patients versus 8.73% of non-anaemic patients (p-value 0.0000001). The causal link could not be established [6]. Nutritional status as assessed by albumin was slightly impaired in anemic patients (28.59 versus 30.2) [9]. The MNA reported poor nutritional status in 94.6% versus 5.4% of non-anaemic patients, a risk of undernutrition in 88.3% versus 11.7%, and good nutritional status in 44.7% versus 55.3% (p-value 0.0000001) [6]. Anemia and malnutrition are risk factors for frailty in the elderly. Poly medication and low serum albumin are independent risk factors for anemia in geriatric patients [11]. Depressive mood was present in 80% of diabetic patients with anemia [6]. Geriatric syndromes are factors of increasing vulnerability, predisposing the elderly to functional decline. They result from the deterioration of one or more physiological systems. Anemia is recognized as a risk factor for a number of impairments in the elderly. It is associated with an increased risk of reduced muscular strength and physical performance, falls, cognitive impairment, hospitalization and mortality [12]. The main etiologies of anemia in our series were infectious (32.7%), chronic renal failure (20.9%) and martial deficiency (7.4%). In eleven percent (11.1%) of cases, the causes were undetermined. This etiological profile differs in several respects from that found in the NHANES III study, where 34% of patients had vitamin B12, folic acid and/or iron deficiency, 12% had chronic renal failure (creatinine > 120 mmol/L or creatinine clearance < 60 mL/min), 20% had a chronic disease (rheumatoid arthritis, haemopathy, cancer, etc.) and 34% had an undetermined cause [13]. Eveline

NDT in Cameroon reported 76.3% acute inflammatory causes [4]. In the wake of the epidemiological transition, infectious diseases persist in Africa, constituting a double burden for the elderly. Self-medication and phytotherapy represent a major risk of kidney damage in our context. Around 30% of anemias in the elderly remain unexplained [14]. The heavy burden of comorbidities and polymedication that accompanies the elderly sometimes makes it difficult to determine the underlying cause of anemia in this population. Against this backdrop, the "Anemia Working Group" of the German Geriatric Society has drawn up a second proposal document: "The multi-causality and significant association between anemia and quantifiable assessment-based impairments suggest that anemia in the elderly should be considered a geriatric syndrome." [15]. Martial supplementation was performed in 23.5% of our patients. 37% of patients received a blood transfusion. This management was combined with etiological treatment of the anemia and comorbidities. The hemoglobin level at which anemia is treated depends on clinical circumstances such as patient tolerance, the etiology of the anemia, and whether it is acute or chronic. Most often, a level of 9 g/L is reported (mean 10.24 ± 0.89 g/L), but around 80 practitioners indicate 11 g/L and around 20 12 g/L. On the other hand, about twenty indicate 9 or even 8 g/L [3]. Transfusion thresholds differed from those recommended in Siriwardana's cross-sectional survey [16]. Transfusion was mainly based on signs of poor tolerance. The most frequent were confusion (23%), drowsiness (22%), heart failure (17%) or coronary insufficiency (16%) [16]. Anemia carries an increased risk of therapeutic complications, especially in relation to underlying pathology and visceral failure. In our study, the outcome was favorable, with 72% of our patients returning home, 9% being transferred to other departments, and a death rate of 19%. Even a moderate hemoglobin deficit should never be considered an inevitable consequence of aging, as it is associated with a number of negative clinical impacts and increased mortality, irrespective of its etiology [17].

The limitations of our study were as follows:

- Information bias inherent in the retrospective method of data collection, with missing data varying in proportion from one case to another.

- We were confronted with a number of constraints in the course of our work:

• Lack of resources in some patients, which made it difficult to carry out the additional investigations requested, thus limiting the paraclinical investigations essential for the management of anemia.

• Lack of data in certain files, which were supplemented by the nurses' register and the consultation register.

5. Conclusion

Anemia is a frequent pathology in geriatric practice that should not be trivialized. It is marked by a high frequency of geriatric syndromes. A multidimensional geriatric assessment is essential for all hospitalized elderly patients with anemia.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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