REUE | Brief Report

Epidemiologic and clinical profile of anemia in a hospital emergency department

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BACKGROUND. Anemia worsens the prognosis of elderly patients and those with comorbid heart disease, chronic kidney disease, or cancer who come to a hospital emergency department (ED). Few studies have described the clinical profile of ED patients with anemia.

OBJECTIVE. To describe the characteristics of ED patients with anemia and the management of their care.

METHODS. Observational, cross-sectional descriptive analysis of the clinical characteristics of anemic patients treated in our hospital ED and the management of cases from November 1, 2015, to February 28, 2016.

RESULTS. A total of 376 patients with anemia were attended (mean age, 76 years; women, 53.2%). Anemia was mild in most cases (79.1%) and related to nutrition in 73.7%. Anemic patients often had serious comorbid conditions such as cancer (29.5%), cardiopathy (*eg*, atrial fibrillation, in 24.7%, and heart failure, in 22.1%), and chronic kidney disease (19.9%). Patients had a prior history of anemia in 23.9% of cases, and 60.1% were taking platelet aggregation inhibitors or anticoagulants. Symptoms of anemia were the cause of 28.2% of the ED visits; the most common symptom was fatigue (16.8%). The diagnosis included in 23.5% of the records. The only contributing factors listed were a prior history of anemia or a hemoglobin concentration less than 8 g/dL ($P < .001$). Anemia was treated in 11.6% of the patients, by blood transfusion in all cases. A hemoglobin concentration lower than 8 g/dL was the only decisive factor for administering treatment ($P < .001$).

CONCLUSIONS. Anemia is a common finding in hospital ED patients and is mild and related to nutrition in most cases. Frequent associations are heart failure, atrial fibrillation, cancer, chronic kidney disease, and medication with platelet aggregation inhibitors or anticoagulants. Anemia is diagnosed and treated in only a small proportion of patients with this finding. An ED visit offers an opportunity to improve the management of anemia, and better management might improve the prognosis for patients with multiple comorbidities.

Keywords: Anemia. Emergency department. Diagnosis. Treatment.

Perfil epidemiológico y clínico de la anemia en un servicio de urgencias hospitalarias

INTRODUCCIÓN. La anemia empeora el pronóstico de aquellos pacientes que acuden a los servicios de urgencia hospitalarios (SUH) y presentan comorbilidades como cardiopatía, enfermedad renal crónica (ERC), enfermedad oncológica (EO) o edad avanzada. A día de hoy, no disponemos de suficientes estudios que describan el perfil clínico de los pacientes con anemia en los SUH.

OBJETIVO. Conocer las características de los pacientes y el manejo clínico de la anemia en un SUH.

METODOLOGÍA. Estudio descriptivo observacional de serie de casos con análisis transversal de características clínicas y manejo de pacientes anémicos que acudieron al SUH entre el 1 de noviembre de 2015 y el 28 de febrero de 2016.

RESULTADOS. Se incluyeron 376 pacientes con anemia (prevalencia 2,6%), con una edad media de 76 años (53,2% mujeres). La mayoría de anemias eran leves (79,1%) y de causa nutricional (73,7%). Los pacientes asociaban frecuentemente patologías graves tales como: EO (29,5%), cardiopatías como fibrilación auricular (FA; 24,7%) e insuficiencia cardiaca (IC; 22,1%) y ERC (19,9%). El 23,9% presentaba antecedentes de anemia previa y el 60,1% tomaba antiagregantes o anticoagulantes. Un 28,2% acudió por síntomas de anemia, siendo la astenia el más frecuente (16,8%). Se incluyó el diagnóstico de anemia en un 23,5% de las historias, siendo los únicos factores que contribuyen a ello, presentar anemia como antecedente o tener hemoglobina (Hb) menor de 8 g/dl ($p < 0,001$). Se trató al 11,6% de los pacientes, siendo la transfusión hemática el método más utilizado (11,6%). La Hb menor de 8 g/dl, fue el único factor decisorio en la administración de tratamiento ($p < 0,001$).

CONCLUSIONES. La anemia es frecuente en los SUH es en la mayoría de casos nutricional y leve. Frecuentemente se asocia a IC, FA, EO, ERC y toma de antiagregantes y anticoagulantes. El diagnóstico y tratamiento se realiza en una baja proporción de pacientes. Existe una oportunidad de mejora en el manejo de la anemia en los SUH, que podría redundar positivamente en el pronóstico del paciente pluripatológico.

Palabras clave: Anemia. Urgencias. Diagnóstico, Tratamiento.

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Introduction

Anemia is a highly prevalent condition, affecting 1.95–2.36 billion people worldwide.[1]

It impacts labor productivity, neurocognitive development in children, increases maternal and infant morbidity and mortality, and negatively affects women's health and quality of life.[1]

In Spain, its prevalence is 8.9%, being more frequent in women and the elderly.[2] Among the Spanish geriatric population,[3] prevalence ranges between 3% and 63%, worsening cognitive and functional capacity.[4] In the hospital emergency setting, a 2019 study reported a prevalence rate of 27.5%.[5]

This entity has regained interest for its role as a prognostic factor, being frequently associated with chronic diseases, increasing morbidity and mortality, and worsening functional status and quality of life in patients with heart failure (HF),[6] chronic kidney disease (CKD),[7] cancer, and inflammatory bowel disease (IBD).[8] In these conditions, anemia prevalence ranges between 14% and 64%.[1]

Physicians often fail to recognize both the high prevalence of anemia[1] and its association with increased morbidity and mortality, longer hospital stays, and higher health care costs.[1]

Given the lack of specific data on this condition in emergency departments (EDs), a descriptive observational study was conducted at *Hospital Universitario Severo Ochoa* (HUSO) (Madrid, Spain). The objective was to identify the clinical profile of patients, their epidemiological characteristics, reasons for consultation, and factors influencing the diagnosis and treatment of anemia in this setting.

Material and methods

We conducted a descriptive observational case series. A pilot study was previously carried out using laboratory data from the emergency department over six months (October 2012 to March 2013), assessing 22,076 patients (of whom 2,325 had anemia), estimating an anemia prevalence of 10.53%, and calculating a required sample size of 433 cases for the main study.

The study included patients older than 16 years who attended the ED between November 2015 and February 2016with blood tests showing anemia, defined as hemoglobin (Hb) < 13 g/dL in men, < 12 g/dL in women, and < 11 g/dL in pregnant women. Eligible participants were informed about the study and gave written informed consent.

Variables were collected by the investigators, supplemented with information from patients and relatives using a standardized form.

– Independent variables: age, sex, comorbidities, pharmacologic treatment, reason for consultation, functional status according to Red Cross physical (CRF) and psychological (CRP) scales, KATZ scale, Lawton Index, NYHA functional class, clinical diagnosis of anemia, type of treatment, and discharge destination from the HUSO ED.

– Analytical values collected: Hb, mean corpuscular volume (MCV), mean corpuscular hemoglobin concentration (MCHC), platelet count, and red cell distribution width (RDW).

– Anemia severity was classified according to the World Health Organization (WHO) 1968 criteria.[1]

Statistical analyses were conducted using IBM SPSS Statistics 22 for Windows. The Student's t-test, ANOVA, and Pearson's correlation coefficient (r) were used for bivariate quantitative analysis; partial correlations were applied to control for the effect of potential confounders. Relationships between qualitative variables were analyzed using contingency tables.

Proportions for primary and secondary endpoints were estimated by the maximum likelihood method with 99% confidence intervals (CIs). The study was approved by the HUSO Research Ethics Committee (CEIm) in full compliance with the current legislation.

Results

Of 14,359 patients seen in the ED, 376 had anemia (2.6%). The mean age was 7 ± 14 years, with 81.1% aged > 65 years and 53.2% women. Mild anemia was present in 79.1%, predominantly normocytic (73.7%), typical of nutritional anemias; 30.3% were anemia of chronic disease, and 17.5% were microcytic, consistent with iron deficiency.

Patients with Hb > 8 g/dL primarily had normocytic anemia (70.5%; n = 263), whereas those with Hb < 8 g/dL mostly showed microcytic anemia (3.5%; n = 13).

A total of 98.1% of patients presented conditions associated with anemia ($P < .001$), as shown in Table 1.

Antiplatelet therapy was reported in 34.3%, anticoagulants in 25.8%, and both in 5.9%.

Chemotherapy was used by 6.1%, gastric protectors by 58%, and NSAIDs by 1.9%.

The most common reasons for consultation were anemic symptoms (28.2%)—particularly asthenia (16.8%)—followed by respiratory (27.7%) and cardiovascular (27.1%) symptoms, with no significant differences between them. There was a significant direct correlation between the severity of anemia and the increase in anemic symptoms ($P < .001$).

Anemia was clinically diagnosed in 23.5% of patients. Only the analytical severity (Hb < 8 g/dL; $P < .001$) correlated significantly with clinical diagnosis (Tables 2 and 3). A clear but non-significant trend was observed toward diagnosis in patients with better functional status (Table 2).

No treatment was prescribed for 85.7% of anemic patients. Among those treated (14.3%), the main approach was blood component transfusion (11.6%), reserved for severe anemia. Oral iron (Fe) was prescribed to 2.7%, and no patient received intravenous Fe. Patients with Hb < 8 g/dL were treated in 88.9% of cases, whereas those with Hb > 8 g/dL received treatment in only 8.4% ($P < .001$).

Hospital admission occurred in 76.7%, and mortality was 0.8%.

Discussion

This study analyzes the clinical characteristics and

Table 1. Previous diseases associated with anemia

Associated previous diseases	Number of cases (N = 376)	Percentage
HTN	296	78.7%
DM	132	35.1%
Dyslipidemia	116	30.8%
Oncologic disease	111	29.5%
Osteoarthritis	98	26.1%
Arrhythmia	93	25.5%
Prior anemia	90	23.9%
HF	83	22.1%
CKD	75	19.9%
Toxic habits (alcohol, tobacco, etc.)	68	18%
ACS	68	18%
Cognitive impairment	66	17.5%
COPD	65	17.2%
ADR	63	16.7%
Urologic disease	50	13.2%
Stroke	47	12.5%
Pneumonia	47	12.5%
Infectious disease	46	12.2%
Fracture	43	11.4%
Aortic disease	39	10.3%
Biliary disease	38	10.1%

HTN: hypertension; DM: Diabetes mellitus; HF: heart failure; CKD: chronic kidney disease; ACS: acute coronary syndrome; COPD: chronic obstructive pulmonary disease; ADR: adverse drug reaction.

Table 2. Clinical factors related to the inclusion of anemia diagnosis in the ED health record

Clinical Factor	With Anemia Diagnosis (N = 88)	Without Anemia Diagnosis (N = 288)	Value	gl	*P*
Age					
Age < 65 years	21.1%	78.9%	3.94	1	.605
Age > 65 years	24%	76%	14.64	1	.605
Medical history					
HTN	69.3%	68.3%	0.03	1	.856
DM	37.5%	34.5%	0.27	1	.606
Dyslipidemia	33.0%	30.0%	0.28	1	.689
Oncologic disease	31.0%	25.0%	1.17	1	.280
Osteoarthritis	27.2%	22.7%	0.69	1	.406
Arrhythmia	27.3%	24.0%	0.38	1	.539
Anemia	39.8%	19.2%	15.68	1	.000
HF	18.2%	23.3%	1.94	1	.307
CKD	18.2%	20.6%	0.24	1	.626
Substance use	14.8%	19.2%	0.88	1	.350
ACS	17.0%	18.5%	0.09	1	.762
Cognitive impairment	19.3%	17.1%	0.23	1	.629
ADR	9.1%	19.9%	5.45	1	.020
COPD	14.8%	17.4%	0.34	1	.561
Urological disease	11.4%	13.9%	0.39	1	.534
Stroke	17.0%	11.1%	2.14	1	.144
Pneumonia	9.1%	13.6%	1.24	1	.265
Infectious disease	9.1%	13.2%	1.08	1	.299
Fracture	15.9%	10.1%	2.24	1	.135
Aortic disease	13.6%	9.4%	1.29	1	.256
Biliary tract disease	3.4%	12.2%	5.71	1	.017
Functional status					
NYHA I–II	90.8%	83.5%	2.82	1	.093
NYHA III–IV	9.2%	16.5%			
KATZ A–B	56.8%	59.4%	1.02	2	.601
KATZ C–D	9.1%	11.5%			
KATZ E–F–G	34.1%	29.1%			
CRF 0–1	47.7%	49.8%	1.19	2	.552
CRF 2–3	25.6%	20.2%			
CRF 4–5	26.7%	30%			
CRP 0–1	73.3%	79.7%	3.61	2	.164
CRP 2–3	7%	2.8%			
CRP 4–5	19.8%	17.5%			
LAWTON (8 or 7)	36%	33.5%	2.73	2	.255
LAWTON (6 to 4)	10.5%	18%			
LAWTON (3 to 0)	53.5%	48.6%			

HTN: hypertension; DM: Diabetes mellitus; HF: heart failure; CKD: chronic kidney disease; ACS: acute coronary syndrome; COPD: chronic obstructive pulmonary disease; ADR: adverse drug reaction.

management of patients with anemia in a ED with the aim of improving the quality of care for this condition.

The prevalence of anemia in the studied population is lower than the European average (22.9%), possibly due to the exclusion of individuals younger than 16 years and the underrepresentation of pregnant women.[1] Our sample, which included a high proportion of patients older than 65 years, resembles that of the study by Guralnik *et al.*, showing comparable results.[9]

It is not surprising that most detected anemias were normocytic, due to the aging population, as observed in Guralnik *et al.*[9] among older adults. Although most cases were mild, anemia may have a significant negative impact in the elderly population, affecting functional capacity, risk of dementia, falls, and mortality,[4] as well as being prevalent in common ED conditions such as HF, CKD, and oncologic diseases.

Anemia often leads patients to seek emergency care due to related symptoms; however, no correlation was found between anemia severity and the reason for consultation, indicating that mild and severe anemias can produce similar symptomatology in certain populations.

In most cases, anemia was not included among the final diagnoses, as also reported in other studies,[10] underscoring the limited importance attributed to this diagnosis in emergency care. The predominance of mild anemia likely explains the low diagnosis and treatment rates in EDs, reflecting a certain normalization of anemia, particularly among the elderly.[11]

Most patients presenting to the ED did not receive any treatment for anemia. Those with Hb < 8 g/dL were the ones most likely to be treated. The treatment of anemia should be etiological (addressing the underlying cause) and pathogenic (based on anemia type—iron, vitamins, erythropoietin, etc.). Transfusion should not aim merely to correct a number, but rather to address clinical signs or symptoms of hypoxia or organ dysfunction, or to restore Hb to a safe level, depending on the rate of onset and patient tolerance.[12] However, transfusions are often performed using blood components without considering hemodynamic status or other clinical factors, contrary to the "Do Not Do" recommendations of the American Society of Hematology,[13] highlighting the inadequate use of transfusion therapy in EDs, as also shown by Quintana *et al.*[14]

Surprisingly, both oral and IV Fe treatments were rarely used, reflecting a lack of awareness of the WHO Patient

Table 3. Analytical factors (Hb) related to the inclusion of anemia diagnosis in the emergency department medical record

Hb Values	Patients with Hb < 8 (N = 28)	Patients with Hb > 8 (N = 348)	Value	gl	*P*
Patients with diagnosis (n = 88)	63.0%	9.8%	55.69	1	.000
Patients without diagnosis (n = 288)	37.0%	90.2%	---	---	---

Hb: hemoglobin.

Blood Management strategies,[1] confirming the findings of Quintana *et al.*[15]

Of note, 75% of anemic patients were hospitalized, a rate much higher than that reported in other studies (13.4–19.5%[16]), suggesting that anemia may serve as a risk marker for hospital admission. This study has several limitations, including its sample size, single-center design, exclusion of certain patient groups, and the lack of socioeconomic and origin data (whether from nursing homes or private residences). Moreover, iron administration practices may have improved since data collection, partly due to blood donation shortages in some regions of Spain, which have prompted alternative therapeutic strategies.

Conclusions

Anemia is a common condition in emergency care, frequently accompanying cardiac disease, oncologic conditions, and chronic kidney disease, as well as antiplatelet and anticoagulant therapy.

Although patients often present with anemia-related symptoms, the condition is not included in emergency diagnoses, with anemia severity, prior anemia history, and functional independence being the main determinants of diagnosis.

In most cases, anemia is not treated, despite its significant impact on comorbidities. Management is largely based on Hb levels, with blood component transfusion being the most widely used therapy.

Further multicenter studies are needed to evaluate the management of anemic patients to identify unmet needs regarding this condition in EDs.

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