

## Came as a blood donor and ended up being transfused: an example of "what not to do"

### *Transfusión sanguínea inadecuada; un ejemplo de "no hacer"*

Blood donation is a safe procedure for healthy, voluntary, unpaid, and unrelated donors. The National Hemovigilance System reports rare cases of syncope, loss of consciousness, or issues related to venous access.<sup>1</sup> In contrast, it is recognized that frequent whole blood donors have a higher risk of developing iron deficiency.<sup>2</sup> The fingerstick hemoglobin (Hb) screening performed prior to donation aims to protect blood donors from developing post-donation anemia and to ensure an adequate hemoglobin content in red blood cell concentrates.<sup>2</sup>

Currently, transfusion medicine practice emphasizes the judicious use of transfusions, to be performed only when clinically indicated.<sup>3</sup> Several studies have shown that up to half of red blood cell transfusions in emergency departments (EDs) could be inappropriate.<sup>4,5</sup>

We present a case of iron-deficiency anemia in a blood donor, with possible inadequate management and follow-up. In addition, we review the "Do Not Do" recommendations<sup>6,7</sup> and propose the implementation of Patient Blood Management Programs (PBMP) in EDs as well.<sup>3,8-11</sup>

## Case report

Day 0. A 35-year-old woman with no relevant past medical history and regular exercise tolerance, who is a blood donor, attended on World Blood Donor Day (June 14<sup>th</sup>, 2023) for a new donation. Fingerstick testing prior to donation revealed anemia, so a blood sample was collected for iron studies and sent to the reference laboratory, following our protocol for preventing iron deficiency in donors (Table 1).

Day 1. The following day, results showed severe microcytic hypochromic anemia. The donor was contacted and informed of moderate-to-severe iron-deficiency anemia and advised to visit her primary care physician to start treatment (Table 1).

Day 2. Instead, the donor went to the nearest hospital ED, where further laboratory and diagnostic tests were performed. Moderate, asymptomatic anemia was confirmed (Table 1).

She was admitted for observation and received 2 units of red blood cells plus 1 gram of IV iron. After confirming clinical and hemodynamic stability, she was discharged with a referral to internal medicine (IM) for outpatient follow-up and prescribed oral iron therapy (1-month regimen of ferrous sulfate 105 mg daily).

The transfusion was deemed inappropriate and was reported to the National System for Reporting and Recording Adverse Events (SINASP) within the framework of the National Patient Safety Strategy, aiming to promote optimal blood

component use and prevent recurrence of such errors.

One month later, she attended an IM consultation, where repeat blood testing was performed (Table 1). Further studies ruled out celiac disease. Two weeks later, gastroscopy revealed no visible abnormalities, but biopsy confirmed chronic gastritis positive for *Helicobacter pylori*. The patient was referred to hematology for evaluation and intravenous iron treatment. Seven months later, she remained anemic with iron deficiency (Table 1).

## Discussion

Anemia is a global health problem — at least one-fourth of the world's population suffers from anemia or iron deficiency.<sup>3</sup> Among female donors, 25% are anemic, and anemia remains one of the most common causes for donor deferral.<sup>2</sup>

Recently, overtransfusion has been reviewed internationally as a clinical action considered inappropriate, though it is rarely reported as a transfusion-related adverse event.<sup>12</sup> A consensus definition of overtransfusion was lacking; overtransfusion can include overdosage of components, administration of the wrong component, or unnecessary administration without evidence-based indication.

Several national scientific societies<sup>6,7</sup> have long issued high-evidence "Do Not Do" recommendations regarding blood component transfusion (Table 2).

In this case, a healthy, athletic woman, attending voluntarily for blood dona-

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**Table 1.** Temporal evolution of laboratory results

Date	Hb (g/dl)	Hct n (%)	MCV	Platelets (10 <sup>9</sup> /L)	Iron (µg/dl)	TSI (%)	Ferritin (µg/L)
<b>Blood Donation Center</b>							
15/06/23	6	20	59	351	18	3	4
<b>Emergency Department</b>							
16/06/23	8.3	26.3	64	310	ND	ND	ND
<b>Outpatient Follow-up</b>							
04/07/23	11	34.5	73.5	213	179	40	227
18/08/23	12.2	36	84	207	91	23	44
28/12/23	10.3	32.4	76.7	311	16	3	6
18/01/24	10	30.9	73.6	280	21	4	5

Hb: hemoglobin; Hct: hematocrit; MCV: mean corpuscular volume; Fe: serum iron; TSI: transferrin saturation index; ND: not determined.

tion, clinically well, ended up overtransfused,<sup>12</sup> remaining asymptomatic and well-compensated, with clinical and therapeutic errors. Notably, eradication therapy for *H. pylori* was not initiated until nearly a year later, and anemia and iron deficiency were not adequately corrected or followed up.

Oral iron was prescribed immediately after transfusion of 2 RBC units and administration of 1 g of IV iron, which was likely ineffective, as hepcidin would be upregulated and natural erythropoietin release suppressed. Oral iron should not be administered immediately before, after, or concurrently with such therapies.<sup>13</sup> The duration of oral iron therapy should be at least three months plus one additional month after recovery to normalize iron stores, and follow-up at 15 days after initiation is recommended.

A recent multicenter study of more than 300 patients with severe anemia (Hb ≤ 7 g/dL) treated solely with IV

iron (without transfusion) found complete recovery and no adverse effects after 1 month.<sup>9</sup> The main beneficiaries of this paradigm are young, fertile women.<sup>14</sup>

We present this case as an example of a “Do Not Do” situation and to promote a culture of safety in patient blood management outside the operating room.<sup>10</sup> In our experience, this represents a common case of unnecessary and inappropriate blood transfusion.<sup>12</sup> National studies report 36–65% of inappropriate transfusions in Eds.<sup>4,5</sup>

More than 20 years after approval of second- and third-generation IV iron formulations, persistent misconceptions remain about their safety, use, and cost. Blood transfusion, however, carries a 10–100 times higher rate of moderate-to-severe reactions or transfusion-related deaths.<sup>10</sup> Although blood donors are voluntary and unpaid, the overall cost per trans-

fusion is estimated between €350 and €1,000.

In this case, transfusing 2 RBC units to a young woman could have induced alloimmunization to erythrocyte, leukocyte, platelet, or HLA antigens, posing an avoidable risk in future pregnancies or the possibility of transfusion-related acute lung injury (TRALI) in future recipients of her blood donations.<sup>15</sup>

## Final comments

According to “Do Not Do” guidelines<sup>6,7</sup> (Annex I), red blood cell transfusion should not have been indicated in a healthy, asymptomatic, hemodynamically stable woman with iron-deficiency anemia, much less two units.<sup>12</sup> IV iron is a safe and effective treatment for moderate-to-severe iron deficiency, though underdosing is common. Treatment of iron-deficiency anemia should focus both on iron supplementation and on correcting the underlying cause.

Anemia is a silent pandemic, particularly affecting young women and children<sup>3</sup>, which must be addressed by all healthcare providers — but not merely through blood transfusions, which are scarce and not risk-free.<sup>16</sup> Continuous education and training in PBMP protocols are necessary for all physicians, including family and emergency doctors.<sup>10,11</sup> It is time to implement PBMP programs in ED as well.<sup>17</sup>

## ARTICLE INFORMATION

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**Table 2.** Do Not Do” Recommendations<sup>18</sup>

Do not transfuse more red blood cell (RBC) units than necessary to relieve the symptoms of anemia or to restore the patient to a safe hemoglobin range (7–8 g/dL in stable, non-cardiac patients).	SEHH
Do not transfuse RBC units in iron-deficiency anemia without hemodynamic instability.	SEHH
RBC transfusion should not be performed in hemodynamically stable, non-bleeding, critically ill patients without cardiac and/or central nervous system involvement, when hemoglobin concentration is > 7 g/dL.	SEMICYUC
Do not administer plasma or prothrombin complex concentrates in a non-emergency situation to reverse vitamin K antagonists.	SEMES
Do not administer plasma or prothrombin complex concentrates for reversal of vitamin K antagonists outside of emergency settings (i.e., severe bleeding, intracranial hemorrhage, or urgent surgery).	SEHH

SEHH: Spanish Society of Hematology and Hemotherapy; [https://www.sanidad.gob.es/areas/calidadAsistencial/excelenciaClinica/docs/SOCIEDAD\\_ESP\\_HEMATOLOGIA\\_HEMOTERAPIA\\_OK.pdf](https://www.sanidad.gob.es/areas/calidadAsistencial/excelenciaClinica/docs/SOCIEDAD_ESP_HEMATOLOGIA_HEMOTERAPIA_OK.pdf)  
SEMICYUC: Spanish Society of Intensive, Critical, and Coronary Unit Medicine; [https://www.sanidad.gob.es/areas/calidadAsistencial/excelenciaClinica/docs/SOCIEDAD\\_ESP\\_MIC\\_UNIDCORONARIAS\\_OK.pdf](https://www.sanidad.gob.es/areas/calidadAsistencial/excelenciaClinica/docs/SOCIEDAD_ESP_MIC_UNIDCORONARIAS_OK.pdf)  
SEMES: Spanish Society of Emergency Medicine; [https://www.sanidad.gob.es/areas/calidadAsistencial/excelenciaClinica/docs/SOCIEDAD\\_ESP\\_MEDICINA\\_URGYEMERG\\_OK.pdf](https://www.sanidad.gob.es/areas/calidadAsistencial/excelenciaClinica/docs/SOCIEDAD_ESP_MEDICINA_URGYEMERG_OK.pdf) [http://10.15.5.20:8162/organizacion/sns/planCalidadSNS/cal\\_sccc.htm](http://10.15.5.20:8162/organizacion/sns/planCalidadSNS/cal_sccc.htm)

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### Anex I. International "Do Not Do" Recommendations<sup>18</sup>

"Don't transfuse patients based solely on an arbitrary hemoglobin threshold."	Canadian Hematology Society <a href="https://choosingwiselycanada.org/recommendation/hematology/">https://choosingwiselycanada.org/recommendation/hematology/</a> último acceso: febrero 2025
"Don't transfuse blood if other non-transfusion therapies or observation would be just as effective."	Canadian Society for Transfusion Medicine <a href="https://choosingwiselycanada.org/recommendation/transfusion-medicine/">https://choosingwiselycanada.org/recommendation/transfusion-medicine/</a> último acceso: febrero 2025
"Don't transfuse more than one red cell unit at a time when transfusion is required in stable, non-bleeding patients."	Canadian Society for Transfusion Medicine <a href="https://choosingwiselycanada.org/transfusion-medicine/">https://choosingwiselycanada.org/transfusion-medicine/</a> último acceso: febrero 2025
Don't transfuse plasma to correct a mildly elevated (< 1.8) international normalized ratio (INR) or activated partial thromboplastin time (aPTT) before a procedure.	Canadian Society for Transfusion Medicine <a href="https://choosingwiselycanada.org/recommendation/transfusion-medicine/#transfusion-medicine">https://choosingwiselycanada.org/recommendation/transfusion-medicine/#transfusion-medicine</a> último acceso: febrero 2025
Don't routinely use plasma or prothrombin complex concentrates for non-emergent reversal of vitamin K antagonists.	Canadian Society for Transfusion Medicine <a href="https://choosingwiselycanada.org/recommendation/transfusion-medicine/#transfusion-medicine">https://choosingwiselycanada.org/recommendation/transfusion-medicine/#transfusion-medicine</a> último acceso: febrero 2025
"Don't transfuse red blood cells for arbitrary hemoglobin or hematocrit thresholds in the absence of symptoms, active coronary disease, heart failure or stroke."	Canadian Society of Internal Medicine <a href="https://choosingwiselycanada.org/recommendation/internal-medicine/">https://choosingwiselycanada.org/recommendation/internal-medicine/</a> último acceso: febrero 2025
Don't routinely transfuse red blood cells in hemodynamically stable ICU patients with a hemoglobin concentration greater than 70 g/l (a threshold of 75 g/L may be considered for patients undergoing cardiac surgery; a threshold of 80 g/L may be considered for patients undergoing orthopedic surgery, those receiving extracorporeal membrane oxygenation and those with active cardiovascular disease).	Canadian Critical Care Society <a href="https://choosingwiselycanada.org/recommendation/critical-care/#critical-care">https://choosingwiselycanada.org/recommendation/critical-care/#critical-care</a> último acceso: febrero 2025
Don't process transfusion orders that do not adhere to best practices without discussing with the ordering clinician.	Medical Laboratory Science <a href="https://choosingwiselycanada.org/recommendation/medical-laboratory-science/">https://choosingwiselycanada.org/recommendation/medical-laboratory-science/</a> último acceso: febrero 2025
"Don't transfuse red blood cells for arbitrary hemoglobin or hematocrit thresholds in the absence of symptoms, or if no benefit was perceived from previous transfusions."	Canadian Society of Palliative Care Physicians <a href="https://choosingwiselycanada.org/recommendation/palliative-care/">https://choosingwiselycanada.org/recommendation/palliative-care/</a> último acceso: febrero 2025
"Don't transfuse more units of blood than absolutely necessary"	American Association of Blood Banks (AABB) <a href="http://www.choosingwisely.org/societies/american-association-of-blood-banks/">http://www.choosingwisely.org/societies/american-association-of-blood-banks/</a> Last reviewed 2017
"Don't transfuse packed red blood cells (pRBC) for iron deficiency anemia in asymptomatic pediatric patients when there is no evidence of hemodynamic instability or active bleeding."	American Society of Hematology-American Society of Pediatric Hematology/Oncology (ASPHO) <a href="https://www.choosingwisely.org/clinician-lists/ash-aspho-avoid-packed-red-blood-cell-transfusions-for-anemia-in-asymptomatic-children/">https://www.choosingwisely.org/clinician-lists/ash-aspho-avoid-packed-red-blood-cell-transfusions-for-anemia-in-asymptomatic-children/</a> Released December 9, 2019
"Don't transfuse red blood cells for iron deficiency without hemodynamic instability."	American Association of Blood Banks (AABB) <a href="http://www.choosingwisely.org/societies/american-association-of-blood-banks/">http://www.choosingwisely.org/societies/american-association-of-blood-banks/</a> Last reviewed 2017
"Don't administer packed red blood cells (PRBCs) in a young healthy patient without ongoing blood loss and hemoglobin of $\geq 6$ g/dL unless symptomatic or hemodynamically unstable".	American Society of Anesthesiologists (ASA) <a href="http://www.choosingwisely.org/societies/american-society-of-anesthesiologists/">http://www.choosingwisely.org/societies/american-society-of-anesthesiologists/</a> Last reviewed 2019
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"Don't routinely transfuse patients with sickle cell disease (SCD) for chronic anemia or uncomplicated pain crisis without an appropriate clinical indication."	American Society of Hematology <a href="http://www.choosingwisely.org/wp-content/uploads/2015/02/ASH-Choosing-Wisely-List.pdf">http://www.choosingwisely.org/wp-content/uploads/2015/02/ASH-Choosing-Wisely-List.pdf</a> Last reviewed 2019
Don't transfuse red blood cells in hemodynamically stable, non-bleeding ICU patients with a hemoglobin concentration greater than 7 g/dL.	Critical Care Societies Collaborative – Critical Care <a href="https://www.choosingwisely.org/clinician-lists/critical-care-societies-collaborative-transfusing-red-blood-cells-in-hemodynamically-stable-icu-patients/">https://www.choosingwisely.org/clinician-lists/critical-care-societies-collaborative-transfusing-red-blood-cells-in-hemodynamically-stable-icu-patients/</a> Released January 28, 2014
"Avoid transfusions of red blood cells for arbitrary hemoglobin or hematocrit thresholds and in the absence of symptoms of active coronary disease, heart failure or stroke."	Society of Hospital Medicine- Adult Hospital Medicine <a href="https://www.choosingwisely.org/clinician-lists/society-hospital-medicine-adult-red-blood-cell-transfusions-for-arbitrary-hemoglobin-hemotocrit-thresholds/">https://www.choosingwisely.org/clinician-lists/society-hospital-medicine-adult-red-blood-cell-transfusions-for-arbitrary-hemoglobin-hemotocrit-thresholds/</a> Released February 21, 2013
Don't transfuse more than the minimum of red blood cell (RBC) units necessary to relieve symptoms of anemia or to return a patient to a safe hemoglobin range (7 to 8 g/dL in stable patients).	American Academy of Family Physicians <a href="http://www.choosingwisely.org/wp-content/uploads/2015/02/AAFP-20-things-List_Updated101119.pdf">http://www.choosingwisely.org/wp-content/uploads/2015/02/AAFP-20-things-List_Updated101119.pdf</a> Last reviewed 2019
"Avoid transfusion, outside of emergencies, when alternative strategies are available as part of informed consent; make discussion of alternatives part of the informed consent process".	Society for the Advancement of Blood Management <a href="http://www.choosingwisely.org/societies/society-for-the-advancement-of-blood-management/">http://www.choosingwisely.org/societies/society-for-the-advancement-of-blood-management/</a> Last reviewed 2019
Don't routinely transfuse stable, asymptomatic hospitalized patients with a hemoglobin level greater than 7–8 grams.	American College of Obstetricians and Gynecologists <a href="https://www.choosingwisely.org/clinician-lists/american-college-obstetricians-gynecologists-avoid-routine-transfusions-asymptomatic-hospitalized-patients/">https://www.choosingwisely.org/clinician-lists/american-college-obstetricians-gynecologists-avoid-routine-transfusions-asymptomatic-hospitalized-patients/</a> Released March 14, 2016