L'ANEMIA:
UN PROBLEMA GLOBALE

Irene Motta

UO Pronto Soccorso – Centro Malattie Rare

Fondazione IRCCS Cà Granda Ospedale Maggiore Policlinico

Milano

Un problema globale

Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015

*GBD 2015 Disease and Injury Incidence and Prevalence Collaborators**

Anaemia was the most common of our nine impairments, affecting 2·36 billion (2·35–2·37 billion) people in 2015.

Iron deficiency was the cause of anaemia in more than half of all cases.

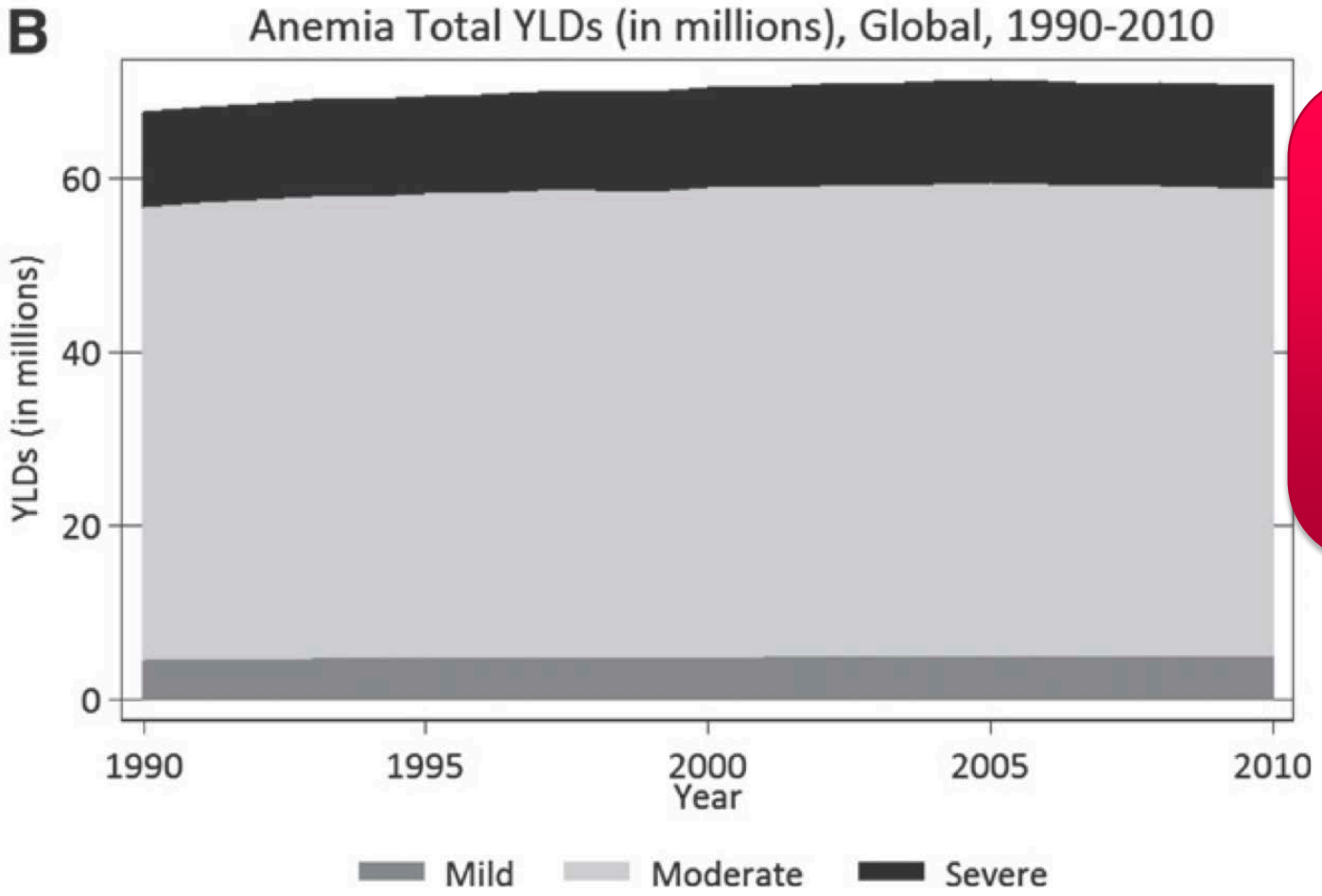
The leading cause of disability in 2015 was iron-deficiency anaemia in 27 countries;

Lancet 2016; 388: 1545–602

blood
2014 123: 615-624
doi:10.1182/blood-2013-06-508325 originally published online December 2, 2013

A systematic analysis of global anemia burden from 1990 to 2010

Nicholas J. Kassebaum, Rashmi Jasrasaria, Mohsen Naghavi, Sarah K. Wulf, Nicole Johns, Rafael Lozano, Mathilda Regan, David Weatherall, David P. Chou, Thomas P. Eisele, Seth R. Flaxman, Rachel L. Pullan, Simon J. Brooker and Christopher J. L. Murray



68.36m YLD
8.8% of total for all conditions [globally] in 2010

Kassebaum NJ, *Blood* 2014

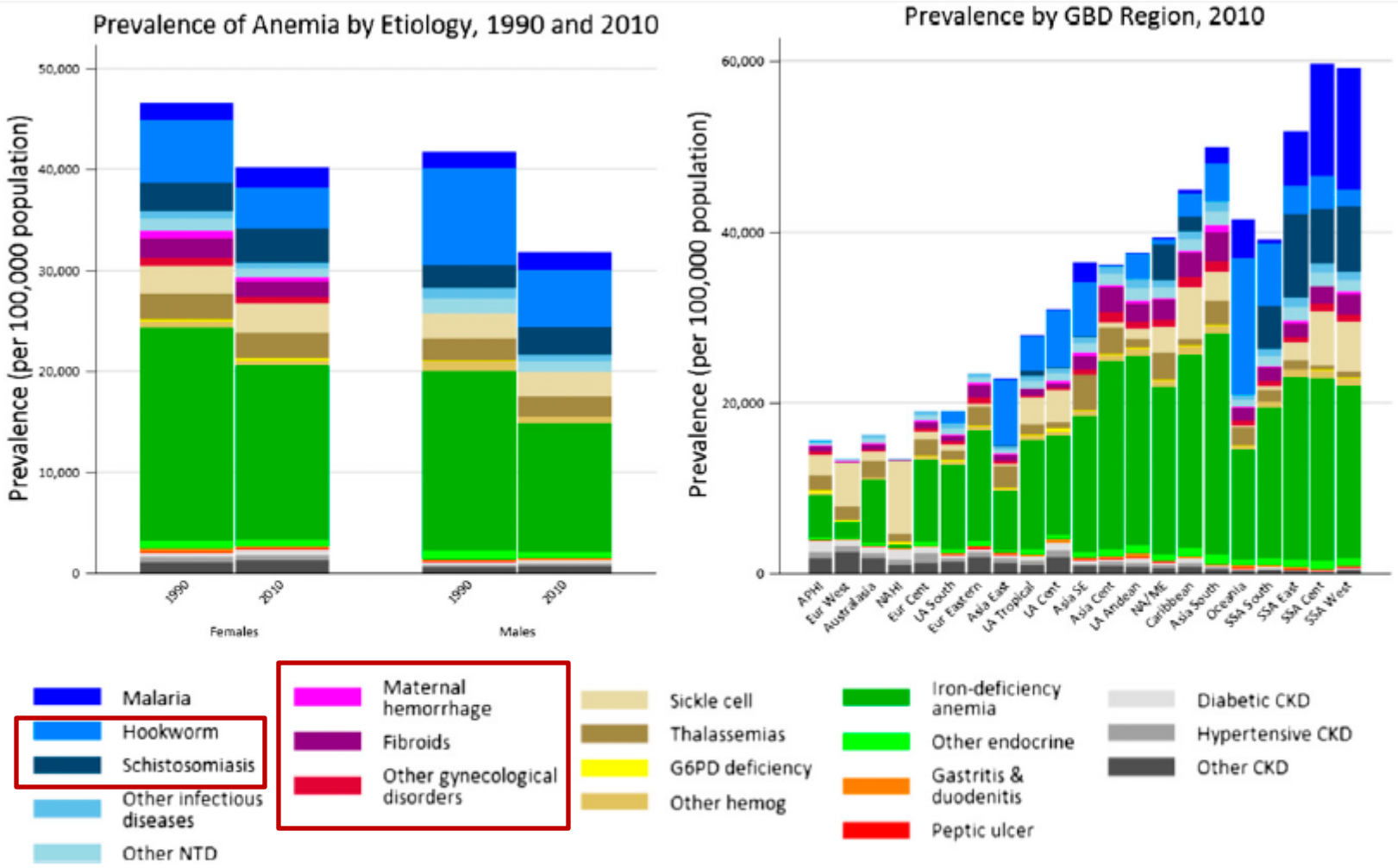


Figure 3. Global and regional cause-specific anemia prevalence for 1990 and 2010. Prevalence of anemia for both males and females decreased from 1990 to 2010. The largest improvements for males were in anemia resulting from hookworm and iron deficiency, while the largest percentage gains for females were in iron deficiency and maternal hemorrhage. Regional differences in proportion of cases resulting from specific causes varied widely. Malaria was a major cause of anemia in many regions, but none more so than West sub-Saharan Africa, where it accounted for 24.7% of all prevalent anemia. South and East Asia, despite being among those regions with the greatest reductions in anemia, had more than half the world's anemia cases. Anemia prevalence in 2010 generally increased with decreasing regional mean age of death. Prevalence was highest in East, Central, and West sub-Saharan Africa. These regions also saw the least improvement among all low- and middle-income regions between 1990 and 2010. AP, Asia Pacific; Cent, central; Eur, Europe; G6PD, glucose-6-phosphate dehydrogenase; hemog, hemoglobinemia; HI, high income; LA, Latin America; NA, North America; NA/ME, North Africa/Middle East; NTD, neglected tropical diseases; South, Southern; SE, Southeast; SSA, sub-Saharan Africa.

Kassebaum NJ, *Blood* 2014

Un problema sottovalutato

Targeted anemia surveillance and intervention should be a greater priority in high-risk populations, especially young children and females.[42] Despite causing so much disability, anemia does not receive its requisite attention in many public health spheres. Such inattention may be partly because anemia is thought of as a by-product of other disease processes rather than as a target for intervention in and of itself. It is somewhat ironic, then, that etiology-specific

Kassebaum NJ, *Blood* 2014

Anemia pre-operatoria

Systematic review

Meta-analysis of the association between preoperative anaemia and mortality after surgery

A. J. Fowler[1], T. Ahmad[1], M. K. Phull[2], S. Allard[3], M. A. Gillies[4] and R. M. Pearse[1]

- **39% sono anemici (definizione WHO)**
- **Anemia associata a:**
  - ⇨ Mortalità perioperatoria ⬆ - OR 2.90 (2.30 – 3.68, p< 0.001)
  - ⇨ Danno renale acuto ⬆ - OR 3.75 (2.95 – 4.76, p< 0.001)
  - ⇨ Infezioni ⬆ - OR 1.93 (1.06 – 1.55, p< 0.01)
  - ⇨ Stroke in cardiochirurgia ⬆ - OR 1.28 (1.17 – 3.18, p< 0.01)
  - ⇨ Trasfusione di EC ⬆ - OR 5.04 (4.12 – 6.17, p< 0.001)

Fowler AJ, *Br J Surg* 2015

Anemia nell’anziano

Nell’anziano l’anemia è associata a

- ↓ performance fisica
- ↑ rischio di cadute
- Fragilità
- ↑ rischio di ospedalizzazione
- Demenza
- ↑ mortalità

Woodman R, *Curr Opin Hematol* 2005
Kikuchi M, *J Am Geriatr Soc* 2001
Pennix BW, *Am J Med* 2003
Pennix BW, *J Am Geriatr Soc* 2005
Chaves PH, *J Gerontol A Biol Sci Med Sci* 2005
Hong CH, *Neurology* 2013
Culleton BF, *Blood* 2006

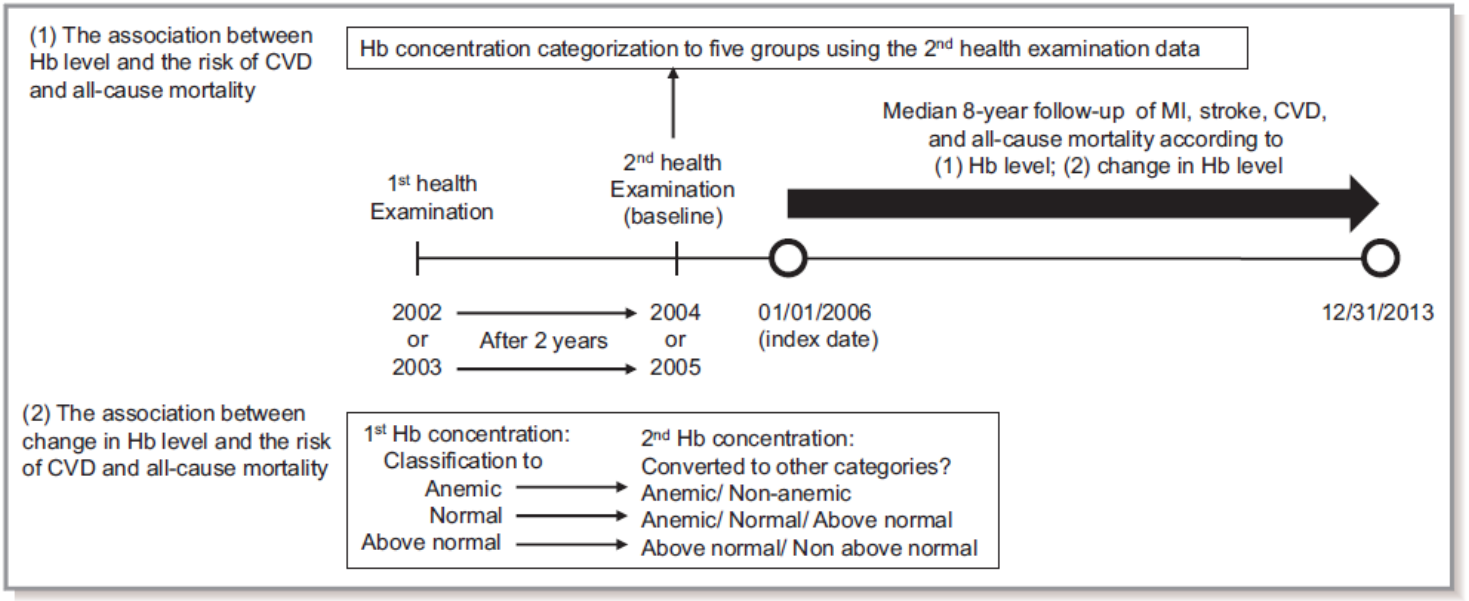
ORIGINAL RESEARCH

American Heart Association | American Stroke Association

Association of Hemoglobin Concentration and Its Change With Cardiovascular and All-Cause Mortality

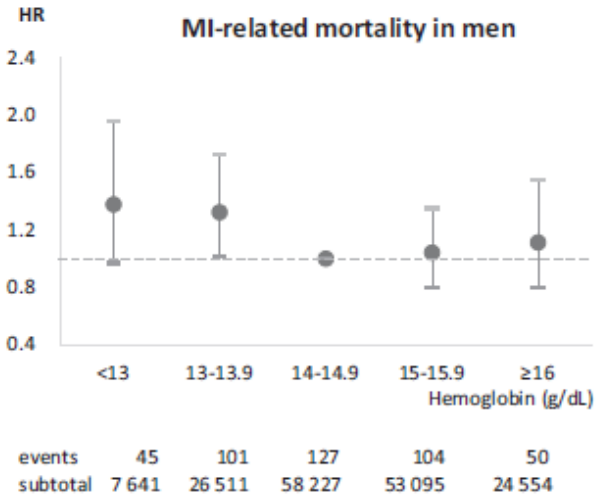
Gyeongsil Lee, MD, MSc; Seulggie Choi, MD; Kyuwoong Kim, BSc; Jae-Moon Yun, MD, MPH; Joung Sik Son, MD, MSc; Su-Min Jeong, MD, MSc; Sung Min Kim, BSc; Sang Min Park, MD, PhD

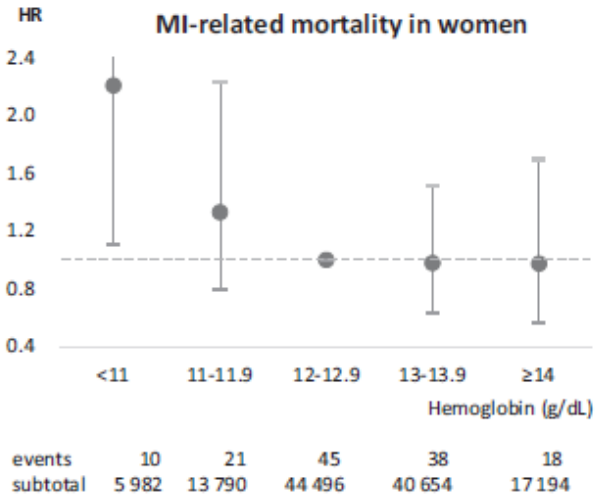
- 292 194 soggetti
- >40 aa senza patologie cardiovascolari
- FU 7.8±0.9 anni

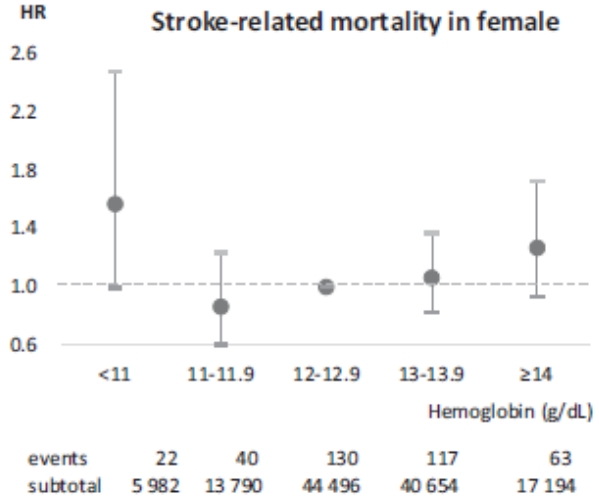


Lee G, *J Am Heart Assoc* 2018

Anemia e mortalità

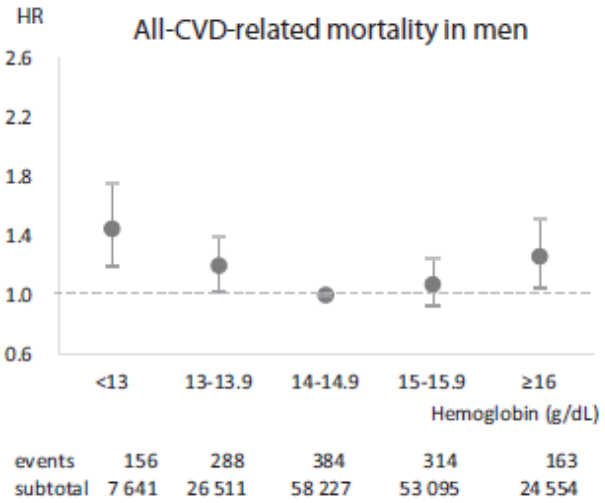


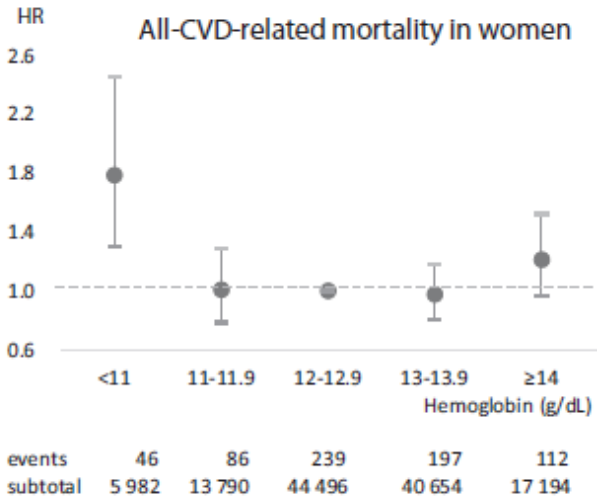


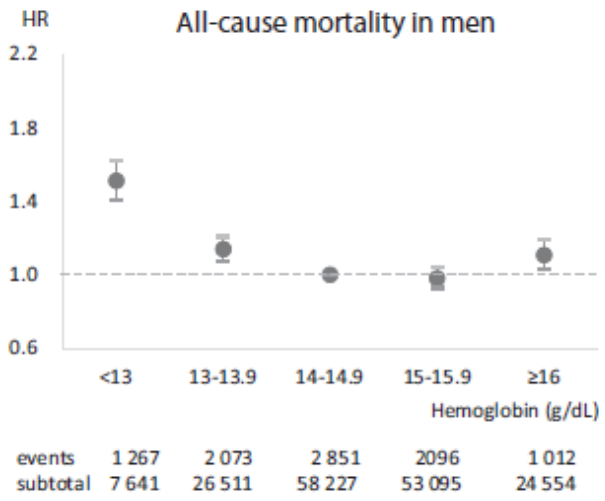


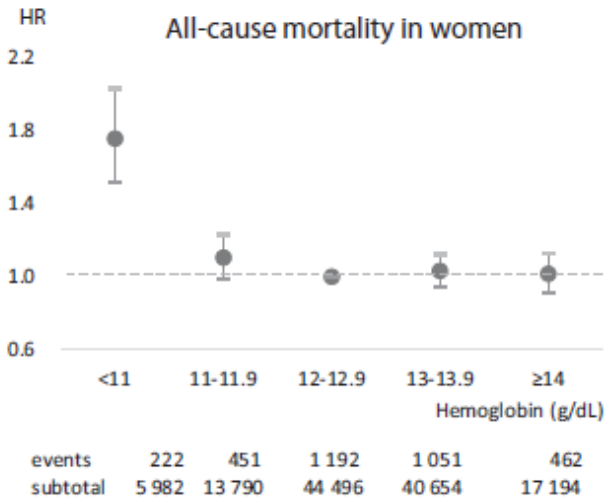
Lee G, *J Am Heart Assoc* 2018

Anemia e mortalità









Lee G, *J Am Heart Assoc* 2018

Choosing Wisely®

An initiative of the ABIM Foundation

AABB®

Five Things Physicians and Patients Should Question

1 Don't transfuse more units of blood than absolutely necessary.

Each unit of blood carries risks. A restrictive threshold (7.0-8.0g/dL) should be used for the vast majority of hospitalized, stable patients without evidence of inadequate tissue oxygenation (evidence supports a threshold of 8.0g/dL in patients with pre-existing cardiovascular disease). Transfusion decisions should be influenced by symptoms and hemoglobin concentration. Single unit red cell transfusions should be the standard for non-bleeding, hospitalized patients. Additional units should only be prescribed after re-assessment of the patient and their hemoglobin value.

2 Don't transfuse red blood cells for iron deficiency without hemodynamic instability.

Blood transfusion has become a routine medical response despite cheaper and safer alternatives in some settings. Pre-operative patients with iron deficiency and patients with chronic iron deficiency without hemodynamic instability (even with low hemoglobin levels) should be given oral and/or intravenous iron.

3 Don't routinely use blood products to reverse warfarin.

Patients requiring reversal of warfarin can often be reversed with vitamin K alone. Prothrombin complex concentrates or plasma should only be used for patients with serious bleeding or requiring emergency surgery.

4 Don't perform serial blood counts on clinically stable patients.

Transfusion of red blood cells or platelets should be based on the first laboratory value of the day unless the patient is bleeding or otherwise unstable. Multiple blood draws to recheck whether a patient's parameter has fallen below the transfusion threshold (or unnecessary blood draws for other laboratory tests) can lead to excessive phlebotomy and unnecessary transfusions.

5 Don't transfuse O negative blood except to O negative patients and in emergencies for women of child bearing potential with unknown blood group.

O negative blood units are in chronic short supply due in part to overutilization for patients who are not O negative. O negative red blood cells should be restricted to: (1) O negative patients; or (2) women of childbearing potential with unknown blood group who require emergency transfusion before blood group testing can be performed.

Choosing Wisely Canada™
In partnership with the Canadian Medical Association

CSTM SCMT
Canadian Society for Transfusion Medicine
Société Canadienne de Médecine Transfusionnelle

Ten Things Physicians and Patients Should Question

1 Don't transfuse blood if other non-transfusion therapies or observation would be just as effective.

Blood transfusion should not be given if other safer non-transfusion alternatives are available. For example, patients with iron deficiency without hemodynamic instability should be given iron therapy.

2 Don't transfuse more than one Red cell unit at a time when transfusion is required in stable, non-bleeding patients.

Indications for red blood transfusion depend on clinical assessment and the cause of the anemia. In a stable, non-bleeding patient, often a single unit of blood is adequate to relieve patient symptoms or to raise the hemoglobin to an acceptable level. Transfusions are associated with increased morbidity and mortality in high-risk hospitalized inpatients. Transfusion decisions should be influenced by symptoms and hemoglobin concentration. Single unit red cell transfusions should be the standard for non-bleeding, hospitalized patients. Additional units should only be prescribed after re-assessment of the patient and their hemoglobin value.

3 Don't transfuse plasma to correct a mildly elevated (<1.8) international normalized ratio (INR) or activated partial thromboplastin time (aPTT) before a procedure.

A mildly elevated INR is not predictive of an increased risk of bleeding. Furthermore, transfusion of plasma has not been demonstrated to significantly change the INR value when the INR was only minimally elevated (<1.8).

4 Don't routinely transfuse platelets for patients with chemotherapy-induced thrombocytopenia if the platelet count is greater than 10 X 109/L in the absence of bleeding.

A platelet count of 10 X 109/L or greater usually provides adequate hemostasis. Platelet transfusions are associated with adverse events and risks. Considerations in the decision to transfuse platelets include the cause of the thrombocytopenia, comorbid conditions, symptoms of bleeding, risk factors for bleeding, and the need to perform an invasive procedure.

5 Don't routinely use plasma or prothrombin complex concentrates for non-emergent reversal of vitamin K antagonists.

Patients requiring non-emergent reversal of warfarin can often be treated with vitamin K or by discontinuing the warfarin therapy. Prothrombin complex concentrates should only be used for patients with serious bleeding or for those who need urgent surgery. Plasma should only be used in this setting if prothrombin complex concentrates are not available or are contraindicated

Choosing Wisely®

An initiative of the ABIM Foundation

American Society of Hematology

Ten Things Physicians and Patients Should Question

1 Don't transfuse more than the minimum number 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, non-cardiac in-patients).

Transfusion of the smallest effective dose of RBCs is recommended because liberal transfusion strategies do not improve outcomes when compared to restrictive strategies. Unnecessary transfusion generates costs and exposes patients to potential adverse effects without any likelihood of benefit. Clinicians are urged to avoid the routine administration of 2 units of RBCs if 1 unit is sufficient and to use appropriate weight-based dosing of RBCs in children.

2 Don't test for thrombophilia in adult patients with venous thromboembolism (VTE) occurring in the setting of major transient risk factors (surgery, trauma or prolonged immobility).

Thrombophilia testing is costly and can result in harm to patients if the duration of anticoagulation is inappropriately prolonged or if patients are incorrectly labeled as thrombophilic. Thrombophilia testing does not change the management of VTEs occurring in the setting of major transient VTE risk factors. When VTE occurs in the setting of pregnancy or hormonal therapy, or when there is a strong family history plus a major transient risk factor, the role of thrombophilia testing is complex and patients and clinicians are advised to seek guidance from an expert in VTE.

3 Don't use inferior vena cava (IVC) filters routinely in patients with acute VTE.

IVC filters are costly, can cause harm and do not have a strong evidentiary basis. The main indication for IVC filters is patients with acute VTE and a contraindication to anticoagulation such as active bleeding or a high risk of anticoagulant-associated bleeding. Lesser indications that may be reasonable in some cases include patients experiencing pulmonary embolism (PE) despite appropriate, therapeutic anticoagulation, or patients with massive PE and poor cardiopulmonary reserve. Retrievable filters are recommended over permanent filters with removal of the filter when the risk for PE has resolved and/or when anticoagulation can be safely resumed.

4 Don't administer plasma or prothrombin complex concentrates for non-emergent reversal of vitamin K antagonists (i.e. outside of the setting of major bleeding, intracranial hemorrhage or anticipated emergent surgery).

Blood products can cause serious harm to patients, are costly and are rarely indicated in the reversal of vitamin K antagonists. In non-emergent situations, elevations in the international normalized ratio are best addressed by holding the vitamin K antagonist and/or by administering vitamin K.

5 Limit surveillance computed tomography (CT) scans in asymptomatic patients following curative-intent treatment for aggressive lymphoma.

CT surveillance in asymptomatic patients in remission from aggressive non-Hodgkin lymphoma may be harmful through a small but cumulative risk of radiation-induced malignancy. It is also costly and has not been demonstrated to improve survival. Physicians are encouraged to carefully weigh the anticipated benefits of post-treatment CT scans against the potential harm of radiation exposure. Due to a decreasing probability of relapse with the passage of time and a lack of proven benefit, CT scans in asymptomatic patients more than 2 years beyond the completion of treatment are rarely advisable.

JAMA | Special Communication

Clinical Practice Guidelines From the AABB
Red Blood Cell Transfusion Thresholds and Storage

Jeffrey L. Carson, MD; Gordon Guyatt, MD; Nancy M. Heddle, MSc; Brenda J. Grossman, MD, MPH; Claudia S. Cohn, MD, PhD; Mark K. Fung, MD, PhD; Terry Gernsheimer, MD; John B. Holcomb, MD; Lewis J. Kaplan, MD; Louis M. Katz, MD; Nikki Peterson, BA; Glenn Ramsey, MD; Sunil V. Rao, MD; John D. Roback, MD, PhD; Aryeh Shander, MD; Aaron A. R. Tobian, MD, PhD

JAMA November 15, 2016 Volume 316, Number 19

First Recommendation

The AABB recommends a restrictive RBC transfusion threshold in which the transfusion is not indicated until the hemoglobin level is 7 g/dL for hospitalized adult patients who are hemodynamically stable, including critically ill patients, rather than a liberal threshold when the hemoglobin level is 10 g/dL (strong recommendation, moderate quality evidence). For patients undergoing orthopedic surgery or cardiac surgery and those with preexisting cardiovascular disease, the AABB recommends a restrictive RBC transfusion threshold (hemoglobin level of 8 g/dL; strong recommendation, moderate quality evidence). The restrictive hemoglobin transfusion threshold of 7 g/dL is likely comparable with 8 g/dL, but RCT evidence is not available for all patient categories. These recommendations apply to all but the following conditions for which the evidence is insufficient for any recommendation: acute coronary syndrome, severe thrombocytopenia (patients treated for hematological or oncological disorders who at risk of bleeding), and chronic transfusion–dependent anemia.

Non si applica

Cochrane Library

Cochrane Database of Systematic Reviews

Transfusion thresholds and other strategies for guiding allogeneic red blood cell transfusion

New search | Conclusions changed | Review | Intervention

Jeffrey L Carson, Simon J Stanworth, Nareg Roubinian, Dean A Fergusson, Darrell Triulzi, Carolyn Doree, Paul C Hebert

First published: 12 October 2016

- **12587 pz** in **31 RCT** dal 1950 al 2016 (10 chirurgia ortopedica, 6 critical care unit, 5 cardiochirurgia, 5 sanguinamento GI, 2 SCA, 2 pz oncoematologici, 1 chirurgia vascolare)

→Confrontare la mortalità a 30 giorni e altri outcome clinici in pz randomizzati a una **strategia restrittiva** vs una **strategia liberale**

Critically ill patient

TRICC study:

- mortalità 30 gg: liberal 23.3% vs restrictive 18.7%
  - <55 aa: liberal 13% vs restrictive 5.7% (*p*=0.028)
  - APACHE II score<20: liberal 16.1% vs restrictive 8.7% (*p*=0.03)
- Complicanze cardiache: liberal 21% vs restrictive 13.2% (*p*<0.01)

TRACS study: end-point composito mortalità a 30 gg e gravi comorbidità in pz cardiochirurgici→ no differenza

Hebert, *NEJM* 1999
Hajjar, *JAMA* 2010

Critically ill patient

bjh guideline

Guidelines on the management of anaemia and red cell transfusion in adult critically ill patients

Andrew Retter,[1,2] Duncan Wyncoll,[1] Rupert Pearse,[3] Damien Carson,[4] Stuart McKechnie,[5] Simon Stanworth,[6] Shubha Allard,[7] Dafydd Thomas,[8] Tim Walsh[9] and British Committee for Standards in Haematology

British Journal of Haematology, 2013, **160,** 445–464

- Soglia trasfusionale di 7 g/dl, con range target di 7-9 g/dl, eccetto in presenza di co-morbidità specifiche o fattori legati alla patologia acuta che modificano la decisione clinica (Grade 1B)
- Non trasfondere sopra il 9 g/dl nella maggior parte dei pz (Grade 1B)
- Provette pediatriche (Grade 2C) **40 ml/dì**

Sepsi e Shock settico

The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 OCTOBER 9, 2014 VOL. 371 NO. 15

Lower versus Higher Hemoglobin Threshold for Transfusion in Septic Shock

Lars B. Holst, M.D., Nicolai Haase, M.D., Ph.D., Jørn Wetterslev, M.D., Ph.D., Jan Wernerman, M.D., Ph.D., Anne B. Guttormsen, M.D., Ph.D., Anders Åneman, M.D., Ph.D., Mari Helle L. Nibro, M.D., Ph.D., Bodil S. Rasmu Anders Oldner, M.D., Ph.D., Ville Petti Ulf G. Pedersen M.D., Nanna Reiter, M. Klaus J. Thornberg, M.D., Peter B. Hjort Morten Steensen, M.D., Inga Tjäder, M.D., P Brit Sjøbø, R.N., Helle Bundgaard, M.D., P Carsten Albeck, M.D., Dorte I and Anders Perner, M.D., Ph.D., for the

Table 2. Primary and Secondary Outcome Measures.*

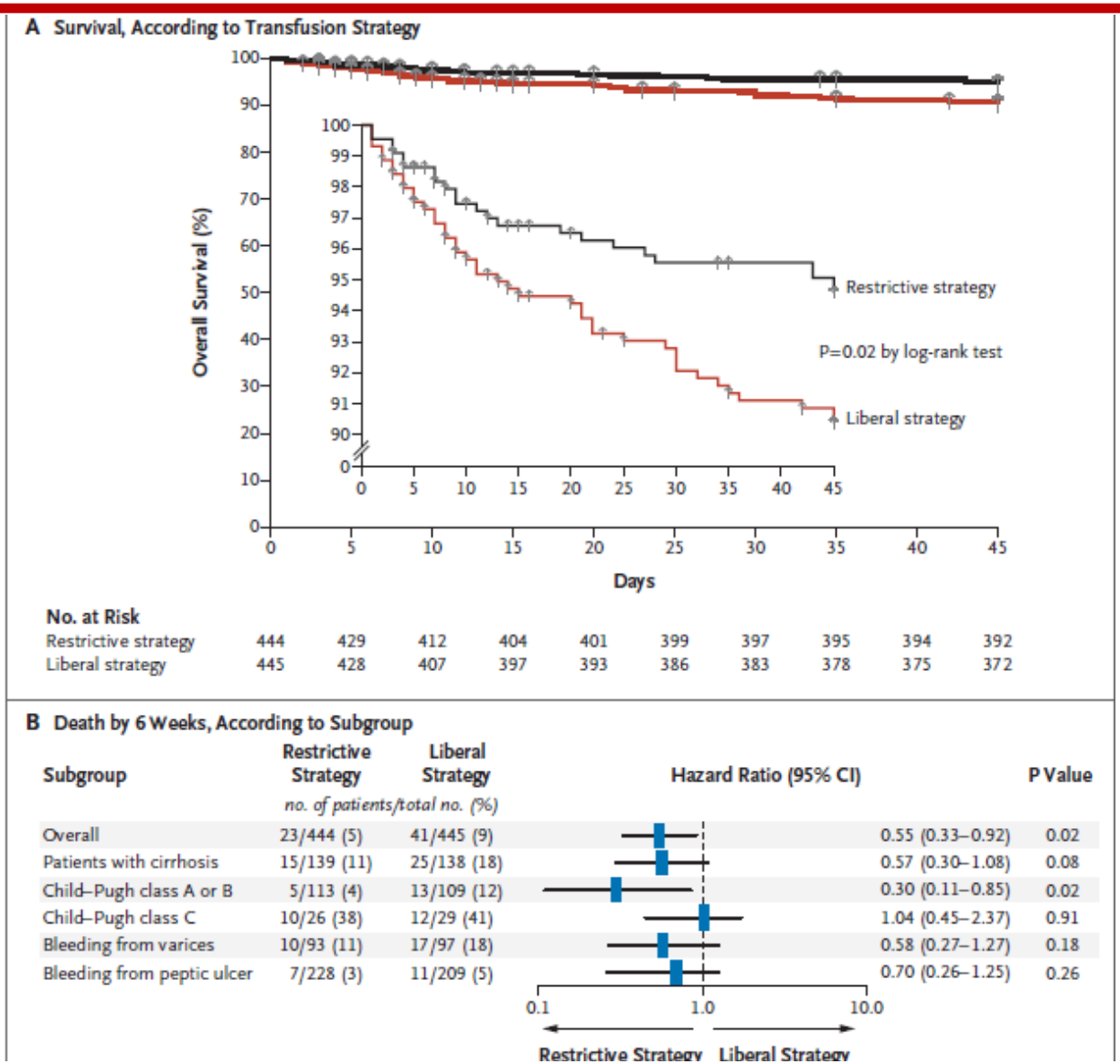
Outcome	Lower Hemoglobin Threshold	Higher Hemoglobin Threshold	Relative Risk (95% CI)	P Value
Primary outcome: death by day 90 — no./total no. (%)	216/502 (43.0)	223/496 (45.0)	0.94 (0.78–1.09)	0.44†
Secondary outcomes‡				
Use of life support — no./total no. (%)§				
At day 5	278/432 (64.4)	267/429 (62.2)	1.04 (0.93–1.14)	0.47†
At day 14	140/380 (36.8)	135/367 (36.8)	0.99 (0.81–1.19)	0.95†
At day 28	53/330 (16.1)	64/322 (19.9)	0.77 (0.54–1.09)	0.14†
Ischemic event in the ICU — no./total no. (%)¶	35/488 (7.2)	39/489 (8.0)	0.90 (0.58–1.39)	0.64
Severe adverse reaction — no./total no. (%)**	0/488	1/489 (0.2)	—	1.00
Alive without vasopressor or inotropic therapy — mean % of days††	73	75	—	0.93
Alive without mechanical ventilation — mean % of days††	65	67	—	0.49
Alive without renal-replacement therapy — mean % of days††	85	83	—	0.54
Alive and out of the hospital — mean % of days††	30	31	—	0.89

Sepsi e Shock settico

Surviving Sepsis Campaign: International Guidelines for Management of Sepsis and Septic Shock: 2016

In pz adulti con sepsi, in assenza di condizioni particolari (ischemia miocardica, grave ipossiemia, o emorragia acuta) trasfondere EC solo quando Hb <7.0 g/dL (Grade 1A)

Sanguinamento tratto GI alto



Sanguinamento tratto GI alto

Table 3. Study Outcomes.*

Outcome	Restrictive Strategy (N = 444)	Liberal Strategy (N = 445)	Hazard Ratio with Restrictive Strategy (95% CI)	P Value
Death from any cause within 45 days — no. (%)	23 (5)	41 (9)	0.55 (0.33–0.92)	0.02
Further bleeding — no. of patients/total no. (%)				
Overall	45/444 (10)	71/445 (16)	0.62 (0.43–0.91)	0.01
Patients with cirrhosis	16/139 (12)	31/138 (22)	0.49 (0.27–0.90)	0.02
Child–Pugh class A or B	12/113 (11)	23/109 (21)	0.53 (0.27–0.94)	0.04
Child–Pugh class C	4/26 (15)	8/29 (28)	0.58 (0.15–1.95)	0.33
Bleeding from esophageal varices	10/93 (11)	21/97 (22)	0.50 (0.23–0.99)	0.05
Rescue therapies				
Balloon tamponade	3/139 (2)	11/138 (8)		0.03
TIPS	6/139 (4)	15/138 (11)		0.04
Patients with bleeding from peptic ulcer	23/228 (10)	33/209 (16)	0.63 (0.37–1.07)	0.09
Rescue therapies				
Second endoscopic therapy	20/228 (9)	26/209 (12)		0.21
Emergency surgery	4/228 (2)	12/209 (6)		0.04
No. of days in hospital	9.6±8.7	11.5±12.8		0.01
Adverse events — no. (%)†				
Any‡	179 (40)	214 (48)	0.73 (0.56–0.95)	0.02
Transfusion reactions	14 (3)	38 (9)	0.35 (0.19–0.65)	0.001
Fever	12 (3)	16 (4)	0.74 (0.35–1.59)	0.56
Transfusion-associated circulatory overload	2 (<1)	16 (4)	0.06 (0.01–0.45)	0.001
Allergic reactions	1 (<1)	6 (1)	0.16 (0.02–1.37)	0.12
Cardiac complications§	49 (11)	70 (16)	0.64 (0.43–0.97)	0.04
Acute coronary syndrome¶	8 (2)	13 (3)	0.61 (0.25–0.49)	0.27
Pulmonary edema	12 (3)	21 (5)	0.56 (0.27–1.12)	0.07
Pulmonary complications	48 (11)	53 (12)	0.89 (0.59–1.36)	0.67
Acute kidney injury	78 (18)	97 (22)	0.78 (0.56–1.08)	0.13
Stroke or transient ischemic attack	3 (1)	6 (1)	0.49 (0.12–2.01)	0.33
Bacterial infections	119 (27)	135 (30)	0.87 (0.63–1.21)	0.41

Paziente (onco)ematologico

[Intervention Review]

Restrictive versus liberal red blood cell transfusion strategies for people with haematological malignancies treated with intensive chemotherapy or radiotherapy, or both, with or without haematopoietic stem cell support

Cochrane Database of Systematic Reviews 2017, Issue 1. Art. No.: CD011305.

Lise J Estcourt[1], Reem Malouf[2], Marialena Trivella[3], Dean A Fergusson[4], Sally Hopewell[5], Michael F Murphy[6]

Findings from this review were based on four studies and 240 participants.

There is low-quality evidence that a restrictive RBC transfusion policy reduces the number of RBC transfusions per participant. There is low-quality evidence that a restrictive RBC transfusion policy has little or no effect on: mortality at 30 to 100 days, bleeding, or hospital stay. This evidence is mainly based on adults with acute leukaemia who are having chemotherapy. Although, the two ongoing studies (530 participants) are due to be completed by January 2018 and will provide additional information for adults with haematological malignancies, we will not be able to answer this review's primary outcome. If we assume a mortality rate of 3% within 100 days we would need 1492 participants to have a 80% chance of detecting, as significant at the 5% level, an increase in all-cause mortality from 3% to 6%. Further RCTs are required in children.

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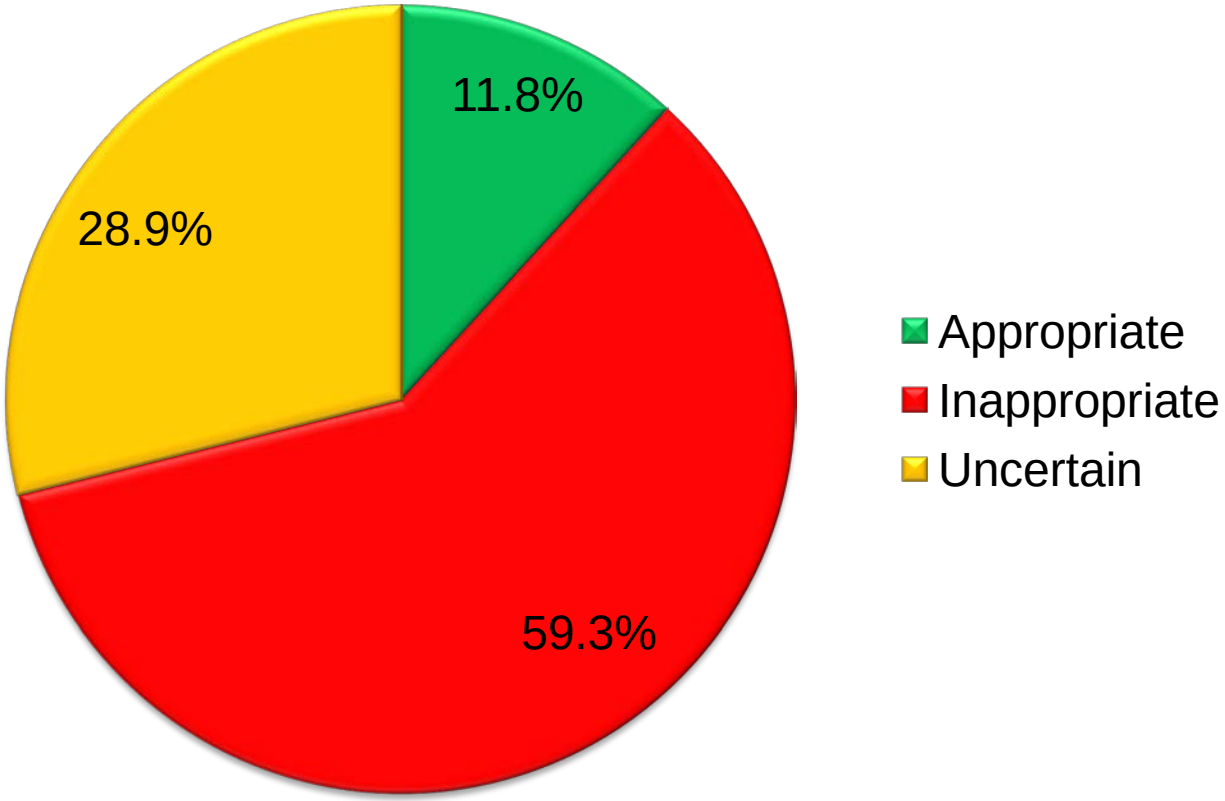
World Health Organization

- 108 milioni di U EC raccolte all'anno
- 76% trasfuse negli over65

La trasfusione di EC nel 2011 è stata la procedura più praticata durante il ricovero (12 % delle ospedalizzazioni con procedura). I ricoveri con ET sono più che raddoppiati dal 1997.

Appropriateness of Allogeneic Red Blood Cell Transfusion: The International Consensus Conference on Transfusion Outcomes

Aryeh Shander, Arlene Fink, Mazyar Javidroozi, Jochen Erhard, Shannon L. Farmer, Howard Corwin, Lawrence Tim Goodnough, Axel Hofmann, James Isbister, Sherri Ozawa, and Donat R. Spahn, for the International Consensus Conference on Transfusion Outcomes Group



Transfusion Medicine Reviews, Vol 25, No 3 (July), 2011: pp 232-246.e53

Alternative all'ET

- Causa dell'anemia?

Table 6. Classification of Anemia According to the Reticulocyte Index

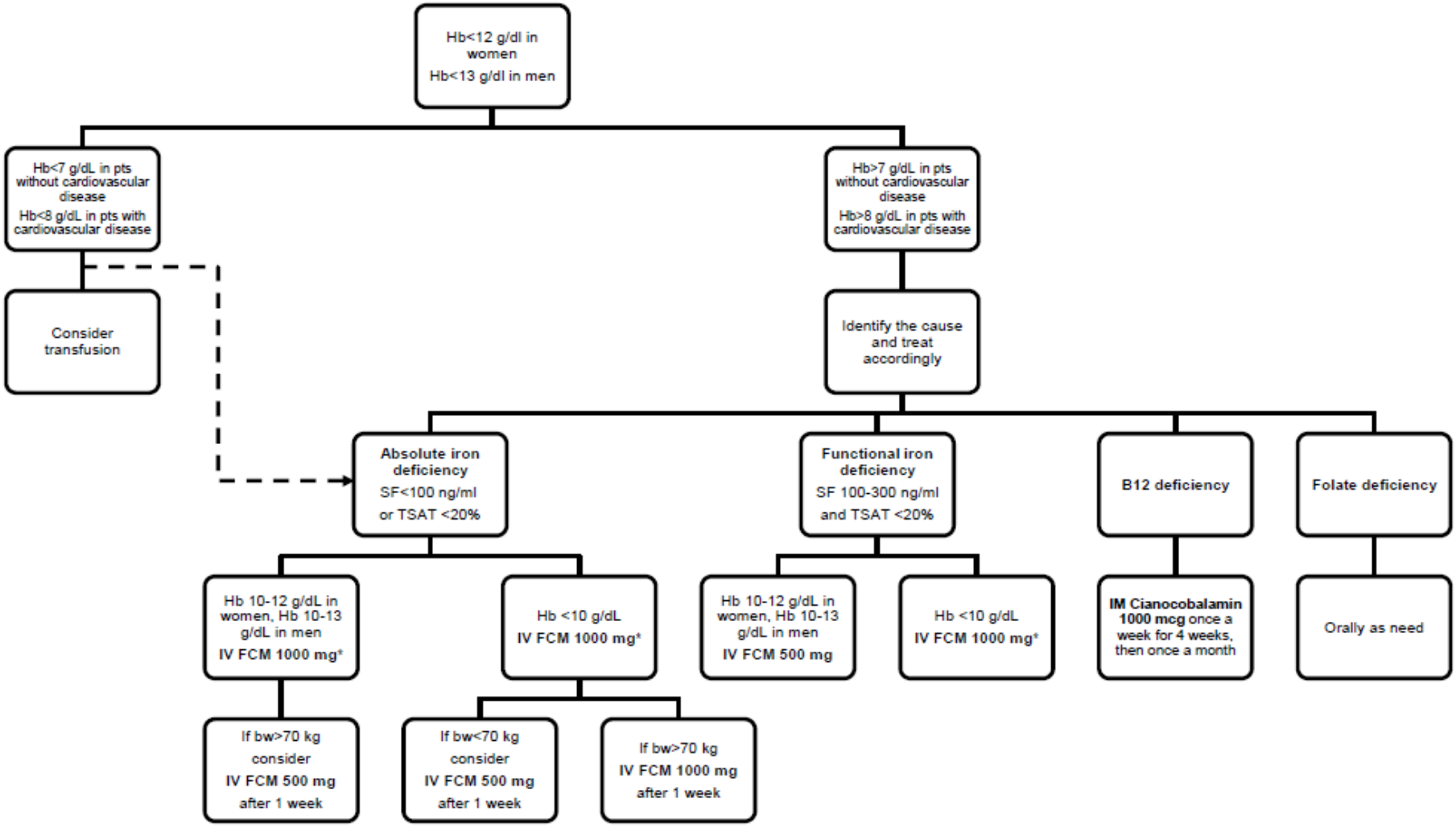
RI < 1% Hypoproliferative Anemias	RI < 1% Maturation Abnormalities	RI > 1%*
ACD	Vitamin B_{12} deficiency	Immune hemolytic anemias
Anemia CKD	Folate deficiency	Infectious causes of hemolysis
IDA	MDS	Membrane abnormalities
Congenital dyserythropoietic anemias	Sideroblastic anemia	Mechanical hemolysis
Drugs or toxins		Hemoglobinopathies
Endocrine anemias		Red blood cell enzyme abnormalities
Marrow replacement		

*Appropriate response to increased red blood cell destruction, blood loss, nutritional supplementation.
ACD: anemia of chronic disease; CKD: chronic kidney disease; IDA: iron deficiency anemia; MDS: myelodysplastic syndromes.

Table 5. Classification of Anemia According to the MCV.

Low MCV (<80 fL)	Normal MCV (80-99 fL)	High MCV (>100 fL)
Thalassemic syndromes*	ACD	Folate or vitamin B_{12} deficiency
IDA	Anemia of CKD	Alcohol
IRIDA	Sickle cell disease	Chronic liver disease
Sideroblastic anemia	Myelodysplasia	MDS
	Combined deficiency (for example iron + folate)	Reticulocytosis

Alternative all'ET



Management of anemic stable hospitalized elderly patients.

Hb: hemobglobin; pts: patients; bw: body weight; TSAT: transferrin saturation, ID: iron deficiency; SF: serum ferritin; FCM: ferric carboxymaltose, IV: intravenous; IM: intramuscular. *If body weight<35 kg the dose will be 20 mg iron/kg body weight.

"WEANING DOCTORS OFF THEIR LOVE AFFAIR WITH BLOOD IS GOING TO BE HARDER THAN WE THINK."

Ian Roberts, London School of Hygiene & Tropical Medicine

Ferro carbossimaltosio in PS

- 16 pz (14 F), età media 42 aa
- **Hb media** in **PS**: **6.1±0.8** g/dl (valore min 4.9 g/dl)

- **Hb media** a **T1** (10.5±2.9 gg): **9.0±1.1** g/dl
- **Reticolociti T1** media: **163000 ±101000**/mm^3, mediana 127000, min 67000, max 371000)
- **Incremento medio T1**: **2.5±1.1** g/dl

- **Hb media** a T2 (30-40 gg): **11.8±1.4** g/dl
- **Incremento medio T2**: **4.7±1.8** g/dl

MCV: PS **61.5±6.1** fl→T1 **72.4±8** fl→ T2 **80.0±8.7** fl

GRAZIE!