Kdy podat transfuzi u kriticky nemocného?

MUDr. Jan Zatloukal, Ph.D.

KARIM FN Plzeň

FAKULTNÍ NEMOCNICE PLZEŇ

FACULTAS MEDICA PILSNENSIS • MCMXLV •

$$DO_2 = CO \times Hb \times SpO_2 \times 1{,}34 + (paO_2 \times 0{,}0031)$$

“ Podíl anemických pacientů vstupujících do intenzivní péče je až 60%, přičemž až u 1/3 z nich je Hb < 100 g/l. Riziko, že bude pacient transfundován stoupá s každým dnem stráveným v intenzivní péči o cca 7%.“

Vincent J.L. JAMA 2002

“ Prevalence anémie u kriticky nemocných pacientů vstupujících do intenzivní péče dosahuje 65% a 97% pacientů dosahuje limitu anémie do 8 dnů od hospitalizace. „

Holst L.B. Dan Med J. 2016

“Podání transfuze je 5. nejčastěji nadužívanou terapií v medicíně!!“

Leahy, Transfusion 57, 6, 2017

Kolego, ušetřil byste si tu okliku přes oběhový systém, kdyby jste tu krev odsával přímo odtud…

Transfusion complications	Estimated frequency (event/no of transfusion)	Comment
INFECTIOUS		
Human immunodeficiency virus (HIV)	1:2.350.000	
Hepatitis B virus (HBV)	1:350.000	
Hepatitis C virus (HCV)	1:1.800.000 - 1:2.800.000	
Human T-cell lymphotrophic virus (HTLV)	1:2.000.000	
Clinical sepsis related to bacterial contamination	1:250.000	Often Yersenia and pseudomonas species
NONINFECTIOUS (NISHOT)		
Immune-mediated		
Haemolytic transfusion reaction	1:10.000 - 1:50.000	Due to IgM and IgG
Anaphylactic reaction	1:20.000 - 1:50.000	Associated with IgA deficiency
TRALI (Transfusion-related acute lung injury)	1:534 - 1:17.000	Within 6 hours of transfusion
Graft versus host disease	Very rare	Immunocompromised patients
Nonimmune-mediated		
"Wrong unit – wrong patient"	1:14.000 - 1:38.000	Mostly related to AB0 incompatibility
TACO (Transfusion-associated circulatory overload)	1:18 - 1:356	Major cause of transfusion related death

TRIM – transfusion-related modulation of immune system

Storage leasion

Celulární změny

- Deplece 2,3 – DPG
- Deplece ATP
- Snížení deformability
- Zvýšení fragility
- Zvýšená interakce s endotelem

Biochemické změny

- Snížení pH
- Zvýšení K^+
- Zvýšení hladina volného hemoglobinu
- Imunomodulační vliv

Review Article

Efficacy of red blood cell transfusion in the critically ill: A systematic review of the literature*

Paul E. Marik, MD, FACP, FCCM, FCCP; Howard L. Corwin, MD, FACP, FCCM, FCCP

Crit Care Med 2008; 36 (9)

Nejednalo se o deleukotizovanou krev!

Senioři s AIM a hematokritem < 30

42 of 45 studies
Risks outweigh benefits

2 of 45 studies
Neutral

1 subgroup in 1 study
Benefits outweigh risks

The New England
Journal of Medicine

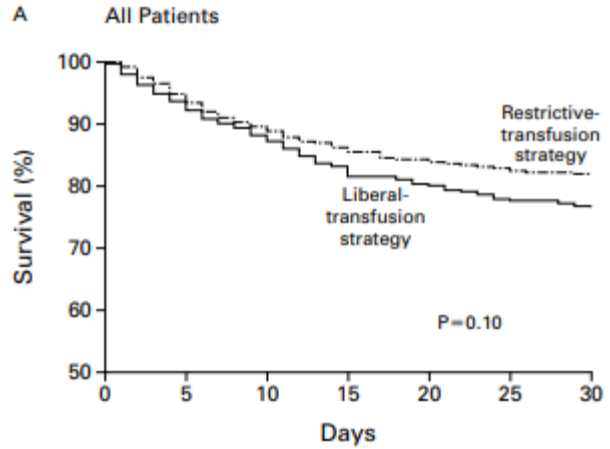
VOLUME 340 FEBRUARY 11, 1999 NUMBER 6

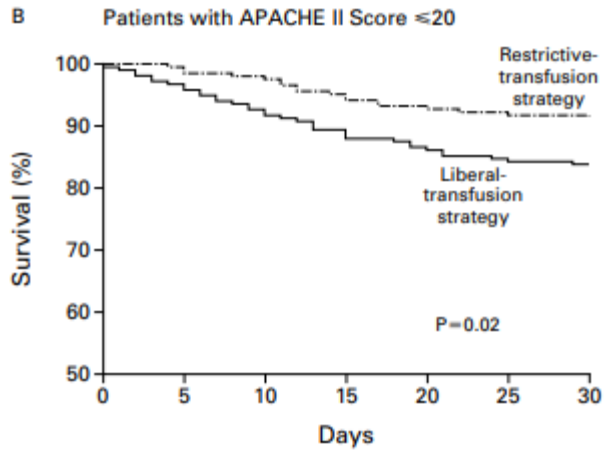
A MULTICENTER, RANDOMIZED, CONTROLLED CLINICAL TRIAL OF TRANSFUSION REQUIREMENTS IN CRITICAL CARE

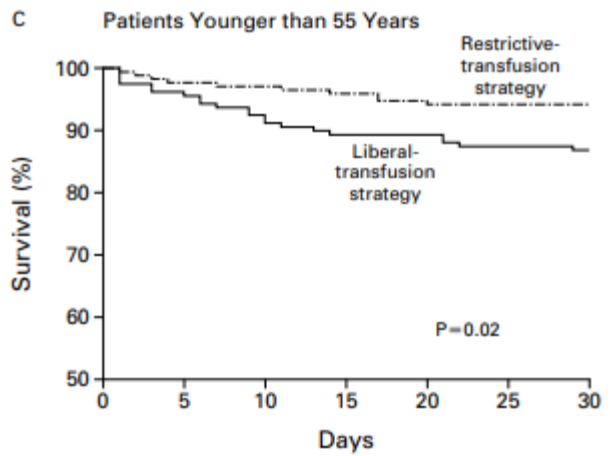
PAUL C. HÉBERT, M.D., GEORGE WELLS, PH.D., MORRIS A. BLAJCHMAN, M.D., JOHN MARSHALL, M.D., CLAUDIO MARTIN, M.D., GIUSEPPE PAGLIARELLO, M.D., MARTIN TWEEDDALE, M.D., PH.D., IRWIN SCHWEITZER, M.SC., ELIZABETH YETISIR, M.SC., AND THE TRANSFUSION REQUIREMENTS IN CRITICAL CARE INVESTIGATORS FOR THE CANADIAN CRITICAL CARE TRIALS GROUP*

Results Overall, 30-day mortality was similar in the two groups (18.7 percent vs. 23.3 percent, P= 0.11). However, the rates were significantly lower with the restrictive transfusion strategy among patients who were less acutely ill — those with an Acute Physiology and Chronic Health Evaluation II score of ≤20 (8.7 percent in the restrictive-strategy group and 16.1 percent in the liberal-strategy group, P=0.03) — and among patients who were less than 55 years of age (5.7 percent and 13.0 percent, respectively; P=0.02), but not among patients with clinically significant cardiac disease (20.5 percent and 22.9 percent, respectively; P=0.69). The mortality rate during hospitalization was significantly lower in the restrictive-strategy group (22.2 percent vs. 28.1 percent, P=0.05).

Conclusions A restrictive strategy of red-cell transfusion is at least as effective as and possibly superior to a liberal transfusion strategy in critically ill patients, with the possible exception of patients with acute myocardial infarction and unstable angina. (N Engl J Med 1999;340:409-17.)







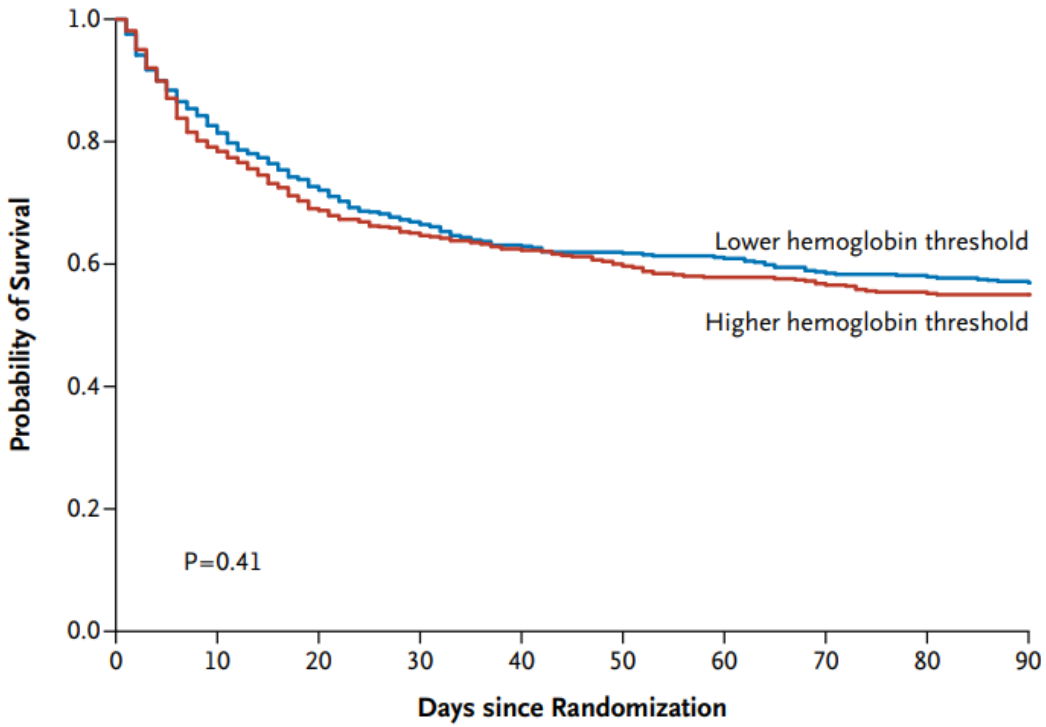
The NEW ENGLAND JOURNAL of MEDICINE

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

Lower versus Higher Hemoglobin Threshold for Transfusion in Septic Shock

RESULTS

We analyzed data from 998 of 1005 patients (99.3%) who underwent randomization. The two intervention groups had similar baseline characteristics. In the ICU, the lower-threshold group received a median of 1 unit of blood (interquartile range, 0 to 3) and the higher-threshold group received a median of 4 units (interquartile range, 2 to 7). At 90 days after randomization, 216 of 502 patients (43.0%) assigned to the lower-threshold group, as compared with 223 of 496 (45.0%) assigned to the higher-threshold group, had died (relative risk, 0.94; 95% confidence interval, 0.78 to 1.09; P=0.44). The results were similar in analyses adjusted for risk factors at baseline and in analyses of the per-protocol populations. The numbers of patients who had ischemic events, who had severe adverse reactions, and who required life support were similar in the two intervention groups.



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

Recommendations

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.

JAMA 2016; 316 (19)

Restriktivní trigger **70 g/l**

80 g/l u pacientů po velkém ortopedickém výkonu, kardiochirurgických pacientů a kardiaků

Nedostatečná data u pacientů s AKS

SOCIETY FOR THE ADVANCEMENT OF BLOOD MANAGEMENT®

International Consensus Conference on Transfusion and Outcomes

Medical Society for Blood Management

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

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

An international multidisciplinary panel of 15 experts reviewed 494 published articles and used the RAND/UCLA Appropriateness Method to determine the appropriateness of allogeneic red blood cell (RBC) transfusion based on its expected impact on outcomes of stable nonbleeding patients in 450 typical inpatient medical, surgical, or trauma scenarios. Panelists rated allogeneic RBC transfusion as appropriate in 53 of the scenarios (11.8%), inappropriate in 267 (59.3%), and uncertain in 130 (28.9%). Red blood cell transfusion was most often rated appropriate (81%) in scenarios featuring patients with hemoglobin (Hb) level 7.9 g/dL or less, associated comorbidities, and age older than 65 years. Red blood cell transfusion was rated inappropriate in all scenarios featuring patients with Hb level 10 g/dL or more and in 71.3% of scenarios featuring patients with Hb level 8 to 8.9 g/dL. Conversely, no scenario with patient's Hb level of 8 g/dL or more was rated as appropriate. Nearly one third of all scenarios were rated uncertain, indicating the need for more research. The observation that allogeneic RBC transfusions were rated as either inappropriate or uncertain in most scenarios in this study supports a more judicious transfusion strategy. In addition, the large number of scenarios in which RBC transfusions were rated as uncertain can serve as a road map to identify areas in need of further investigation.

From the Departments of Anesthesiology, Critical Care and Hyperbaric Medicine, Englewood Hospital and Medical Center, Englewood, NJ; and Medicine and Surgery, Mount Sinai School of Medicine, Mount Sinai Hospital, New York, NY; Carle Cancer Research Institute, UCLA-Kaiser Permanente Center, Los Angeles, CA; and Atlantic Care Foundation, Pomona, NJ; Department of Critical Care and Hyperbaric Medicine, Englewood Hospital and Medical Center, Englewood, NJ; and Pacific Research Corporation, Inc, Newport Coast, CA; Clinic of Surgery, Vascular Surgery, University Hospital Zurich, Zurich, Germany; Patient Blood Management Program, Department of Health, Western Australia, Perth, Western Australia; Centre for Population Health Research, Curtin University, Perth, Western Australia; Royal Perth Hospital, Perth, Western Australia; School of Surgery, Faculty of Medicine, University of Western Australia, Perth, Western Australia; Dartmouth Hitchcock Medical Center, Lebanon, NH; Transfusion Service, Transfusion Medicine Fellowship Program, Stanford Blood Center, Department of Pathology, Stanford University Medical Center, CA; Medical Service for Blood Management, Vienna, Austria; Royal Perth Hospital, Perth, Western Australia; Department of Surgery, St Elizabeth's Hospital of Boston, Boston, MA; Australian Patient Blood Management, Englewood Hospital and Medical Center, Englewood, NJ; and Institute of Anesthesiology, University Hospital Zurich, Zurich, Switzerland.

For a list of group participants, see Appendix 1.

Address reprint requests to Aryeh Shander, MD, Professor, Department of Anesthesiology, Critical Care and Hyperbaric Medicine, Englewood Hospital and Medical Center, 350 Engle Street, Englewood, NJ 07631.

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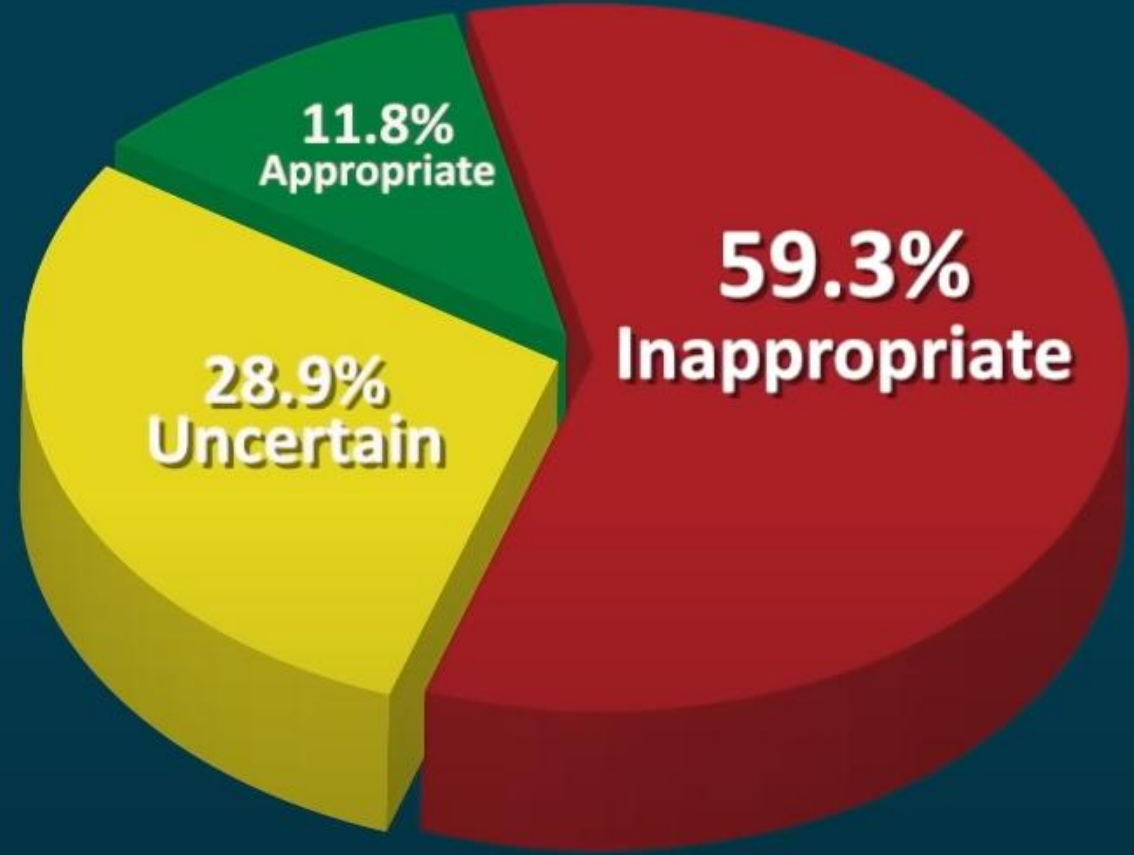
0887-7963/$ - see front matter

doi:10.1053/j.tmrv.2011.04.002

IN 2006, MORE than 14 million units of allogeneic red blood cells (RBCs) were transfused in the United States alone.[1] From 1997 to 2007, the hospital discharges in the United States in which patients' record indicated RBC transfusion increased from 5% to 10.4%, with blood transfusion becoming the most common inpatient hospital procedure.[2] Red blood cell transfusion rates in other countries are variable but often comparably high.[3-5]

Although therapeutic modalities routinely undergo rigorous evaluation of their efficacy and safety before entering clinical practice, RBC transfusion has not been subjected to similar examination.[6-9] In addition to known transfusion complications,[10] a large (and increasing) number of studies indicate that RBC transfusion is associated with unfavorable general outcomes.[11] Similarly, the available large randomized clinical trials[12-15] and prospective observational studies[16,17] that have assessed the efficacy/effectiveness of allogeneic RBC transfusions have indicated that restricting RBC transfusions in nonbleeding/nonageing patients has no significant negative effect on patient outcomes and may even improve outcomes in some populations.

Decisions to transfuse RBCs are often based on "unsubstantiated" hemoglobin (Hb) level or hematocrit "triggers" and are further complicated by regulatory constraints, fear of future litigation, and public expectations rather than on the



TRANSFUSION MEDICINE REVIEWS Vol 25, No 3 (July) 2011

Journal of
Clinical Medicine

MDPI

Article

Appropriateness of Allogeneic Red Blood Cell Transfusions in Non-Bleeding Patients in a Large Teaching Hospital: A Retrospective Study

Piotr F. Czempik [1,2,*], Dawid Wilczek [3], Jan Herzyk [3] and Łukasz J. Krzych [1]

and some additional criteria. The overall incidence of RBC transfusions at our institution was 10.2 per 1000 patient-days. There were 216 (26.1%) RBC units appropriately transfused and 612 (73.9%) RBC units that were transfused with no clear indications. The incidence of appropriate and inappropriate RBC transfusions were 2.6 and 7.5 per 1000 patient-days, respectively. The most frequent clinical situations when RBC transfusion was classified as appropriate were: Hb < 70 g/L plus cognitive problems/headache/dizziness (10.1%), Hb < 60 g/L (5.4%), and Hb < 70 g/L plus dyspnea despite oxygen therapy (4.3%). The most frequent causes of inappropriate RBC transfusions were: no Hb determination pre-RBC transfusion (n
single-transfusion episode (n = 260); a
and Hb concentration ≥80 g/L (n = 80)

Table 1. Appropriate red blood cell transfusion clinical scenarios.

Clinical Scenarios
Hb [1] < 60 g/L;
Hb < 70 g/L plus tachycardia and/or hypotension despite normal blood volume;
Hb < 70 g/L plus dyspnea and/or tachypnea despite oxygen therapy (aimed at SpO_2 [2] 100%);
Hb < 70 g/L plus problems with concentration/attention and/or headache and/or dizziness;
Hb < 70 g/L plus Scv_2O [3]/SvO_2 [4] < 55% and/or lactate > 1.8 mmol/L;
Hb < 80 g/L plus coronary artery disease plus any sign/symptom of anemia;
Hb < 80 g/L plus acute coronary syndrome;
Hb < 80 g/L plus acute cerebral ischemia.

[1] Hemoglobin; [2] peripheral oxygen saturation; [3] central venous oxygen saturation; [4] mixed venous oxygen saturation.

JAMA | Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

Red Blood Cell Transfusion in the Intensive Care Unit

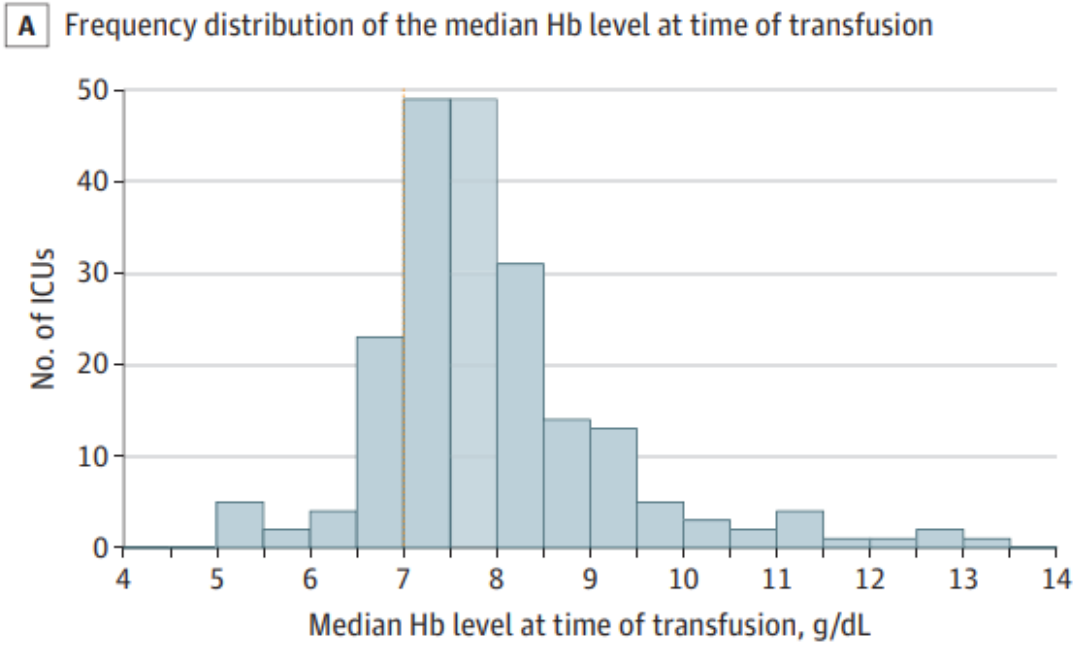
JAMA 2023; 330(19)

- 3643 pacientů
- 233 ICU
- 30 zemí
- 6 kontinentů

- 894 (25%) dostalo alespoň 1 transfuzi
- medián 2 jednotky

- Největší incidence transfuze Afrika (45% pacientů)
- 33% transfuzí v Africe bylo indikováno s cílem “zlepšit stav pacienta“
- Nejvíce transfuzních epizod a podaných jednotek Jižní Amerika
- Podíl transfuzí splňujících restriktivní trigger byl největší v Severní Americe (89%) a **Evropě (24%)**

gers is presented in **Table 3**. Across all patients, the main stated clinical reasons for transfusion were low Hb level in 81.8%, active bleeding in 27.7%, and hemodynamic instability in 23.5%. The main stated physiological triggers were hypotension in 42.2%, tachycardia in 27.4%, and increased lactate level in 17.8%. In 39.5% of transfusion events, no physiological trigger was cited to support the decision to transfuse.

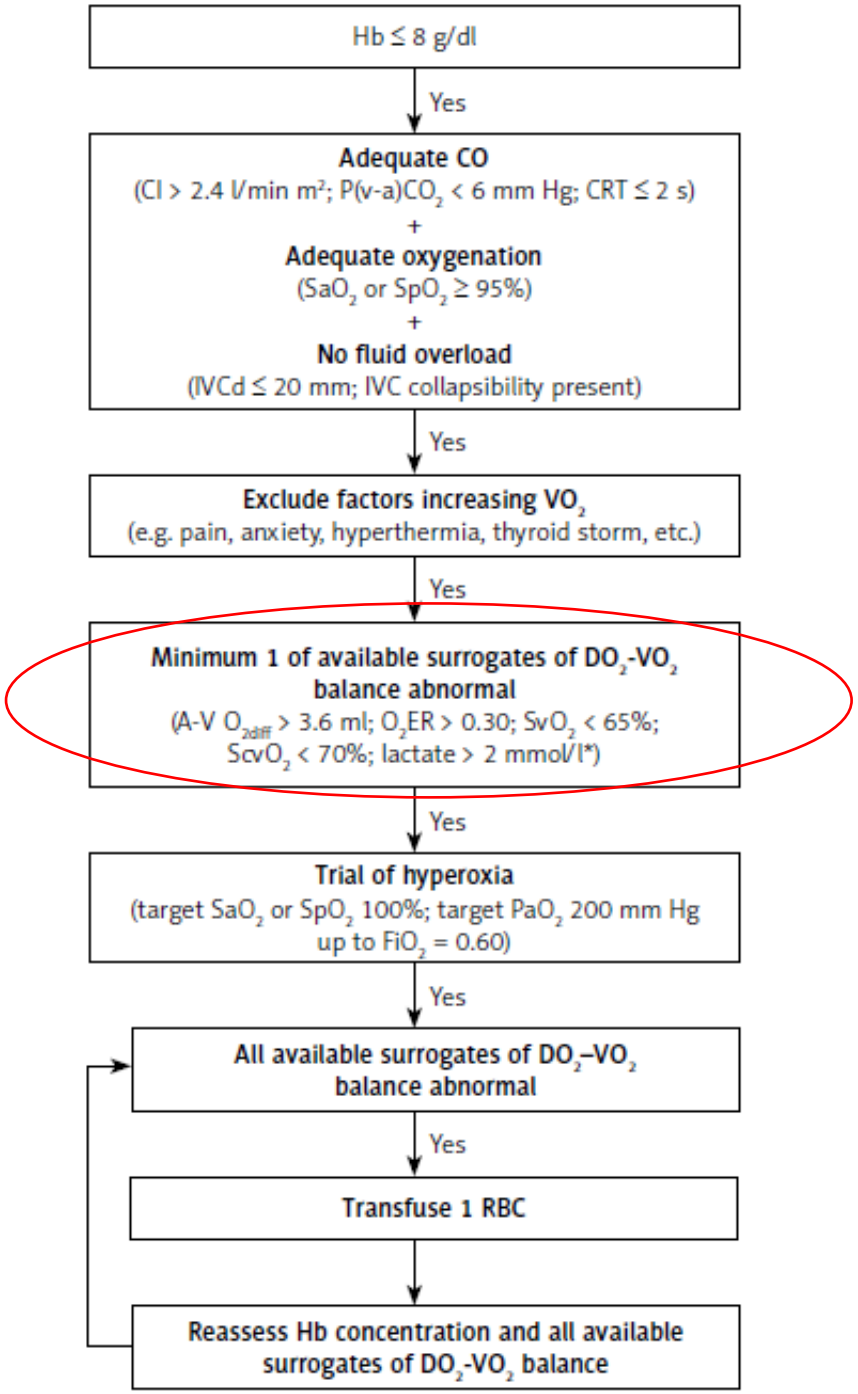


(Fyziologické) transfuzní triggery

- Nejčastěji hladina Hb
- Optimálně Hb + klinické symptomy
- Ideálně Hb + klinické symptomy (na ICU ?) + fyziologické triggery

- Fyziologické triggery reflektují DO_2 - VO_2 bilanci
  - A-V O_2 diference
  - O_2 ER
  - $ScvO_2$ (SvO_2)
  - Laktát (vliv sepse, jaterní dysfunkce, katecholaminů, hyperglykémie…)

A-V O_2 diference	> 3,6 ml
O_2 ER	> 0,3
$ScvO_2$ (SvO_2)	< 70%
Laktát	> 2 mmol/l



Czempik, Hematology 2022; 18(5)

RESEARCH Open Access

Using arterial-venous oxygen difference to guide red blood cell transfusion strategy

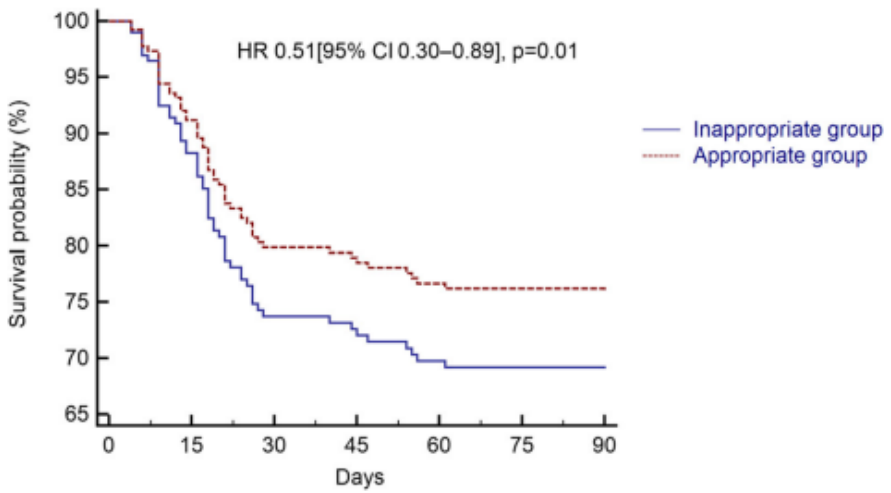
Alberto Fogagnolo[1†], Fabio Silvio Taccone[2†], Jean Louis Vincent[2], Giulia Benetto[1], Elaine Cavalcante[2], Elisabetta Marangoni[1], Riccardo Ragazzi[1], Jacques Creteur[2], Carlo Alberto Volta[1] and Savino Spadaro[1*]

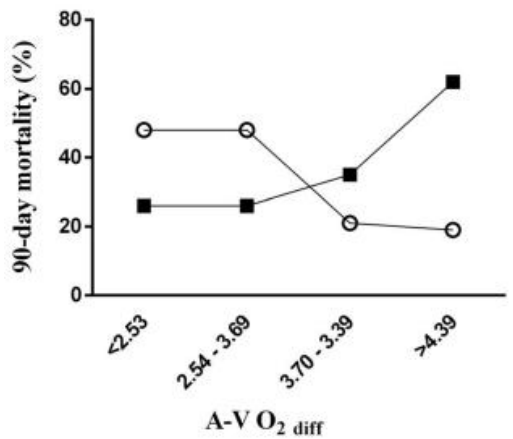
The A-V O_{2diff} was calculated on the day of study inclusion as the difference between arterial oxygen content (CaO_2) and central venous oxygen content ($CcvO_2$) where:

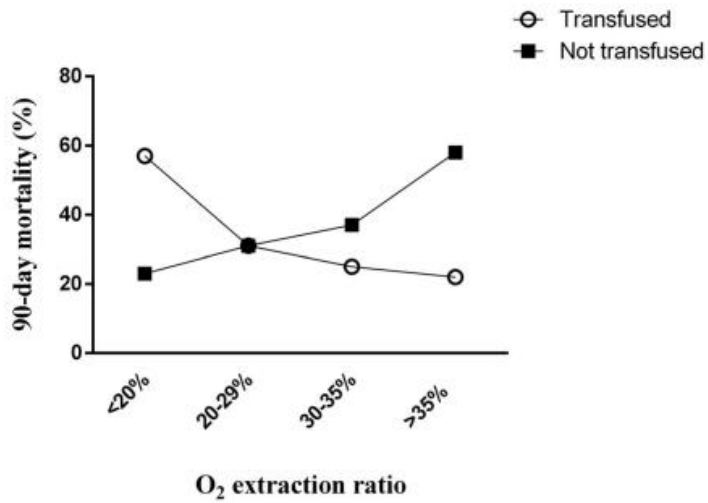
$$CaO_2 = SaO_2 \times Hb \times 1.39 + (PaO_2 \times 0.0031)$$

and

$$CcvO_2 = ScvO_2 \times Hb \times 1.39 + (PcvO_2 \times 0.0031).$$







Methods: A prospective observational study including 177 non-bleeding adult patients with a Hb concentration of 7.0–10.0 g/dL within 72 h after ICU admission. The A-V O_{2diff}, central venous oxygen saturation ($ScvO_2$), and oxygen extraction ratio (O_2ER) were noted when a patient's Hb was first within this range. Transfusion decisions were made by the treating physician according to institutional policy. We used the median A-V O_{2diff} value in the study cohort (3.7 mL) to classify the transfusion strategy in each patient as "appropriate" (patient transfused when the A-V $O_{2diff} > 3.7$ mL or not transfused when the A-V $O_{2diff} \leq 3.7$ mL) or "inappropriate" (patient transfused when the A-V $O_{2diff} \leq 3.7$ mL or not transfused when the A-V $O_{2diff} > 3.7$ mL). The primary outcome was 90-day mortality.

Strategie jedné krevní transfuze

“Jedna ná krev“

“Podání j fuze je kontra ransfuze“

Transfuze a ACS

NATIONAL BLOOD AUTHORITY
AUSTRALIA

RECOMMENDATION – acute coronary syndrome	
R1 GRADE C	In ACS patients with a Hb concentration >100 g/L, RBC transfusion is not advisable because of an association with increased mortality.

PRACTICE POINTS – acute coronary syndrome	
PP5	In patients with ACS and a Hb concentration <80 g/L, RBC transfusion may be associated with reduced mortality and is likely to be appropriate. (See PP1 and PP2).
PP6	In patients with ACS and a Hb concentration of 80 – 100 g/L, the effect of RBC transfusion on mortality is uncertain and may be associated with an increased risk of recurrence of MI. Any decision to transfuse should be made with caution and based on careful consideration of the risks and benefits. (See PP1 and PP2).

ESC European Society of Cardiology
European Heart Journal (2023) **00**, 1–52
https://doi.org/10.1093/eurheartj/ehad191

2023 ESC Guidelines for the management of acute coronary syndromes Supplementary data

12.1.3.5. Transfusion therapy

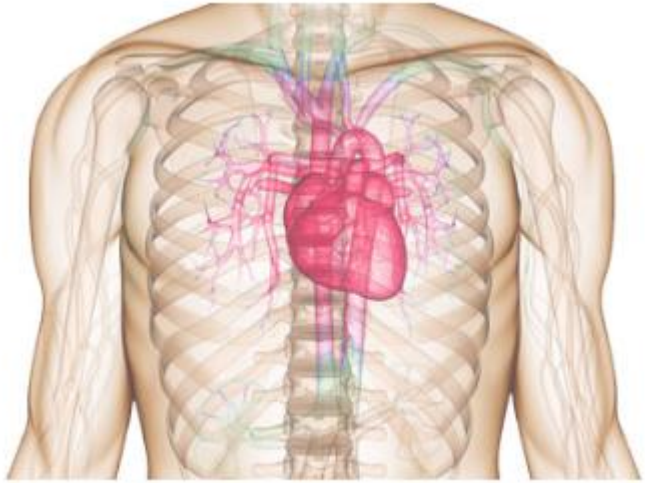
Regardless of bleeding complications, the need for blood transfusion is associated with an approximately four-fold increase in early mortality and a three-fold increase in death or MI in ACS patients.[313–315] The nadir haemoglobin cut-off value mandating transfusion is not standardized and varies across hospitals.[314,316,317] In the majority of studies investi-

However, a transfusion or liberal transfusion strategy seemed to be associated with a significantly higher risk of 30-day death only at a nadir haematocrit >25%.[314,318] Observations from the CRUSADE initiative in 44 242 patients with NSTE-ACS reported that, among patients with haematocrit ≤24%, transfusions were associated with a trend towards a reduction in in-hospital mortality in comparison to no transfusion (11.8 vs. 15.0%, adjusted OR 0.68, 95% CI, 0.45–1.02). In patients

haematocrit >25%.[314,318] Observations from the CRUSADE initiative in 44 242 patients with NSTE-ACS reported that, among patients with haematocrit ≤24%, transfusions were associated with a trend towards a reduction in in-hospital mortality in comparison to no transfusion (11.8 vs. 15.0%, adjusted OR 0.68, 95% CI, 0.45–1.02). In patients with haematocrit between 25 and 30%, transfusions had a neutral

MINT
Myocardial Ischemia and Transfusion

About MINT



The trial will enroll 3500 hospitalized patients diagnosed with myocardial infarction who are anemic (have blood counts less than 10 g/dL) to receive either a liberal or a restrictive transfusion strategy.

Patients assigned to the liberal transfusion strategy will receive a red blood cell transfusion anytime there is a blood count less than 10 g/dL.

Patients assigned to the restrictive transfusion strategy are permitted to receive a blood transfusion if the blood count is below 8 g/dL and the doctor believes it is in the patient's best interest. A transfusion will be strongly recommended if the blood count drops to less than 7 g/dL. If the patient has symptoms of angina (e.g., chest discomfort described as pressure or heaviness) that do not go away with medication, a blood transfusion will be ordered regardless of the blood count.

Patients will be followed for 6 months to assess how well they are recovering from their heart attack.

100 g/l vs.	80 g/l + názor doktora 70 g/l při ischemické bolesti

ORIGINAL ARTICLE FREE PREVIEW

Restrictive or Liberal Transfusion Strategy in Myocardial Infarction and Anemia

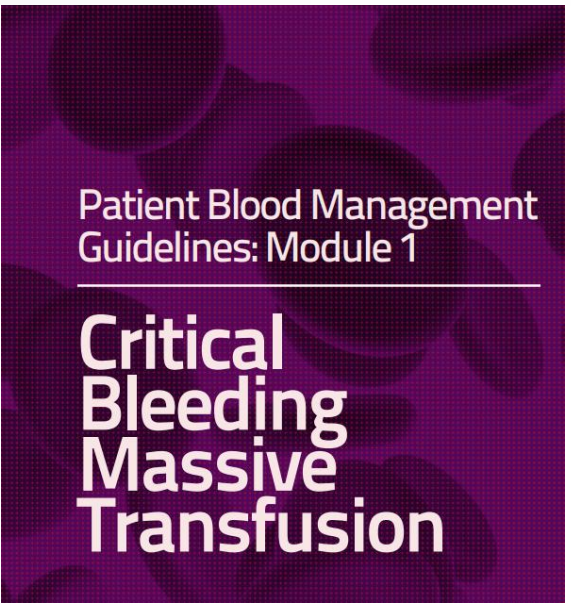
Jeffrey L. Carson, M.D., Maria Mori Brooks, Ph.D., Paul C. Hébert, M.D., M.H.Sc., Shaun G. Goodman, M.D., Marnie Bertolet, Ph.D., Simone A. Glynn, M.D., M.P.H., Bernard R. Chaitman, M.D., Tabassome Simon, M.D., Ph.D., Renato D. Lopes, M.D., Ph.D., Andrew M. Goldsweig, M.D., Andrew P. DeFilippis, M.D., J. Dawn Abbott, M.D., et al., for the MINT Investigators*

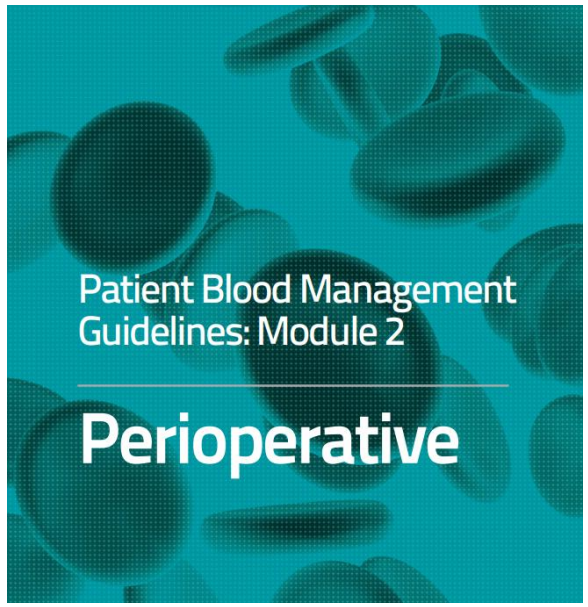
RESULTS A total of 3504 patients were included in the primary analysis. The mean (±SD) number of red-cell units that were transfused was 0.7±1.6 in the restrictive-strategy group and 2.5±2.3 in the liberal-strategy group. The mean hemoglobin level was 1.3 to 1.6 g per deciliter lower in the restrictive-strategy group than in the liberal-strategy group on days 1 to 3 after randomization. A primary-outcome event occurred in 295 of 1749 patients (16.9%) in the restrictive-strategy group and in 255 of 1755 patients (14.5%) in the liberal-strategy group (risk ratio modeled with multiple imputation for incomplete follow-up, 1.15; 95% confidence interval [CI], 0.99 to 1.34; P=0.07). Death occurred in 9.9% of the patients with the restrictive strategyand in 8.3% of the patients with the liberal strategy (risk ratio, 1.19; 95% CI, 0.96 to 1.47); myocardial infarction occurred in 8.5% and 7.2% of the patients, respectively (risk ratio, 1.19; 95% CI, 0.94 to 1.49).

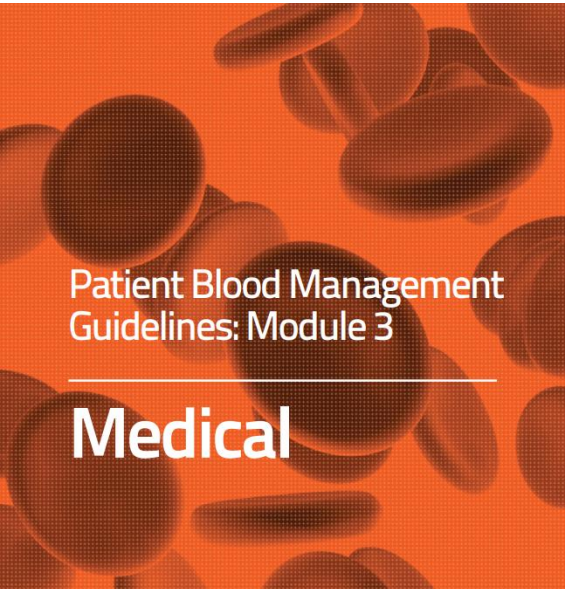
CONCLUSIONS In patients with acute myocardial infarction and anemia, a liberal transfusion strategy did not significantly reduce the risk of recurrent myocardial infarction or death at 30 days. However, potential harms of a restrictive transfusion strategy cannot be excluded. (Funded by the National Heart,

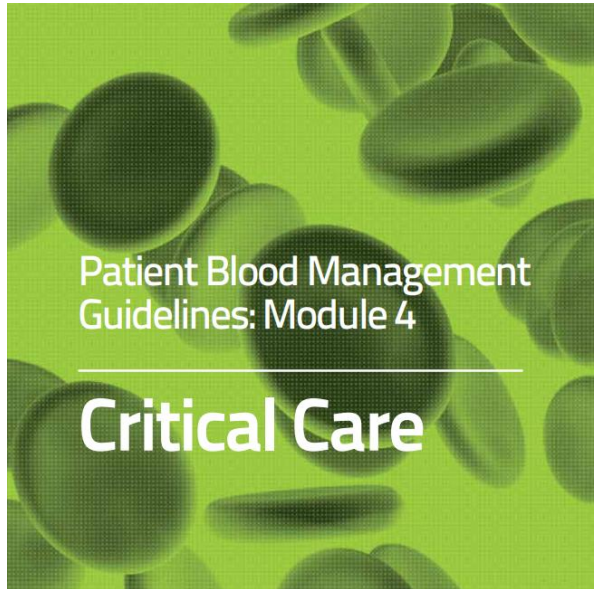
- PBM = soubor postupů jejichž cílem je zvýšení a udržení objemu autologní krve pacienta s cílem vyhnout se nutnosti podání krevní transfuze a rizik s tím spojených

NATIONAL BLOOD AUTHORITY
AUSTRALIA









- Restriktivní transfuzní trigger
- Strategie jedné krve
- Využití viskoelastických metod při diagnostice a léčbě koagulační poruchy
- Minimalizace iatrogenních krevních ztrát
- Korekce anemie aktivací hematopoezy

Improved outcomes and reduced costs associated with a health-system–wide patient blood management program: a retrospective observational study in four major adult tertiary-care hospitals

Michael F. Leahy,[1,2,3] Axel Hofmann,[4,5,6] Simon Towler,[7] Kevin M. Trentino,[8] Sally A. Burrows,[1] Stuart G. Swain,[8] Jeffrey Hamdorf,[9,10] Trudi Gallagher,[11,12] Audrey Koay,[11] Gary C. Geelhoed,[11,13] and Shannon L. Farmer[9,14]

Největší světová PBM studie

N = 605 046

Transfuzní výsledky:

- Snížení počtu pacientů přijatých anemií z 20,8,na 14,3% (p = 0.001)
- 41% redukce použití transfuzí (p< 0.001) (EBR o 41%, MLP o 47%, TRN o 27%)
- Snížení triggeru pro podání EBR ze 7,9 na 7,3 g/l (p< 0.001)
- Zvýšení počtu podání 1 EBR z 33% na 64% (p< 0.001)

Klinické výsledky:

- Mortalita ↓ 28 %
- Délka hospitalizace ↓ 15 %
- Infekční komplikace ↓ 21 %
- AIM/mrtvice ↓ 31 %

Ekonomické výsledky:

- 18,5 mil. USD úspora spojená s odběry krve
- 80 mil. USD úspora spojená s transfuzí
- Další nevyčíslené úspory spojné se snížením morbidity

Závěr

- Vždy nejprve zhodnotit klinickou situaci (stabilní nekrvácející pacient vs. nestabilní krvácející pacient)
- Jistě používat restriktivní transfuzní triggery (70 g/l respektive 80 g/l – vyjímkou jsou pacienti s akutním koronárním syndromem)
- Ideálně mít vytvořen vícepoložkový rozhodovací algoritmus
- Aktivně zavádět principy PBM (patient blood management)
- Opustit staré dogma “jedna krev žádná krev“ a přijmout strategii jedné transfuzní jednotky

Děkuji Vám za pozornost !