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Red blood cell transfusion in the intensive care setting: controversies amongst evidence

Transfusão de hemácias em terapia intensiva: controvérsias entre evidências

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ABSTRACT

Anemia is a prevalent issue in intensive care units. It appears in the first days, and may continue or worsen during hospital stay. Its etiology is generally multifactorial. Red blood cell transfusion is the most common intervention for treating anemia. Approximately 12 million blood units are used for transfusions in the United States, 25% to 30% in the intensive care units. Due to reduction of transfusion infections the increased safety has allowed an expansion of clinical indications. However, transfusion therapy is associated with other adverse effects such as nosocomial infections, immunological impairment, lung injury, hemolytic reactions and higher cancer incidence. Various papers have tried to show an association between correction of anemia and mortality-morbidity, but no consensus has been reached in literature. One of the current World Health Organization's proposals is to reduce potentially unnecessary transfusions, promoting a rational transfusion attitude. The primary objective of this narrative review is to approach controversies regarding the transfusion threshold according to recent studies, and as a secondary objective, it aims to discuss iatrogenic anemia aspects and the different behaviors among intensivists on the best practices for implementation of transfusion practices. It is not within our objectives to discuss transfusion complications, although they are mentioned. A search was conducted on electronic literature databases (PubMed - Clinical Queries), and UpToDate 16.2, and additional consultation to textbooks. It became clear that transfusion practices are widely variable among intensive care units. Evidence is scarce that routine transfusion in non-hemorrhagic patients should be used in those with > 7 g/dL hemoglobin. There is no consensus on the transfusion threshold in critically ill patients. Cardiovascular disease patients seem to present a higher risk of death than non-cardiovascular patients, for any level of hemoglobin. Transfusion guided by hemoglobin levels and individual oxy-hemodynamic physiologic parameters and clinical context is apparently, the current best accepted strategy, rather than arbitrary and isolated hemoglobin correction.

Keywords: Anemia/therapy; Intensive care; Blood transfusion

INTRODUCTION

Anemia is among the most common problems in intensive care patients. It already appears during the first days in the intensive care unit (ICU) and may continue and worsen with hospital stay.

In critically ill patients anemia etiology is multifactorial. Among the several causes, blood loss from surgical procedures, trauma and gastrointestinal bleedings are still the most significant. Recent studies reported that about

25% of all critically ill patients blood transfusions are for patients with hemorrhage.[1,2]

About 14 million units of blood are collected in the United States, and of these 12 million are used for transfusions, 25% to 30% of which in ICUs.[3] This information raised important questions regarding this practice, due to its connection with non immune-mediated adverse effects, such as nosocomial infections, surgical wounds, immunological impairment, lung injury, febrile and non-febrile hemolytic reactions, increased cancer incidence and thus, increased morbidity and mortality.[4,5]

The primary objective of this review was to discuss the transfusion threshold for complex critically ill patients, including the anemia problem in patients with cardiovascular disease. As secondary objectives, blood loss by phlebotomies was discussed, aiming to alert intensivists regarding its prevention. Medical behavior and attitude in transfusion strategy over time was approached, and compared after the recent scientific literature. This review was not aimed to discuss pediatric, burn, neurological and trauma patients. Severe adverse effects from blood and components transfusion were not discussed, although mentioned due to their relevance.

METHODOLOGY

A critical analysis of medical literature was conducted by a narrative review searching information from the National Library of Medicine database using the PubMed tool and classical intensive care textbooks. The terms used were: ((“Anemia” [Mesh] AND (“Erythrocyte Transfusion”[Mesh] OR “Blood Transfusion” [Mesh])) AND (“Critical Illness”[Mesh] OR “Critical Care”[Mesh])) AND “Adult” [Mesh]. Until early 2009, 44 publications were identified. In another search by a clinical query on PubMed, more sensitive scope terms were used: (Anemia Transfusion Critically ILL) AND (clinical [Title/Abstract] AND trial [Title/Abstract]) OR clinical trials [MeSH Terms] OR clinical trial [Publication Type] OR random* [Title/Abstract] OR random allocation [MeSH Terms] OR therapeutic use [MeSH Subheading]); 83 papers were identified. Uptodate online 16.2 search was used including the terms (transfusion & anemia & cardiovascular) looking for the most relevant texts on internal medicine and transfusion medicine areas. The selected studies approach red blood cells transfusion in critically ill adult and with cardiovascular disease patients. The importance of iatrogenic anemia was emphasized from these studies, as it is both prevalent and preventable within ICUs.

RED BLOOD CELL TRANSFUSION IN INTENSIVE CARE UNIT – DILEMMA OF THE BEST THRESHOLD

Observational studies try to establish association between red blood cells transfusion and clinical outcome in transfused patients. In 1996, Carson et al.[6] evaluated 1958 cardiovascular surgery patients (70% women) who refused transfusion for religious matters. Although this was a retrospective study, Carson emphasized that the global risk of death increased when the hemoglobin concentration was reduced, and that tolerance of anemia was even lower with cardiovascular disease, however involving cardiovascular surgery patients. Probability of death translated into odds ratio, would range from 2.3 times (95% IC 1.4-4.0) to 12.3 times (95% CI 2.5-62.1) when preoperative hemoglobin declined from 10-10.9 to 6-6.9 g/dL. This was the largest observational clinical trial published on acute anemia natural history in patients undergoing cardiovascular surgery, without transfusion. Thus, Carson et al.[6] concluded that a single transfusion trigger, e.g. of 10 g/dL, could be inappropriate, as potential transfusion benefits should be individualized for each patient, considering 3 approaches:

- hemodynamic performance and cardiovascular status
- blood loss intensity within per- and pos-operative periods,
- presence of associated diseases.

The ABC study[7] (Anemia and Blood Transfusion in Critical Ill) (n= 3534 and 146 ICUs) and CRIT study[8] (n= 4892 and 284 ICUs), raised important questions on transfusion benefits for critically ill patients with anemia, helping to define the current transfusion practices. As described in Table 1, there is increased anemia prevalence in intensive care units. Additionally, most critically ill patients still are transfused with hemoglobin thresholds between 8.4 and 8.6 g/dL, except for the Brazilian study,[9] which may have been influenced by the TRICC study.[4] This trial,[9] although in a smaller population, described a trend to use a more restrictive threshold for correction of anemia. It should be emphasized that in these three observational studies,[7-9] red blood cell transfusions were shown to increase with length of stay.

ABC and CRIT[7,8] studies used a statistical methodology aimed at analyzing the relationship between

Table 1 – Comparison between registry, prospective observational studies (International and Brazilian)

Demographics	American trial CRIT[8]	European trial ABC[7]	Brazilian trial Fundo AMIB[9]
ICU/Hospitals/ Countries	284/213/1	146/146/15	19/19/1
Patients	4892	3534	231
% of < 10 g/dL admission Hb patients	35%	36.60%	33%
Transfusion threshold	8.6 g/dL	8.4 g/dL	7.7 g/dL
Transfused (ICU)	50%	37%	36.50%
Anemia correction transfusion	90%	28%	53%

AMIB – Associação de Medicina Intensiva Brasileira [Brazilian Intensive Care Association]; ICU – intensive care unit

transfusion and mortality, adjusting differences among groups by propensity score, indicating an increased risk of death for those transfused, i.e., on the ABC study, from the patients who died, 57.1% were transfused versus 42% among those not transfused. On the CRIT study, adjusting for the baseline severity characteristics from the 1059 transfused patients (44.8%) versus the 1059 non-transfused (44.8%) patients, again using propensity score, the risk of death was higher for the transfused by 1.65 times, with a confidence interval (95% CI -1.35-2.03; P<0.001). However, the most important finding is that these scientific evidences challenge our historical use on red blood cells transfusion usefulness, mainly if effectively beneficial for acute anemia in critically ill patients. This habit to use transfusion stems from not very well established parameters, such as 10 g/dL hemoglobin and 30% hematocrit, obeying the old empirical 10/30 rule suggested by Adams and Lundy,[10] resulting from the few cases of risk anesthesia described in 1942. Various clinical trials have tried to answer when a critically ill patient should be transfused. One of the most consistent papers in literature was the prospective multicenter trial by Paul Hébert et al.[4] issued in 1999 (Transfusion Requirements in Critical Care - TRICC Study). In this trial, 834 critically ill patients were randomized into two transfusion strategies: restrictive and liberal. This trial pointed out that one should use blood less generously, as a restrictive blood strategy (give one unit of red blood cell concentrate only when hemoglobin dropped below 7 g/dL) was as safe as, and possibly more than the liberal strategy (hemoglobin maintained between 10 g/dL and 12 g/dL, and one bag of red blood cell concentrate given when below 10 g/dL). Globally the 30 days mortality was similar, 23.3% for the liberal strategy group versus 18.7% for the restrictive strategy group (P=0.11). However, in a subgroup analysis, mortality was lower for the less severe and younger patients, i.e., for those with an APACHE II score ≤ 20 (8.7% vs. 16.1%) and aged ≤ 55 years (5.7% vs. 13%) in the restrictive group and liberal group, respectively.

In 2002 Carson and Hebert[11] issued a systematic review of 10 randomized and controlled trials on transfusion thresholds, including 1780 patients over 40 years. From these, 5 trials involved surgical patients, 3 involved acute blood loss and trauma, but only 2 trials involved intensive care patients. In addition to the heterogeneity in this systematic review, mostly encompassing small sample studies, it was highly influenced by the TRICC trial, i.e., 50% of the patients included in the analysis (n=892) were used in the Canadian trial[4] and about 43% were elective surgical patients, or stable at postoperatively. The authors concluded that there was no difference in mortality, heart events, morbidity rates and hospital stay. It is important to consider that the trials involved in this systematic differed widely in terms of sample size (22 to 838 patients), types of patients, and most importantly, the transfusion threshold between the trials varied widely. Data in this metanalysis emphasized the possibility of a more restrictive transfusion practice for treating anemia in the different settings.

The best evidence based on TRICC, ABC and CRIT trials

In the intensive care setting there is a large heterogeneity not only of critically ill patients but also regarding the distinct associated diseases (internal medicine, surgical, trauma, sepsis, neurological and severe bleeding patients), including the different features and organic dysfunctions involved. In the TRICC trial, mortality of cardiovascular patients did not increase significantly when compared to the cohort randomized for the restrictive strategy, also there was no clinically relevant increase in the group of 257 patients with known coronary heart disease. Care must be taken when interpreting these data, as there was a screening bias on the orig-

inal trial by excluding the heart disease patients from participation in the TRICC trial. Patients not recruited for the Canadian study were different from those recruited considering the aspects below:

1- They were somewhat older (57.6 ± 18.2 vs. 59 ±18.8 years), although sharing the same APACHE II score (*P*=0.36) and similar diagnosis (*P*=0.26)

2- Were different regarding heart disease.

It is noteworthy that, from all patients excluded from the TRICC trial, 26% had heart disease versus 20% of those not eligible for inclusion. Patients assigned to the liberal strategy group received 5.6 red blood cells units concentrate versus 2.6 red blood cells units in the restrictive strategy group. Curiously, the lower hemoglobin level group (n=418 with restrictive therapy) showed a lower incidence of acute myocardial infarction (AMI = 0.07%) and heart failure (HF = 5.3%) versus the liberal strategy group (n=420) with 2.9% AMI and 10.7% HF incidence. (Table 2)[12]

Table 2 – Selected TRICC Trial results

	Restrictive Strategy N= 418	Liberal Strategy N= 420	P value
30 days mortality	18.7	23.3	0.11
Acute myocardial infarction	0.07	2.9	0.23
Heart failure	5.3	10.7	< 0.01
Pneumonia	20.8	20.5	0.92
Sepsis	4.0	6.0	
Other infections	10	11.9	0.38
Length of stay	34.8	35.5	0.58

Adapted from Klein HG, Spahn DR, Carson JL. Red blood cell transfusion in clinical practice. Lancet. 2007;370(9585):415-26. Review.[12]
Values expressed as % and number of days.

Sepsis was listed as primary diagnosis in only 6% of the restrictive strategy group patients, and 4% of the liberal strategy group. Thus, generalization of these results, extrapolating for intensive care severe sepsis patients, should be considered with care.

The ABC European trial[7] showed that 55% of the transfusions were for hemorrhage patients, a larger percentual than the described by other researchers,[1,2] where about 25% of transfusions were for critically ill hemorrhagic patients. The acute infarction and heart failure rates with hemoglobin levels, and the indications for red blood cell transfusions were very similar among these trials.[1,2,7,9] However, interestingly about 75% of indications for red blood cell transfusion were for "low hemoglobin".

The origins for this attitude are based upon the adverse effects and anemia-associated risk factors already identified in several papers and guidelines.[3,13-16] Anemia is poorly tolerated by critically ill elderly patients, mainly in those with associated heart, cerebrovascular and respiratory diseases. However, clinical evidence is still unavailable confirming whether these factors are independently connected to increased adverse effects.[17] Small cohort studies, involving anemic vascular surgery high risk patients,[18] cardiovascular perioperative in Jehovah's witnesses,[6] and more recently a heart surgery multicenter trial involving 3500 patients,[19] were favorable to correction of anemia because of the higher risk of complications and mortality. New studies should be performed to clarify if indeed therapy specifically directed towards correction of preoperative anemia could relieve adverse effects, for each surgery category.

The best evidence on cardiologic patients' anemia

It is interesting to mention the large observational studies regarding consequences of anemia in coronary heart disease and acute myocardial infarction patients.[20-22] The largest, by Wu et al.,[20] showed 50% increased mortality among patients admitted with hematocrit ≤ 27% throughout the 30 days of hospital stay, despite the fact that they had not been transfused. Although this retrospective study evaluated 78,974 Medicare databank patients above 65 years of age, it had potential bias such as low transfusion rate, limited statistical adjustments from multivariate analysis, based upon admission hematocrit, instead of hematocrit value just before red blood cell transfusion. Furthermore, transfusion times, if they were connected to hematocrit values or to other specific indications were not considered.

In a secondary analysis, transfusions benefit occurred when patients had hematocrit values between 30.1% and 33%. Patients who died within the first 48 hours after admission were excluded.[17] Regardless of the methodological limitations, the authors reported sufficient evidence to recommend red blood cell transfusion, mainly when the hematocrit was below 33%, in elderly patients after acute myocardial infarction.

Rao et al.,[21] presented a study using strictert methodology that encompassed a population with more aggressive interventions, and with greater exposure to the blood components. A multivariate statistical analysis was applied adjusting the influences of several base-

line characteristics. This study showed that there was no association with improved survival when red blood cell transfusions were performed with borderline hematocrit levels, between 20% or 25%. Additionally, it was clearly reported that the worst results came from transfusions associated with hematocrit values above 30%. However, although this study followed stricter methodological criteria, it was subject to the limiting sample factor, i.e., this study involved only 2,400 subjects (10%) receiving transfusion, a small fraction of patients exposed to blood, resulting in a mean mortality of 4%.

Sabatine et al.[22] studied the association between baseline hemoglobin values and cardiovascular adverse events in 39,922 patients during 30 follow-up days. The study showed that anemia is an important predictor of major cardiovascular events. On the other hand, it pointed out that hemoglobin values above 17 g/dL also disclosed excessive mortality. This trial showed that mortality of AMI and St-segment elevation increased by 20%, the odds ratio by 1.21 times for each gram decrease of hemoglobin (1 g/dL) below 14 g/dL. However, patients with no-ST segment elevation, acute coronary syndrome (ACS), AMI, recurrent ischemia and cardiovascular death increased when hemoglobin levels were below 11 g/dL. Curiously, this study also observed increased adverse effects for all ACS patients with or without ST-segment elevation when hemoglobin values were above 14 g/dL.

A converging fact among these trials[20-22] is that transfused subjects with higher hematocrit levels also had the most aggressive adverse effects. The Wu et al.[20] study encompassed elderly heat disease patients (AMI) while the Rao et al.[21] study involved younger patients who needed more aggressive transfusion interventions. Although Sabatine's study was not analytical regarding the transfusion threshold, it explained the impact of anemia on an ACS population and how it can be a powerful complication and mortality predictor in coronary disease patients; furthermore that high hemoglobin could also be harmful. In a recent and extensive literature review by Marik et al.,[23] only one subgroup in a single study[20] mentioned blood transfusion-associated benefit: for elderly patients with acute infarction, with baseline hematocrit below 33%, and not undergoing cardiopulmonary bypass surgery. Thus, it is possible that blood transfusions in elderly patients with comorbidities may be indicated for a slightly higher hematocrit threshold, as it seems beneficial; on the other hand, blood transfusions for younger patients are perhaps less beneficial. An explanation would be that young persons can physiologically cope and tolerate anemia better than the elderly. In addition, other pharmaceutical options, more often used in young persons, such as statins, antiplatelet agents among others, have shown to be more, effective and life saving.[17]

Taking these arguments into account, it is possible to adopt more restrictive transfusion strategy for younger subjects with better cardiac reserve, able to endure more aggressive approaches to management of ACS. Red blood cell transfusions do not seem to have a positive incremental effect on post-AMI patients with >20% hematocrit or hemoglobin above 7 g/dL, as described in the study by Rao et al.[21]

However, the use of a more liberal transfusion strategy for elderly patients with less cardiovascular reserve is also possible , as suggested by Wu et al.[20] Nevertheless, , literature has not yet clearly established which is the best transfusion strategy, and which threshold is most suitable for critically ill heart disease and ischemic coronary syndrome patients.[23]

The recent American College of Cardiology/ American Heart Association guidelines suggest conducting screening for anemia and its correction in ACS. However which hemoglobin value should be targeted is not specified.[22]

The best evidence regarding iatrogenic anemia in ICU

Iatrogenic anemia is considered another important factor contributing to perpetuation and worsening of anemia in critically ill patients. About 40 mL bloods for routine testing are drawn daily from critically ill patients. In septic patients, this volume can be even larger.[7,24] Other trials report daily blood collection by means of diagnostic phlebotomy ranging from 25 to 45 mL, and patients with arterial catheters may loose as much as 900 mL during their ICU stay.[7,25,26] Other factors contributing for anemia in these critically ill patients include coagulopathy, pathogen-associated hemolysis, hypoadrenalism and dietary deficits.[27,28] Acute blood loss (20% of volume) may be initially managed by fluid reposition, in an effort to manage a hemorrhagic shock. However, initial volume administration without clear targets or monitoring may lead to additional drop of hemoglobin levels by hemodilution, thus aggravating coagulopathy. Compensatory mechanisms increasing cardiac output could be less effective in aged populations, or in those with more severe organic conditions.[12]

In a recent publication Hébert et al.[17] suggest that

use of red blood cell transfusion should consider several different critical situations within their respective thresholds. Table 3 presents a proposal for transfusion in some peculiar clinical situations in the intensive care setting. However analysis of several clinical features that drive each disease is advocated, for an individualized therapeutic approach of each clinical feature. Carson[6] in 1996 already recommended an individual approach.

Table 3 – Suggestion of approach for transfusion threshold identification

Variables	Transfusion Trigger g/dL	Target (hemoglobin) g/dL
Critical patients (no bleeding)	7	7 - 9
Critical septic shock patients (> 6 h)	7	7 - 9
Critical septic shock patients (< 6 h)	8 -10	10
Critical chronic heart disease patients	7	7 - 9
Critical acute heart disease patients	8 -10	10

Adapted from: Hébert PC, Tinmouth A, Corwin HL. Controversies in RBC transfusion in the critically ill. Chest. 2007;131(5):1583-90.[17]

Disparity between the Rivers and Hébert studies

In healthy subjects, the coronary flow significantly increases during acute anemia in order to compensate for the decreased arterial oxygen contents (CaO_2 = Hb x 1.34 x SaO_2 + PaO_2 X 0.0031) consisting of the oxygen delivery (DO_2 = cardiac output X CaO_2). Thus, a case by case analysis is strongly recommended regarding indication of red blood cell transfusions. The Rivers'study[29] optimized the tissue oxygen supply, based on central venous saturation within the first 6 hours of severe acute sepsis. This demonstrated a beneficial approach in terms of reducing hospital mortality, from 46.5% in the control group (without transfusion and managed protocol) to 30.5% in the managed protocol group, called the early-goal directed therapy (EGDT). However, this early transfusion prescription is part of an algorithm or managed protocol for volemic resuscitation intended for severe sepsis patients, still in the emergency room. The red blood cell transfusion is part of an additional therapeutic intervention within EGDT, and not a separate medical intervention, therefore cannot be separately assessed. In this study, although 64% of the protocol group patients received transfusions versus only 18.5% of the control patients, it should be emphasized that other therapies are part of the bundle within the first 6 hours of severe sepsis diagnosis, as use of inotropics, vasoactive amines, clear oxy-hemodynamic targets to be reached, aimed at establish the most suitable perfusion pattern in the macrocirculation.

In contrast, the Canadian study (TRICC) compared two different transfusion strategies within 72 hours after admission in a not so specific population, however with well defined inclusion hemoglobin. Both trials[4,29] generated hypothesis to meet important queries as, for instance, which would be the best strategy for resuscitation of septic patients in the intensive care setting. Should different anemia thresholds be used during hospital stay?

Currently, which benefits from a given transfusion practice for severe sepsis patients throughout their stay and comorbidities, still remains unclear

Intensive care transfusion attitudes

The transfusion practice in intensive care units worldwide, even after the classic Canadian 1999 study, has not substantially changed towards a lower transfusion threshold. Except in Canada: after an investigation on intensive care transfusion attitudes,[30] it was shown that 85% of the evaluated physicians changed their approach towards a restrictive strategy. However, this behavioral change promoted by the TRICC study in Canada contrasts with the European and American practices, as expressed by the trials ABC[7] and CRIT[8] where the pre-transfusion hemoglobin was about 8.5 g/dL, significantly above the lower threshold in the TRICC trial, and the practice of Canadian intensivists.

In the Brazilian trial,[9] the pre-transfusion hemoglobin was 7.7 g/dL, and heart disease patients had a hemoglobin trigger of about 8 g/dL, approximating the Canadian practice.

It should be stressed that, until the eighties, most anesthesiologists prescribed red blood cell transfusions for reaching pre-operative hemoglobin equal or above 10 g/dL.[31] This practice, based upon isolated thresholds was maintained even after the National Institutes of Health Consensus Conference on Perioperative Blood Transfusion and American College of Physician Clinical Guidelines were issued, guiding clinicians not to be limited by laboratory thresholds, but to meet the

individual physiological and clinical needs, in the disease context, mainly in patients with hemoglobin above 7 g/dL.[15,16] Despite several guidelines, until today, a wide range of medical behavior regarding transfusion prescription is perceived in general surgery, cardio respiratory bypass graft,[32-34] gynecologic patients[35] or in intensive care units.[36] Unfortunately medical practice is based on transfusion triggers, with the premise that blood transfusion is beneficial because it improves oxygen supply and thus reduce tissue injury, even though being aware of the of trials showing the opposite. The red blood cell and other blood components transfusion-linked risks, called NISHOT (Noninfectious Serious Hazards of Transfusion) are well defined in current literature, and can be explored in the Hendrickson et al [37] review. However, it should be mentioned that transfusion also leads to important microcirculation disorders,[38,39] an increasingly investigated feature in the intensive care setting.[40]

CONCLUSION AND FINAL CONSIDERATIONS

The transfusion model has been highly variable for decades in and out intensive care units, mainly regarding the thresholds for correction of anemia. The TRICC study remains a scientific landmark, with a methodological quality yet not perfect for intensive care patients, and thus with a non-universal applicability. Transfusion thresholds for critically ill patients could be those described on Table 2. It is recommended to give one (1) red blood cell unit at a time (if there is no severe bleeding), always monitoring the hemoglobin plasma concentration pre- and post-transfusion, aiming to assure that targets were reached.

Underlying cardiovascular disease patients are under higher risk of death than those without cardiovascular disease, for any hemoglobin level.

With a decreased risk of transfusion-transmitted infections, emerge the major complications called NISHOT - (Noninfectious Serious Hazards of Transfusion). Currently, a transfused patient has a 1,000 times greater risk of enduring serious damage [such as transfusion related acute lung injury (TRALI), transfusion associated circulatory overload (TACO), transfusion thrombocytopenic pupura (TTP) and hemolysis than blood-related infections (as viral infections related to hepatitis B, C and other viruses)].[37]

To enhance safety of these actions, intensivists should address preventive measures, avoiding excessive phlebotomies, blood volume collected for daily, constant laboratory assessments and transfusion based on intuition or habit.[7,25,26]

The behavioral change in medical practice, incorporated for decades, is challenging, as it relies more on beliefs than on evidence. Inclusion of the best scientific evidence into continuous practice of bedside care requires actions in addition to publicizing, dissemination and constant training. The good understanding of existing individual and institutional barriers against the understanding of modern scientific knowledge, for use and adoption in our daily life is essential.[41]

Medical practice is also enhanced and gains credibility when coexisting with consistent information and critical judgment, which is progressively incorporated into our behavior. Scientific discussion is the connecting link that facilitates and allows for the improvement of our clinical-scientific skills thereby leading us to appropriately transform our routines and habits.

RESUMO

A anemia é um problema prevalente nas unidades de terapia intensiva. Ela surge nos primeiros dias e pode sustentar-se, ou agravar-se, durante a internação. A etiologia normalmente é multifatorial. A transfusão de hemácias é a intervenção mais comumente utilizada para combatê-la. Aproximadamente 12 milhões de unidades de sangue são utilizadas para transfusões nos Estados Unidos, sendo 25% a 30% dentro das terapias intensivas. A maior segurança com a diminuição das infecções provocadas por transfusões permitiu uma ampliação de indicações clínicas. No entanto, a terapia transfusional está associada a outros efeitos adversos, como infecções nosocomiais, comprometimento imunológico, injúria pulmonar, reações hemolíticas e aumento da incidência de câncer. Alguns trabalhos já tentaram demonstrar associação entre a correção da anemia, mortalidade e morbidade, entretanto a literatura ainda não alcançou um consenso. Atualmente, uma das propostas de segurança da Organização Mundial de Saúde é a redução de transfusões potencialmente desnecessárias, promovendo uma postura de transfusão racional. Esta revisão narrativa pretende abordar como objetivo primário as controvérsias referentes ao limiar transfusional, de acordo com estudos recentes, e como objetivos secundários citar aspectos da anemia iatrogênica e da variabilidade de atitudes entre intensivistas para a implementação das melhores práticas relativas à transfusão. Não faz parte de nossos objetivos discutir as complicações transfusionais, embora tenham sido mencionadas. Foi feita busca em fontes eletrônicas da literatura médica (PubMed - Clinical Queries), e UpToDate versão

16.2 e consulta adicional em livros texto Mostrou-se que a prática transfusional ainda é extremamente variada dentro das terapias intensivas. São escassas as evidências de que a hemotransfusão de rotina em pacientes não-hemorrágicos deva ser aplicada naqueles com hemoglobina superiores a 7 g/dL. Não existe um consenso sobre o limiar transfusional em pacientes críticos. Os pacientes com doença cardiovascular parecem apresentar um maior risco de morte do que aqueles sem doença cardiovascular, para qualquer nível de hemoglobina. A transfusão guiada por níveis de hemoglobina e parâmetros fisiológicos, oxi-hemodinâmicos individualizados e contexto clínico parece ser atualmente estratégia mais aceita do que a correção arbitrária e isolada da hemoglobina.

Descritores: Anemia/terapia; Cuidados intensivos; Transfusão de sangue

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