



## Revisiting transfusion safety and alternatives to transfusion

Patrick Schoettker<sup>1</sup>, Carlos E. Marcucci<sup>1</sup>, Gabriele Casso<sup>2</sup>, Catherine Heim<sup>1</sup>

Available online: 27 July 2016

1. Lausanne University Hospital CHUV, Department of Anesthesiology, rue du Bugnon 21, 1011 Lausanne, Switzerland
2. Cardiocentro Ticino, Department of Cardiac Anesthesiology and Intensive Care, Via Tesserete 48, 6900 Lugano, Switzerland

### Correspondence:

Patrick Schoettker, Lausanne University Hospital CHUV, Department of Anesthesiology, rue du Bugnon 21, 1011 Lausanne, Switzerland.  
patrick.schoettker@chuv.ch

### In this issue

*Blood transfusion in 2016 – Towards a "Nouvelle Vague" therapy?*  
Olivier Garraud, France

*Ethics and blood donation: a marriage of convenience*  
Jean-Daniel Tissot, Switzerland and Olivier Garraud, France

*Past, present and forecast of transfusion medicine: What has changed and what is expected to change?*  
Amy E. Schmidt, Majed A. Refaai, Neil Blumberg, United States

*Rethinking blood components and patients: Patient blood management. Possible ways for development in France*  
Gilles Folléa, France

*Red blood cell components: Meeting the quantitative and qualitative transfusion needs*  
Richard O. Francis, and Steven L. Spitalnik, United States

*Platelet concentrates: Balancing between efficacy and safety?*  
Miguel Lozano, Joan Cid, Spain

*Focus on fresh frozen plasma – facilitating optimal management of bleeding through collaboration between clinicians and transfusion specialists on component specifications*  
Sheila MacLennan, United Kingdom

*The infectious risks in blood transfusion as of today – A no black and white situation*  
Olivier Garraud, Luiz Amorim Filho, Syria Laperche, Claude Tayou-Tagny, Bruno Pozzetto, France, Brazil, Cameroun

*Immunological complications of blood transfusions*  
Anneke Brand, Netherlands

*The outsider adverse event in transfusion: Inflammation*  
Elizabeth A. Godbey, Eldad A. Hod, United States

*Revisiting transfusion safety and alternatives to transfusion*  
Patrick Schoettker, Carlos E. Marcucci, Gabriele Casso, Catherine Heim, Switzerland

### Summary

Transfusion of blood products can be life saving when used appropriately. It carries however at the same time a potential for morbidity and mortality, depending on the patient, the product or the setting. Numerous strategies have been elaborated to minimize these risks, and in recent years, transfusion has no longer been regarded as essential for the management of a wide range of diseases. Uncomplicated surgeries in well-prepared patients can now be conducted without the use of transfusions. Questions about transfusion safety and shortage have led to extensive research on alternatives to blood transfusion, ranging from non-pharmacological to pharmacological solutions. Restrictive transfusion therapies, preoperative autologous blood donations, perioperative red cell salvage, acute normovolaemic haemodilution techniques or patient blood management are potential solutions where prothrombin complex or fibrinogen concentrates, synthetic anti-fibrinolytic agents, desmopressin, rFVIIa, or erythropoiesis stimulating agents may play a complementary pharmacologic role.

### Introduction

Transfusion of blood components has been an integral part of medical care for decades and may be necessary as treatment of chronic or acute conditions. Red blood cell transfusion is the quickest way to rise haemoglobin and it has been credited with saving lives of thousands since this special day when Percy Lane Oliver, honorary secretary of the Red Cross at Camberwell, United Kingdom, received an urgent call from a nearby hospital in need of a volunteer blood donor, creating the world's first transfusion service ([www.redcross.org.uk/About-us/Who-we-are/Museum-and-archives/Historical-factsheets/Blood\\_transfusion](http://www.redcross.org.uk/About-us/Who-we-are/Museum-and-archives/Historical-factsheets/Blood_transfusion), 2011).

Although blood transfusions are considered to be safe, severe major complications exist. Statistics show that blood causes side effects in 10% of transfusions, and serious side effects in 1/5000 transfusions. Its routine and widespread use in clinical practice ignores the fact that blood transfusion can be viewed as an organ transplant with known complexities and risks, albeit lacking the rigorous indications of solid transplants [1].

In parallel, declining donor pools, aging populations associated to a declining birth rate, difficulties in storage or increased use due to more complex surgery, have tailored a long tradition of research and clinical management aimed at finding suitable alternatives to blood transfusion. Non-pharmacological or pharmacological approaches, exploring ways of stimulating erythropoiesis or improving oxygen transport with the help of artificial oxygen carriers or combining strategies adapted to specific patients are currently undergoing numerous trials.

The aim of this article is to review the current knowledge of safety of blood transfusion and existing alternatives.

### Transfusion safety

Blood transfusions have become an ever safer clinical procedure in developed countries [2]. However, major complications still exist and hemolytic reactions [3], transfusion-related acute lung injury (TRALI) [4], bacterial contamination [5] or an increase in multi-organ failure, infections, renal dysfunction or mortality have been described in specific types of patients in relation to blood products [6] (table I). While the transmission of hepatitis and HIV by blood components is nowadays rare in developed countries, bacterial contamination is the most common residual infectious hazard. Donor screening methods, improved laboratory techniques and enhanced infectious disease testing have led to a minimization of risks for blood donors and transfusion recipients. Platelets are screened for bacteria before release to minimize risk [7], plasma derivatives have been subject to pathogen removal or inactivation treatments for many years and these technologies are increasingly applied to blood components. Nevertheless, as blood transfusion is a complex

TABLE I  
Complications of transfusion and approximate frequency. Adapted from data Serious Hazards of Transfusion scheme [93]

Transfusion risk	Frequency in the UK (units transfused)
ABO incompatible red cell transfusion	1/180,000
Incorrect blood component transfused	1/13,000
Serious acute transfusion reaction	1/7000
TRALI	1/150,000
TACO	1/450,000
HIV	1/6.25 million
Hepatitis B virus	1/1 million
Hepatitis C virus	1/100 million

multistep process involving members of various professional groups, several risk points have been identified, including donors and recipients (table II).

This understanding has led to the development of haemovigilance, defined as surveillance procedures covering the whole transfusion chain, from collection of blood and its components to follow-up of recipients. It is intended to collect and assess information on unexpected or undesirable effects resulting from the therapeutic use of labile blood products and to prevent their occurrence or recurrence (International Haemovigilance Network [IHN] 2012, [www.ihn.org.com](http://www.ihn.org.com)). A survey of worldwide participants demonstrated variable development of haemovigilance schemes, hindered in many countries by lack of resources, while challenges, such as fragmented blood transfusion services, cultural fear or reporting adverse events and lack of government commitment were identified challenges.

In a further effort to report incident, and therefore increase the safety of blood transfusions, the Serious Hazards of Transfusion

TABLE II  
Hotspots for errors in the transfusion process (adapted from [93])

Location	Critical point	Health care professional
Blood donor center	Identification of donor Assessment of donor for safety	Donation session staff
Blood center	Processing and issue	Blood center laboratory staff
Ward	Assessment of recipient Decision to transfuse	Medical and nursing staff
Laboratory	Reception, testing, allocation of component and labeling	Medical laboratory assistants Porters
Operating rooms, emergency department	Bedside administration checks, monitoring or adverse incidents	Nurses, midwives, doctors, operating room practitioners

Download English Version:

<https://daneshyari.com/en/article/3816885>

Download Persian Version:

<https://daneshyari.com/article/3816885>

[Daneshyari.com](https://daneshyari.com)