

BLOOD TRANSFUSIONS

Preface

My Juju's Stronger Than Yours!

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Perhaps no single topic evokes as strong visceral reactions as transfusion of whole blood or fractionated blood component. Practitioners who share a common philosophy regarding such diverse topics as antimicrobial prescription, colloid versus crystalloid resuscitation, and the value of early enteral nutrition readily draw the proverbial line in the sand regarding optimal values of hemoglobin and hematocrit. This issue of *TraumaCare* explores the data that underpin this divisive topic, explores the physiologic rationale supporting transfusion triggers and practices, provides a rational guide for initiating component therapy, and details alternatives to transfusion therapy for the critically ill in the operating room and intensive care unit.

Despite the wealth of experience with whole blood and component therapy transfusion, there is little *compelling* evidence that increasing hemoglobin concentration, arteriolar oxygen content, or global oxygen delivery increases survival in patients other than in two very precisely defined patient populations: those with 1) active hemorrhage and 2) active cardiac ischemia. Otherwise, despite deeply entrenched notions of the benefit of transfusion for ventilator weaning, strength, hemodynamic performance, and microvascular flow, there are no prospective, randomized, controlled data to support the practice of maintaining a hemoglobin of 10 g/mL or hematocrit of 30%.

How can our profession engage in as costly a practice as component therapy without definitive data to support such a practice? Likely, we (medical professionals) have generally surrendered our clinical equipoise with regard to transfusion therapy and are loath to subject our patients to a clinical investigation that may withhold transfusion in a circumstance where we believe transfusion to be beneficial or even critical. Additionally, although the cost of component therapy has sharply escalated with the widespread use of leukoreduction, enhanced screening for blood-borne infection, and detergent-treated plasma to reduce infection transmission, these costs may be negligible in comparison to the cost for enhanced technology. The last decade witnessed the growth of near-universal CT scanning, magnetic resonance imaging, positron emission tomography, virtual colonoscopy and bronchoscopy, which detail only a few of the "standard" diagnostic tools that add to the spiraling cost of medical care *prior to definitive therapy*. Thus, the costs of component therapy appear minimal in comparison. Furthermore, increasingly toxic chemotherapeutic regimens, often in conjunction with bone marrow transplantation, require component therapy as a standard commensal of definitive therapy for the underlying malignancy. Hence, we have accepted component therapy as a supportive measure in much the same way as we use intravenous fluid, activated protein C, and increasingly, activated factor VIIa.

Nonetheless, deleterious effects of transfusion therapy have been elucidated. These untoward and unintended consequences span such diverse effects as immunosuppression, increased mortality, transfusion-related acute lung injury, alloimmunization, and reduced microvascular flow. These consequences are detailed throughout this issue of *TraumaCare* and provide a strong rationale for exploring alternatives to transfusion. Alternatives may include colloid resuscitation, acute normovolemic hemodilution, red cell scavenging, and pharmacologic adjuncts to enhance the clotting cascade.

It is my hope that the contents of this issue will provoke readers to critically explore their personal and institutional transfusion practices, explore alternatives to component therapy, and adopt practices that minimize or even eliminate component utilization, except in circumstances where that practice is supported by data.

Why Should Clinicians Be Concerned about Blood Conservation?

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Learning Objectives: 1) To fully understand the meaning and working of bloodless conservation. 2) To know the importance of implementing a blood conservation program. 3) To understand the various methods and techniques of decreasing allogeneic blood transfusion.

Abstract

A shrinking donor pool and an increased awareness of risks associated with allogeneic blood transfusion have contributed to the evolving and widening application of techniques for blood conservation. "Bloodless medicine and surgery" has moved beyond the concerns of just Jehovah's Witness patients. Risks associated with blood transfusions have been well documented, which, coupled with more stringent donor screening, has had significant impact on the availability and costs of blood supply. The challenge for clinicians is to prevent complications and unnecessary blood use. Although there is no single blood

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