Hematol Oncol Clin N Am 21 (2007) xv–xvii
HEMATOLOGY/ONCOLOGY CLINICS
OF NORTH AMERICA

Preface

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Guest Editor

Inflammation, as part of normal host protective systems, serves to limit injury in patients as a host surveillance mechanism. Different stimuli activate inflammatory pathways with signaling mechanisms that link these diverse pathways. Inflammatory responses can also result from allogeneic blood transfusions that contain protein and cellular components. These responses range from hypersensitivity to adverse organ system dysfunction. Thus, the role of blood conservation in managing hospitalized patients, especially critically ill patients, is increasingly being investigated and appreciated.

Hemostatic abnormalities occur in patients after a broad spectrum of injury, as part of pathophysiologic processes (ie, atherosclerosis, infections), or subsequent to traumatic or surgical interventions. Hemostatic activation is critically linked to inflammatory responses by a network of humoral and cellular components including proteases of the clotting and fibrinolytic cascades. Hemostatic initiation, thrombin generation, contact activation, and other pathways amplify inflammatory responses to produce collectively end-organ damage as part of host defense mechanisms.

Cross talk between activation of inflammation and hemostasis occurs, where cytokines and other inflammatory mediators activate coagulation proteases to modulate inflammation through specific cell receptors including protease-activated receptors. Strategies directed at inhibiting coagulation activation have been reported in experimental and early clinical studies and include inhibiting tissue factor–mediated activation of coagulation or restoration of physiologic anticoagulant pathways by recombinant human activated protein C or antithrombin. In disseminated intravascular coagulation, overactivation of thrombin, clotting, or both leads to bleeding complications; depletion of coagulation proteins and platelets and endothelial dysfunction produce

0889-8588/07/$ – see front matter
doi:10.1016/j.hoc.2006.11.014

microvascular dysfunction and a thrombotic state. These sequelae can occur to varying degrees in our critically ill patients.

Surgical patients often receive transfusions with multiple blood products. They have a unique circumstance as they can be preventively treated with pharmacologic agents to better modulate inflammatory responses and downstream responses. Multiple studies have reported preventive pharmacologic therapies to reduce bleeding and the need for allogeneic transfusions in surgery. Strategies for cardiac surgical patients during cardiopulmonary bypass (CPB) include administration of the lysine analogs including epsilon aminocaproic acid, tranexamic acid, or aprotinin (Trasylol). Novel therapies are also under investigation that involve recombinant approaches.

In September 2005, a group of multidisciplinary physicians and scientists in the areas of hematology, inflammation, cardiology, surgery, anesthesiology, neurology, critical care, and transfusion medicine representing multiorganizational specialties met at Emory University to review topics in inflammation, hemostasis, and blood conservation strategies. The proceedings from this meeting are presented here. Part of the purpose of the meeting was also to understand inflammation and bleeding, understand the role of transfusions and other therapies, and strategize solutions to the growing issues involving blood management and health care quality and delivery.

National medical and regulatory organizations have developed guidelines for blood transfusions, but these guidelines remain inconsistent and unenforceable. The way blood is used in the surgical setting is normally left to the discretion of individual physicians. However, transfusion practices vary based on knowledge level and overall interest. Further, these variances may affect procedures that routinely involve a significant amount of blood loss. Thus, establishing scientifically based guidelines to guide blood management within the health care system is an important undertaking.

The Inflammation, Hemostasis and Blood Conservation Strategies forum also reviewed the latest science surrounding the management of surgical bleeding. Although guidelines for transfusion are not clearly defined, blood needs to be used judiciously, especially in procedures that involve significant blood loss such as cardiac surgery and orthopedic procedures. Discussion at the event centered on three key topics: the risks of blood transfusion, the potential benefits of anti-inflammatory strategies and blood-sparing agents, and the overall need for better blood management strategies to improve the overall quality of patient outcomes.

My colleague, Robert J. Bachman, who is Chief Operating Officer, Emory University Hospital, summarized the importance of the Inflammation, Hemostasis and Blood Conservation Strategies forum. "Blood management is on the minds of people at every level of the hospital. It is critical that physicians and institutions give more attention to managing blood as an essential component of improving patient care, and delivering quality services in the context of modern healthcare administration."

The chapters included in this edition of *Hematology/Oncology Clinics of North America* represent important aspects from the meeting related to our current

understanding of hemostasis and links to inflammation by thrombin signaling, platelet activation, and overall issues related to ischemia–reperfusion injury. The chapters review therapeutic issues in treating these patients; three important chapters regarding blood issues address current transfusion risks; transfusion-related acute lung injury, an increasingly recognized problem associated with transfusion therapy; and transfusion algorithms and rational approaches to administering blood. Finally, one of the most important chapters is a novel review of blood and transfusions by Bruce Spiess, an insightful crusader of blood conservation and, like me, a believer of multimodal perspectives essential to blood conservation.

To all the participants who made this meeting possible, I thank you for your outstanding efforts, and your important contributions to science and clinical care. This meeting was supported by unrestricted educational grants from Bayer, Novo Nordisk, Eisai, and Zymogenetics.

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