

Book Review

Perioperative Transfusion Medicine

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It has been almost 100 years since Karl Landsteiner first noticed the immiscibility of blood obtained from various individuals. His classification of blood groups shortly thereafter opened inroads into medicine that heretofore had been all but unappreciated. Some 200 years earlier, a French physician named Jean Baptiste Denis had transfused several milliliters of blood from a lamb into a 15 year old lethargic youth, and noticed improvement in the patient's previously depressed condition. During the wars of the latter part of this century, although the degree of tolerance to anemia was tested in field conditions, the establishment of blood banks saved thousands of lives. All of these milestones serve to remind us how powerful a contribution transfusion medicine has made in the development of the science of medicine.

This year a lengthy treatise on transfusion has been published by Williams and Wilkins of Baltimore. *Perioperative Transfusion Medicine*, edited by Spiess, Counts, and Gould, contains contributions from 60 authors who report on a diverse range of topics within the field of blood management. The editors are all respected individuals whose research and clinical experiences provide insight into the complexities of hematology. The chapters within the book have been divided logically into six major sections, with the delineation following a logical time frame from admission to discharge of a surgical patient. Following an introductory chapter, the major headings include Blood Services Interaction with Surgical Care, Perioperative Preparations, Operative Transfusion Management, Transfusion Surgical Subspecialty Concerns, and The Postoperative Transfusion Decision. Each section contains between two and 12 chapters which delve thoroughly into the topic.

The first four chapters provide both an overview of the history of transfusion practices and an examination of blood collection, processing, and administration practices. Counts' chapter is especially enlightening and provides a summary review of both collection and preparation of blood components. The

latter part of the fourth chapter is complete with a description of some of the adverse reactions to autogeneic transfusions.

Chapters 5 and 6 review the physiological processes of hemostasis and contain a number of explanatory figures that succinctly diagram a number of the processes involved in coagulation. The order of chapters, however, places a review of platelet physiology before a general description of hemostasis, which seems at first reversed. However, the quality of information is excellent. Perhaps a chapter on fibrinolysis may have been better placed in close proximity to these two, to provide a basis on the importance of these processes in undermining clot stability, and increasing morbidity, in a number of major surgical interventions and clinical conditions.

The information contained in Chapter 7 provides a basis for what most clinicians and law makers in this country have come to know only too well: that the infusion of autogeneic blood is not without risk. The chapter provides, in tabular form, an estimation of the risks of major disease transmission and the probability of contracting disease if so transfused. Chapters 8 through 11 then proceed to identify techniques to limit the risks associated with non-self transfusions. The chapter on autologous blood donation recognizes the potential benefit of this underutilized modality, and suggests techniques for specific surgical interventions. Chapter 10 was split into two segments on red cell substitutes and contains a thorough examination by authors who, in toto, possess a wealth of knowledge in this area. The challenges facing researchers in this dynamic area of study are many, and the results of the early clinical trials are presented. Spiess's chapter contains a list, with explanation, of the many potential applications for administering red cell substitutes - many of which would impact cardiovascular perfusionists. The placement of Chapter 11, *Surgery in the Patient Who Refuses Transfusion*, was well thought out, since many of the techniques described in the previous three chapters have been applied in treating individuals who can not be transfused with autogeneic products. The final two chapters of the Second Section (Chapters 12 and 13) describe both regulatory mandates for blood product transfusions and the legal aspects inherent there within.

The third section addresses a hodgepodge of transfusion related topics in chapters as varied as inherited hematological disorders to coagulation assessment. Chapter 14 describes methods of fluid resuscitation and contains a review of the oft-debated virtues of crystalloid and colloid fluid therapies. The description of sickle cell disease in Chapter 15 is especially thorough, and should provide ample information to perfusionists looking for information to include in a policy and procedure manual, for managing these challenging cases. Interest in the use of fractionated heparin derivatives has increased during the

past decade. Chapter 17 contains a brief review of low-molecular-weight heparin, and heparanoid, compounds, as well as several hemostatic altering agents in common use for surgical patients.

Despite the relatively rare occurrence of congenital clotting disorder deficiencies, when these are encountered, they pose a significant challenge to the clinician, both from a diagnosis and management perspective. Thompson's chapter does an excellent job in summarizing the treatment of these disorders and provides the reader with a review of how factors and concentrates are prepared. The final chapter in this section is on management of the hypercoagulable patient, which is especially noteworthy for perfusionists for a number of reasons. A significant number of patients presenting for cardiac surgery have tendencies towards thrombosis, and have been treated with coagulation-altering medications to reduce such risk. In addition, hyper-transfusion with various blood components has resulted in iatrogenic hypercoagulable states that predispose patients to thrombotic events. Chapter 19 describes in detail many of states that contribute to this condition, and ends with a review of diagnostic approaches and treatments for hypercoagulability.

In the fourth section, several chapters address various blood conservation methods, with the major emphasis placed on anesthetic and hemodilution techniques. Although methods utilizing devices such as autotransfusion cell washing devices, ultrafiltrators, and heparin coated circuits are mentioned, they are perfunctory and not of the in depth nature that can be found in other publications. This section also contains useful information for managing patients suffering massive blood loss, especially that encountered in trauma situations. Both isolated component therapy with fresh frozen plasma and the use of topical fibrin glue, also have chapters devoted to them.

The fifth section contains general chapters that describe hemostatic derangements resulting from a variety of surgical procedures, as well as treatment strategies. Chapter 28 is devoted entirely to cardiac surgery and its effects on coagulation. This is the largest chapter (by number of pages and of references) in the book and contains a diverse list of topics, including cardiopulmonary bypass. Unfortunately, the flow of the chapter was somewhat difficult to follow and illogical. For example, the first several sections were devoted to rare hemostatic abnormalities or conditions, infrequently encountered in the clinical environment, and would have been better placed towards the end of the chapter. The process of extracorporeal circulation is described along with a description of pathophysiological effects of such an intervention. This would have been better placed at the beginning of the chapter, with the strategies to reduce this morbidity following. Nevertheless, the information contained in this chapter was well referenced and thorough.

The final section of the book was devoted to the postoperative management of patients, and concludes with a chapter by the editors on the complexities of making transfusion decisions. Here the editors emphasize many of the points made throughout the book concerning the tolerance of the human organism

to reductions in both the cellular and acellular elements involved in hemostasis. This chapter emphasizes the principle of strict attention to detail to which all individuals must adhere in order to make sound clinical decisions that remain in the best interest of the patient, more so, than the practitioner.

In conclusion, the editors have done an outstanding job in amassing a significant amount of information within this diverse field into a single, exhaustive treatise on the subject. There are a minimum of redundancies despite the quantity of information contained, and when they do appear, go far in emphasizing the basic concepts germane to making decisions utilizing a limited, yet powerful, basic resource.

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