

Book Review

Cardiopulmonary Bypass Principles and Practice

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845 pages
30 chapters divided into five sections
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Cardiopulmonary Bypass Principles and Practice is an excellent book that reviews basics as well as advanced topics related to cardiopulmonary bypass. This book compiles extensive information concerning cardiopulmonary bypass history, practices and research in a concise and understandable manner.

The first chapter of this book discusses the historical development of cardiopulmonary bypass. This historical account recorded by heart surgery pioneer C. Walton Lillehei is fascinating.

Section one of five examines the components of the cardiopulmonary bypass system. The first chapter of this section on oxygenator/heat exchanger units provides technical information concerning bubbler, solid membrane and microporous membrane oxygenators. The next chapter, "Extracorporeal Circuitry," briefly discusses each component of the system, from venous to arterial cannula. This comprehensive discussion, which includes oxygenators, would be more appropriate as the first chapter in this section. Blood cardioplegia continues to be an issue in cardiac surgery and the third chapter comprehensively considers the techniques of hemofiltration, dialysis and blood salvage. The final chapter in this section discusses various priming solutions and analyzes hemodilution options.

Section two addresses the various ways in which cardiopulmonary bypass challenges normal physiology. The first chapter in this section explains the relevance of oxygen consumption, pH management and other alterations in organ function during hypothermia. A 50 page chapter on myocardial protection in this section is an excellent overview of this topic. The chapter on pharmacology offers interesting discussion on the way in which cardiopulmonary bypass disrupts both pharmacokinetics and pharmacodynamics. In this chapter research on extracorporeal

circuit drug absorption is presented, a topic often omitted in perfusion texts. At the end of this chapter, a literature summary outlines interactions between drugs and cardiopulmonary bypass. Chapters nine and ten describe the inflammatory and immune response to cardiopulmonary bypass. Both these chapters are excellent and provide current research results. The chapter on extracorporeal circuit emboli reviews both particulate and air detection, prevention and pathophysiology. The chapter on neuroendocrine response examines pituitary, adrenal and thyroid hormone metabolism in relation to cardiopulmonary bypass. The final chapter in this section describes research findings related to pulsatile cardiopulmonary bypass.

Section three gives detailed analysis (100 pages) of coagulation management during cardiopulmonary bypass. These four chapters include anticoagulation, neutralization of heparin, platelet function and coagulopathy. The information provided in this section is invaluable at both the introductory and advanced level (from coagulation cascade to platelet adenylate cyclase activity).

Section four considers the organ systems most notably affected by cardiopulmonary bypass: the lungs, kidneys, viscera and brain. The analyses in these four chapters describe the specific organ response to all aspects of cardiopulmonary bypass.

The final section consisting of nine chapters discusses the management of cardiopulmonary bypass. Individual chapters on monitoring, pediatrics, ECMO, thoracic aortic surgery, cardiopulmonary bypass support outside the operating room, circulatory assist devices, noncardiovascular applications, unusual problems, and cardiopulmonary bypass termination contain exceptional, comprehensive narratives and bibliographies.

With over 800 pages it is surprising how little overlap exists in the text. Most of the topics present various sides of a

question in a fair and unbiased manner. Cardiopulmonary bypass is still a relatively new science. With numerous patient variables and new technologies to be studied, we need to review all information critically to determine its applicability to specific clinical circumstances. As a member of AmSECT, I was very pleased to find a significant number of Journal of Extra-Corporeal Technology references cited. This is a book that will carry students through the learning phase of perfusion and well into their careers. Based on the comprehensiveness and relatively reasonable price, I would recommend this book to perfusionists, cardiac anesthesiologists and cardiac surgeons alike. It has become a required text for our perfusion education program.

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