

Book Review

Cardiopulmonary Bypass in Neonates, Infants, and Young Children

Edited by Richard A. Jonas and Martin J. Elliot

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26 contributing authors
1505 references

A number of books have been written on cardiopulmonary bypass and perfusion. Unfortunately, little has been written on pediatric cardiopulmonary bypass, much less neonatal bypass, until now. The publishing of this book certainly fills this longstanding void.

Part 1, Physiology, is composed of three chapters. These chapters cover the introduction and two very informative and detailed chapters on organ development and physiology during the transitional period of birth.

Part 2, Physiological manipulations employed during bypass, encompasses six chapters.

Chapter 4 (123 references) is a detailed overview of anesthetic management during cardiopulmonary bypass for congenital heart disease. There is a thorough and well-written presentation on the anesthetic effects on the heart and central nervous system, and the effects of anesthetic management on the hormonal and metabolic stress responses related to cardiopulmonary bypass.

Chapter 5 (65 references) is an in-depth review of hypothermia from its first use to current concerns relative to the technique.

Chapter 6 (96 references) is an excellent presentation of the current knowledge relative to low flow bypass and circulatory arrest. The techniques for both methods are presented including cooling technique, pH and pCO₂ management, safe duration of each, and rewarming techniques.

Chapter 7 (67 references) is a good presentation of the rationale for the use of hemodilution including the hemodynamic effects of hemodilution as well as the adverse effects of hemodilution.

Chapter 8 (27 references) is on acid base balance and is basically a review of the topic with the question once again leading to whether we are reptiles or hibernators. There is also a nice section on some of the current knowledge related to pH vs. alpha stat management.

Chapter 9 (137 references), Manipulation of hemostasis during pediatric bypass, is a nice review of platelet dysfunction. Unfortunately, it may have been more appropriately titled platelet dysfunction in cardiopulmonary bypass. While research in this area for neonates and infants is not overwhelming, a current review of the neonatal coagulation system contrasted with the adult would have been interesting.

Part 3, Practical Aspects of Cardiopulmonary Bypass, encompasses the next seven chapters: Chapter 10 (1 reference), Cannulation for CPB for repair of congenital heart defects; Chapter 11 (38 references), Perfusion Pumps; Chapter 12 (80 references), Filtration in pediatric cardiac surgery; Chapter 13 (49 references), Ultrafiltration; Chapter 14 (35 references), Oxygenators for pediatric cardiac surgery; Chapter 15 (107 references), Prime composition; and Chapter 16 (5 references), Priming volume and other aspects of pump oxygenators for neonates and infants. Chapters 10-15 were all very informative, well-written, up to date, and pertinent to pediatric cardiopulmonary bypass. Chapter 16, however, was a bit of a disappointment. This chapter was interesting and a little futuristic, but could have been better spent dealing with current techniques of circuit size and prime reduction that allow some centers to reduce their primes as low as the authors suggest.

Part 4, Pathophysiology of Cardiopulmonary Bypass and its Relation to Age, is composed of four chapters: Chapter 17 (77 references), Metabolic response; Chapter 18 (85 references), Inflammatory and immunological response to cardiopulmonary bypass; Chapter 19 (116 references), The effect of cardiopulmonary bypass on the lung; and Chapter 20 (126 references), The effects of cardiopulmonary bypass on the brain. While there are a few overlaps of earlier material within these chapters, all are very thorough and pertinent to pediatrics.

Part 5, Current Practice and Research Directions, is composed of the twenty-first and final chapter, titled the same. A discussion of the current and future research related to pediatric cardiopulmonary bypass is presented.

Finally, two appendices which detail the approach to cardiopulmonary bypass and perfusion equipment used at Boston Children's and The Hospital for Sick Children are presented in detail. Both of these are very informative and greatly appreciated.

Doctors Elliot and Jonas have done an outstanding job in putting this book together. Overall, this is an excellent book and a great reference for anyone involved or interested in neonatal and pediatric cardiopulmonary bypass.

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