Contents

Preface ................................................................. vii
Acknowledgments .................................................. xi
Contributors ........................................................ xix

Section I  Original Principles

1 The Use of Homograft Valves: Historical Perspective ....... 3
   Richard A. Hopkins

Section II  Major Clinical Series of Homograft Valve
Transplants: Left Ventricular Outflow Tract

2 Mayo Clinic Series ............................................. 17
   Robert B. Wallace and Thomas A. Orszulak

3 University of Alabama at Birmingham Series ................. 23
   David C. McGiffin and James K. Kirklin

4 Modified Root Replacement Concept: Influence of Implant
   Technique on Allograft Durability ......................... 30
   William W. Angell and Aubyn Marath

Section III  Major Clinical Series of Homograft Valve
Transplants: Right Ventricular Outflow Tract

5 Great Ormond Street Series ................................. 43
   Jaroslav Stark and Mila Stajevic-Popovic

6 Denver Series ................................................... 50
   David R. Clarke and Deborah A. Bishop

7 Toronto Series .................................................. 63
   William G. Williams
Section IV  Cryopreserved Allograft Tissue for Cardiac Reconstruction

8 Cryopreserved Cardiac Valves: Initial Experiences and Theories ............................... 77
   Richard A. Hopkins

9 Surgery for Infections ................................. 85
   David C. McGiffin and James K. Kirklin

10 Pulmonary Valve Autotransplant Procedure: Clinical Results Compared with Other Methods for Aortic Valve Replacement ............................. 95
   Erle H. Austin, III

11 In Vivo Pulsatile Hemodynamics of Homografts ........ 100
   Jeff L. Myers and Richard A. Hopkins

Section V  Cell Biology of Heart Valve Leaflets

12 Leaflet Endothelium ................................. 107
   Flavian M. Lupinetti

13 Leaflet Interstitial Cells ............................. 114
   Robert H. Messier, Jr., Patrick W. Domkowski, and Richard A. Hopkins

14 Leaflet Interstitial Cell Growth and Recovery ............... 118
   Robert H. Messier, Jr., Diane Hoffman-Kim, and Richard A. Hopkins

15 Activation of the Immune System by Cardiac Valve Allografts ...................... 123
   Franciska Hoekstra, Christiaan Knoop, Ad Bogers, and Willem Weimar

Section VI  Cryobiology of Heart Valve Preservation

16 Application of Cryopreservation to Heart Valves ............ 133
   Lloyd Wolfinbarger, Jr., Kelvin G.M. Brockbank, and Richard A. Hopkins

17 Cell Viability and Problems with Its Quantification ........ 161
   Diane Hoffman-Kim and Richard A. Hopkins

18 Factors Affecting Cellular Viability During Preimplantation Processing ............ 165
   Richard A. Hopkins, Diane Hoffman-Kim, Robert H. Messier, Jr., and Patrick W. Domkowski

19 Cell Origins and Fates Following Transplantation of Cryopreserved Allografts ........ 175
   M.G. Hazekamp, D.R. Koolbergen, J. Braun, J.A. Bruin, C.J. Cornelisse, Y.A. Goffin, and J.A. Huysmans
20 Resolution of the Conflicting Theories of Prolonged Cell Viability
Richard A. Hopkins

Section VII Allograft Heart Valves: Morphologic, Biochemical, and Explant Pathology Studies

21 Overview: Allograft Heart Valves
Stephen L. Hilbert, Frederick J. Schöen, and Victor J. Ferrans

22 Morphology: Allograft Heart Valves
Stephen L. Hilbert, Frederick J. Schöen, and Victor J. Ferrans

23 Biomechanics: Allograft Heart Valves
Stephen L. Hilbert, Frederick J. Schöen, and Victor J. Ferrans

24 Effects of Preimplantation Processing on Allograft Valves
Stephen L. Hilbert, Frederick J. Schöen, and Victor J. Ferrans

25 Explant Pathology Studies
Stephen L. Hilbert, Frederick J. Schöen, and Victor J. Ferrans

26 Implications of Explant Pathology Studies
Stephen L. Hilbert, Frederick J. Schöen, and Victor J. Ferrans

Section VIII Allograft Valve Banking: Harvesting and Cryopreservation Techniques

27 Cryopreservation and Tissue Banking
Perry L. Lange and Richard A. Hopkins

28 Donor Suitability and Heart Procurement
Scott A. Brubaker

29 Techniques and Technology: Dissection, Examination, Sterilization, and Cryopreservation
Mark VanAllman and Kelvin G.M. Brockbank

30 Techniques and Technology: Storage, Transportation and Distribution, Thawing, Dilution, and Quality Systems
Perry L. Lange and Kelvin G.M. Brockbank

Section IX Surgical Techniques: Valve and Root Methods for Left Ventricular Outflow Tract Reconstructions

31 Indications and Contraindications: Valve and Root Methods
Richard A. Hopkins

32 “Freehand” Aortic Valve Replacement with Aortic Allograft Valve Transplant Aortotomy
Richard A. Hopkins
33 The Small Aortic Root: Surgical Techniques for Annulus Enlargement
   Richard A. Hopkins

34 Aortoplastic Techniques for Problematic Aortic Root Geometry
   Richard A. Hopkins

35 Aortic Root Replacement with Aortic Allograft Conduit
   Richard A. Hopkins

36 Aortoventriculoplasty with Aortic Allograft
   Richard A. Hopkins

37 “Miniroot” Replacement Techniques
   Neal D. Kon and A. Robert Cordell

38 Stentless Xenograft Valves
   Richard A. Hopkins

Section X  Surgical Techniques: Ross Operation and Variants

39 Indications: Ross Operation
   Richard A. Hopkins

40 Surgical Anatomy: Ross Operation
   Patricia A. Penkoske and Robert H. Anderson

41 Surgical Technique: Ross Operation
   Richard A. Hopkins

42 The Role of Transesophageal Echocardiography During the Ross Procedure
   Arthur A. Bert and Scott F. MacKinnon

43 Guidelines for Use of Aprotinin with the Ross Procedure
   Arthur A. Bert

44 Ross-Konno Procedure
   V. Mohan Reddy, Doff B. McElhinney, and Frank L. Hanley

45 Methods for Avoiding Technical Errors in Performing the Autograft Pulmonary Valve Transplant
   Erle H. Austin, III

Section XI  Surgical Techniques: Complex Reconstructions

46 Management of Transposition with Complex Systemic Ventricular Outflow Tract Reconstruction: Rastelli’s Operation and Aortic Root Translocation
   Pedro J. del Nido

47 Homograft Variant of the Nikaidoh Procedure
   Richard A. Hopkins
48 Application of the Principle of Creation of Double Outlet Systemic Ventricle for Hypoplastic Aortic Outflow
Richard A. Hopkins and Gary K. Lofland

Section XII Surgical Techniques: Right Ventricular Outflow Tract Reconstructions

49 Indications: Right Ventricular Outflow Reconstructions
Richard A. Hopkins

50 Right Ventricle to Pulmonary Artery Aortic Allograft Conduits in Children and Infants
Richard A. Hopkins

51 Pulmonary Valve Replacement in Adults
Richard A. Hopkins

52 Corrected Transposition
Richard A. Hopkins

53 Reconstruction of Right Ventricle Outflow with Abnormal Pulmonary Arteries
Richard A. Hopkins

54 Management of Difficult Allograft Alignments: The “Divide and Reapproximate” Principle
Erle H. Austin, III

55 Pulmonary Valve Allografts in Children
David R. Clarke and Deborah A. Bishop

56 Truncus Arteriosus Repair
Gary K. Lofland

57 Pulmonary Atresia with MAPCAs: Staged Unifocalization Techniques
Richard A. Hopkins and Erle H. Austin, III

58 Pulmonary Atresia with MAPCAs: Repairs in Neonates and Young Infants
Doff B. McElhinney, V. Mohan Reddy, and Frank L. Hanley

59 Reoperative Right Ventricular Outflow Tract Reconstructions
Richard A. Hopkins

60 Proximal and Distal Extensions
Kim F. Duncan

61 Reconstruction with Nonvalved Cryopreserved Cardiovascular Tissues
John L. Myers

62 Extracardiac Fontan Operation
Ed Petrossian, V. Mohan Reddy, and Frank L. Hanley
Section XIII  Future Directions

63  FDA Regulatory Policy ................................. 595  
  Scott Bottenfield and Margaret Deuel

64  The Biological Valve Spectrum and a Rationale for  
    Prosthetic Valve Choice ................................. 602  
  Richard A. Hopkins, R. Eric Lilly, and James St. Louis

65  Tissue Engineered Heart Valves: The Next Challenge ...... 612  
  Stephen L. Hilbert and Richard A. Hopkins

Appendix: Valve Diameters ................................. 621
Index .......................................................... 623
Cardiac Reconstructions with Allograft Tissues
Hopkins, R.A.
2005, XXIV, 656 p. 426 illus., 11 illus. in color., Hardcover
ISBN: 978-0-387-94962-8