

# CONTENTS

## PART I FUNDAMENTALS OF CARDIOVASCULAR DISEASE

- CHAPTER 1 Global Burden of Cardiovascular Disease** 1  
Thomas A. Gaziano and J. Michael Gaziano
- CHAPTER 2 Heart Disease in Varied Populations** 21  
Clyde W. Yancy
- CHAPTER 3 Ethics in Cardiovascular Medicine** 30  
Paul S. Mueller
- CHAPTER 4 Clinical Decision Making in Cardiology** 35  
Harlan M. Krumholz
- CHAPTER 5 Measurement and Improvement of Quality of Cardiovascular Care** 42  
Thomas H. Lee
- CHAPTER 6 Design and Conduct of Clinical Trials** 49  
Elliott M. Antman

## PART II MOLECULAR BIOLOGY AND GENETICS

- CHAPTER 7 Principles of Cardiovascular Molecular Biology and Genetics** 57  
Elizabeth G. Nabel
- CHAPTER 8 Inherited Causes of Cardiovascular Disease** 70  
J.G. Seidman, Reed E. Pyeritz, and Christine E. Seidman
- CHAPTER 9 Genetics of Cardiac Arrhythmias** 81  
David J. Tester and Michael J. Ackerman
- CHAPTER 10 Principles of Drug Therapy** 91  
Dan M. Roden
- CHAPTER 11 Cardiovascular Regeneration and Tissue Engineering** 99  
Piero Anversa, Jan Kajstura, and Annarosa Leri

## PART III EVALUATION OF THE PATIENT

- CHAPTER 12 The History and Physical Examination: An Evidence-Based Approach** 107  
James C. Fang and Patrick T. O'Gara
- CHAPTER 13 Electrocardiography** 126  
David M. Mirvis and Ary L. Goldberger  
**Guidelines: Electrocardiography** 165  
David M. Mirvis and Ary L. Goldberger
- CHAPTER 14 Exercise Stress Testing** 168  
Bernard R. Chaitman  
**Guidelines: Exercise Stress Testing** 192  
Bernard R. Chaitman
- CHAPTER 15 Echocardiography** 200  
Heidi M. Connolly and Jae K. Oh  
**Appropriate Use Criteria: Echocardiography** 270  
Robert O. Bonow
- CHAPTER 16 The Chest Radiograph in Cardiovascular Disease** 277  
Michael A. Bettmann
- CHAPTER 17 Nuclear Cardiology** 293  
James E. Udelson, Vasken Dilsizian, and Robert O. Bonow  
**Appropriate Use Criteria: Nuclear Cardiology** 336  
James E. Udelson
- CHAPTER 18 Cardiovascular Magnetic Resonance Imaging** 340  
Raymond Y. Kwong  
**Appropriate Use Criteria: Cardiovascular Magnetic Resonance** 359  
Raymond Y. Kwong
- CHAPTER 19 Cardiac Computed Tomography** 362  
Allen J. Taylor  
**Appropriate Use Criteria: Cardiac Computed Tomography** 379  
Allen J. Taylor
- CHAPTER 20 Cardiac Catheterization** 383  
Charles J. Davidson and Robert O. Bonow

**CHAPTER 21 Coronary Arteriography** 406

Jeffrey J. Popma

**Guidelines: Coronary Arteriography** 433

Jeffrey J. Popma

**CHAPTER 22 Intravascular Ultrasound Imaging** 441

Jean-Claude Tardif and Philippe L. L'Allier

**CHAPTER 23 Molecular Imaging in Cardiovascular Disease** 448

Peter Libby, Farouc A. Jaffer, and Ralph Weissleder

**PART IV HEART FAILURE****CHAPTER 24 Mechanisms of Cardiac Contraction and Relaxation** 459

Lionel H. Opie and Gerd Hasenfuss

**CHAPTER 25 Pathophysiology of Heart Failure** 487

Douglas L. Mann

**CHAPTER 26 Clinical Assessment of Heart Failure** 505

Barry Greenberg and Andrew M. Kahn

**CHAPTER 27 Diagnosis and Management of Acute Heart Failure Syndromes** 517

Mihai Gheorghiu, Gerasimos S. Filippatos, and G. Michael Felker

**CHAPTER 28 Management of Heart Failure Patients With Reduced Ejection Fraction** 543

Douglas L. Mann

**Guidelines: Management of Heart Failure** 569

Douglas L. Mann

**CHAPTER 29 Devices for Monitoring and Managing Heart Failure** 578

William T. Abraham

**CHAPTER 30 Heart Failure with Normal Ejection Fraction** 586

Margaret M. Redfield

**CHAPTER 31 Surgical Management of Heart Failure** 601

Michael A. Acker and Mariell Jessup

**CHAPTER 32 Assisted Circulation in the Treatment of Heart Failure** 617

Mandeep R. Mehra and Bartley P. Griffith

**CHAPTER 33 Emerging Therapies and Strategies in the Treatment of Heart Failure** 627

Stefanie Dimmeler, Douglas L. Mann, and Andreas M. Zeiher

**CHAPTER 34 Care of Patients with End-Stage Heart Disease** 644

Linda L. Emanuel and Robert O. Bonow

**PART V ARRHYTHMIAS, SUDDEN DEATH, AND SYNCOPE****CHAPTER 35 Genesis of Cardiac Arrhythmias: Electrophysiologic Considerations** 653

Michael Rubart and Douglas P. Zipes

**CHAPTER 36 Diagnosis of Cardiac Arrhythmias** 687

John M. Miller and Douglas P. Zipes

**Guidelines: Ambulatory Electrocardiographic and Electrophysiologic Testing** 702

John M. Miller and Douglas P. Zipes

**CHAPTER 37 Therapy for Cardiac Arrhythmias** 710

John M. Miller and Douglas P. Zipes

**CHAPTER 38 Pacemakers and Implantable Cardioverter-Defibrillators** 745

Charles D. Swerdlow, David L. Hayes, and Douglas P. Zipes

**Guidelines: Cardiac Pacemakers and Cardioverter-Defibrillators** 765

Charles D. Swerdlow, David L. Hayes, and Douglas P. Zipes

**CHAPTER 39 Specific Arrhythmias: Diagnosis and Treatment** 771

Jeffrey Olgin and Douglas P. Zipes

**CHAPTER 40 Atrial Fibrillation: Clinical Features, Mechanisms, and Management** 825

Fred Morady and Douglas P. Zipes

**Guidelines: Atrial Fibrillation** 838

Fred Morady and Douglas P. Zipes

**CHAPTER 41 Cardiac Arrest and Sudden Cardiac Death** 845

Robert J. Myerburg and Agustin Castellanos

**CHAPTER 42 Hypotension and Syncope** 885

Hugh Calkins and Douglas P. Zipes

**PART VI PREVENTIVE CARDIOLOGY****CHAPTER 43 The Vascular Biology of Atherosclerosis** 897

Peter Libby

**CHAPTER 44 Risk Markers for Atherothrombotic Disease** 914

Paul M. Ridker and Peter Libby

- CHAPTER 45 Systemic Hypertension: Mechanisms and Diagnosis** 935  
Ronald G. Victor
- CHAPTER 46 Systemic Hypertension: Therapy** 955  
Norman M. Kaplan  
**Guidelines: Treatment of Hypertension** 972  
Norman M. Kaplan
- CHAPTER 47 Lipoprotein Disorders and Cardiovascular Disease** 975  
Jacques Genest and Peter Libby
- CHAPTER 48 Nutrition and Cardiovascular Disease** 996  
Dariush Mozaffarian
- CHAPTER 49 Primary and Secondary Prevention of Coronary Heart Disease** 1010  
J. Michael Gaziano, Paul M Ridker, and Peter Libby
- CHAPTER 50 Exercise-Based, Comprehensive Cardiac Rehabilitation** 1036  
Paul D. Thompson
- CHAPTER 51 Complementary and Alternative Approaches to Management of Patients with Heart Disease** 1042  
Edzard Ernst
- PART VII ATHEROSCLEROTIC CARDIOVASCULAR DISEASE**
- CHAPTER 52 Coronary Blood Flow and Myocardial Ischemia** 1049  
John M. Canty, Jr.
- CHAPTER 53 Approach to the Patient with Chest Pain** 1076  
Marc S. Sabatine and Christopher P. Cannon
- CHAPTER 54 ST-Segment Elevation Myocardial Infarction: Pathology, Pathophysiology, and Clinical Features** 1087  
Elliott M. Antman
- CHAPTER 55 ST-Segment Elevation Myocardial Infarction: Management** 1111  
Elliott M. Antman and David A. Morrow  
**Guidelines: Management of Patients with ST-Segment Elevation Myocardial Infarction** 1171  
Stephen D. Wiviott and Elliott M. Antman
- CHAPTER 56 Unstable Angina and Non-ST Elevation Myocardial Infarction** 1178  
Christopher P. Cannon and Eugene Braunwald  
**Guidelines: Unstable Angina and Non-ST Elevation Myocardial Infarction** 1201  
Christopher P. Cannon and Eugene Braunwald
- CHAPTER 57 Stable Ischemic Heart Disease** 1210  
David A. Morrow and William E. Boden  
**Guidelines: Chronic Stable Angina** 1258  
David A. Morrow and William E. Boden
- CHAPTER 58 Percutaneous Coronary Intervention** 1270  
Jeffrey J. Popma and Deepak L. Bhatt  
**Guidelines: Percutaneous Coronary Intervention** 1290  
Jeffrey J. Popma and Deepak L. Bhatt
- CHAPTER 59 Percutaneous Therapies for Structural Heart Disease in Adults** 1301  
John G. Webb
- CHAPTER 60 Diseases of the Aorta** 1309  
Alan C. Braverman, Robert W. Thompson, and Luis A. Sanchez
- CHAPTER 61 Peripheral Artery Diseases** 1338  
Mark A. Creager and Peter Libby
- CHAPTER 62 Prevention and Management of Stroke** 1359  
Larry B. Goldstein
- CHAPTER 63 Endovascular Treatment of Noncoronary Obstructive Vascular Disease** 1368  
Andrew C. Eisenhauer, Christopher J. White, and Deepak L. Bhatt
- CHAPTER 64 Diabetes and the Cardiovascular System** 1392  
Darren K. McGuire
- PART VIII DISEASES OF THE HEART, PERICARDIUM, AND PULMONARY VASCULATURE BED**
- CHAPTER 65 Congenital Heart Disease** 1411  
Gary D. Webb, Jeffrey F. Smallhorn, Judith Therrien, and Andrew N. Redington
- CHAPTER 66 Valvular Heart Disease** 1468  
Catherine M. Otto and Robert O. Bonow  
**Guidelines: Management of Valvular Heart Disease** 1530  
Robert O. Bonow and Catherine M. Otto

**CHAPTER 67 Infective Endocarditis** 1540  
Adolf W. Karchmer

**Guidelines: Infective Endocarditis** 1558  
Robert O. Bonow

**CHAPTER 68 The Dilated, Restrictive, and Infiltrative Cardiomyopathies** 1561  
Joshua M. Hare

**CHAPTER 69 Hypertrophic Cardiomyopathy** 1582  
Barry J. Maron

**CHAPTER 70 Myocarditis** 1595  
Peter Liu and Kenneth L. Baughman

**CHAPTER 71 Chagas' Disease** 1611  
José A.F. Ramires, Andrei C. Sposito, Edécio Cunha-Neto, and Maria de Lourdes Higuchi

**CHAPTER 72 Cardiovascular Abnormalities in HIV-Infected Individuals** 1618  
Stacy D. Fisher and Steven E. Lipshultz

**CHAPTER 73 Toxins and the Heart** 1628  
Richard A. Lange and L. David Hillis

**CHAPTER 74 Primary Tumors of the Heart** 1638  
Bruce McManus

**CHAPTER 75 Pericardial Diseases** 1651  
Martin M. LeWinter and Marc D. Tischler

**CHAPTER 76 Traumatic Heart Disease** 1672  
Matthew J. Wall, Jr., Peter I. Tsai, and Kenneth L. Mattox

**CHAPTER 77 Pulmonary Embolism** 1679  
Samuel Z. Goldhaber

**CHAPTER 78 Pulmonary Hypertension** 1696  
Stuart Rich

**CHAPTER 79 Sleep Apnea and Cardiovascular Disease** 1719  
Virend K. Somers

## **PART IX CARDIOVASCULAR DISEASE IN SPECIAL POPULATIONS**

**CHAPTER 80 Cardiovascular Disease in the Elderly** 1727  
Janice B. Schwartz and Douglas P. Zipes

**CHAPTER 81 Cardiovascular Disease in Women** 1757  
L. Kristin Newby and Pamela S. Douglas

**CHAPTER 82 Pregnancy and Heart Disease** 1770  
Carole A. Warnes

**Guidelines: Pregnancy and Heart Disease** 1780  
Carole A. Warnes and Thomas H. Lee

**CHAPTER 83 Exercise and Sports Cardiology** 1784  
Gary J. Balady and Philip A. Ades

**CHAPTER 84 Medical Management of the Patient Undergoing Cardiac Surgery** 1793  
Richard J. Gray and Dhun H. Sethna

**CHAPTER 85 Anesthesia and Noncardiac Surgery in Patients with Heart Disease** 1811  
Lee A. Fleisher and Joshua Beckman

**Guidelines: Reducing Cardiac Risk with Noncardiac Surgery** 1824  
Lee A. Fleisher and Joshua Beckman

## **PART X CARDIOVASCULAR DISEASE AND DISORDERS OF OTHER ORGANS**

**CHAPTER 86 Endocrine Disorders and Cardiovascular Disease** 1829  
Irwin Klein

**CHAPTER 87 Hemostasis, Thrombosis, Fibrinolysis, and Cardiovascular Disease** 1844  
Jeffrey I. Weitz

**CHAPTER 88 Rheumatic Fever** 1868  
B. Soma Raju and Zoltan G. Turi

**CHAPTER 89 Rheumatic Diseases and the Cardiovascular System** 1876  
Alexandra Villa-Forte and Brian F. Mandell

**CHAPTER 90 The Cancer Patient and Cardiovascular Disease** 1893  
Thomas Force and Ming Hui Chen

**CHAPTER 91 Psychiatric and Behavioral Aspects of Cardiovascular Disease** 1904  
Viola Vaccarino and J. Douglas Bremner

**CHAPTER 92 Neurologic Disorders and Cardiovascular Disease** 1916  
William J. Groh and Douglas P. Zipes

**CHAPTER 93 Interface Between Renal Disease and Cardiovascular Illness** 1934  
Peter A. McCullough

**CHAPTER 94 Cardiovascular Manifestations of Autonomic Disorders** 1949  
Virend K. Somers