英文影印版

心脏病学

BRAUNWALD

HEART DISEASE

A Textbook of Cardiovascular Medicine

5TH EDITION

VOLUME 2

科学出版社
Harcourt Asia
W.B.SAUNDERS

5TH EDITION
第 5 版

心 脏 病 学

HEART DISEASE

A Textbook of Cardiovascular Medicine

VOLUME 2
下册

EUGENE BRAUNWALD

科 学 出 版 社
Harcourt Asia
W.B.SAUNDERS

Heart Disease: A Textbook of Cardiovascular Medicine, Fifth Edition

北京市版权局著作权登记号： 01-1999-1540

图书在版编目(CIP)数据

心脏病学：第5版：英文/(美)布朗瓦尔德(Braunwald, E.)主编.
-北京：科学出版社，1999.10
书名原文：Heart Disease - A Textbook of Cardiovascular Medicine
ISBN 7-03-007720-2
Reprint ISBN 0-8089-2176-2
Ⅰ.心… Ⅱ.布… Ⅲ.心脏病学-英文 Ⅳ.R541

中国版本图书馆 CIP 数据核字(1999)第27408号

科学出版社出版
Harcourt Asia 出版
W.B.SAUNDERS

北京市东黄根北街16号
邮政编码：100717

中国科学院印刷厂印刷

北京新华书店北京发行所发行 各地新华书店经销

*

1999年10月第 一 版 开本：889×1194 1/16
1999年10月第一次印刷 印张：135 1/4 插页：6
印数：1—3000 字数：4 764 000

定价：480.00元（上下册）

（如有印装质量问题，我社负责调换〈科印〉）

5TH EDITION

HEART DISEASE

A Textbook of Cardiovascular Medicine

VOLUME 2

Edited by

EUGENE BRAUNWALD A.B., M.D., M.A.(hon.), M.D.(hon.),Sc.D. (hon.),F.R.C.P.

Vice President for Academic Programs, Partners HealthCare System; Distinguished Hersey Professor of Medicine, Faculty Dean for Academic Programs at Brigham and Women's Hospital and Massachusetts General Hospital, Harvard Medical School, Boston, Massachusetts

SCIENCE PRESS
Harcourt Asia
W.B.SAUNDERS

SCIENCE PRESS
16 Donghuangchenggen North Street,
Beijing 100717
China

HACOURT ASIA PTE, LTD
A Harcourt Publishers International Company
583 Orchard Road #09-01 Forum
Singapore 238884

Distributed in the Mainland China by Science Press,
16 Donghuangchenggen North Street, Beijing 100717, China

Printed in China by HARCOURT ASIA PTE, LTD. and SCIENCE PRESS under special arrangment with W.B.Saunders, A Harcourt Health Science Company. This edition is the only authorized complete and unabridged reproduction of the latest American Edition, published and priced for sale in China only, not including Hong Kong SAR and Taiwan.

This Edition First Printed in China in 1999.
China ISBN 7-03-007720-2
Reprint Edition ISBN 0-8089-2176-2

Printed in China

Dedicated to

ELAINE

KAREN, ALLISON, JILL

DANA, ALEX, MARA, ELISE, CARI, *and* BENJAMIN

CONTRIBUTORS

ELLIOTT M. ANTMAN, M.D.
Associate Professor of Medicine, Harvard Medical School. Director, Coronary Care Unit, Brigham and Women's Hospital, Boston, Massachusetts
Acute Myocardial Infarction: Medical Management of the Patient Undergoing Cardiac Surgery

S. SERGE BAROLD, M.D.
Professor of Medicine, University of Rochester School of Medicine and Dentistry. Chief, Cardiology Division, Department of Medicine, The Genesee Hospital, Rochester, New York
Cardiac Pacemakers and Antiarrhythmic Devices

JOHN A. BITTL, M.D.
Associate Professor of Medicine, Harvard Medical School. Director of Interventional Cardiology, Brigham and Women's Hospital, Boston, Massachusetts
Coronary Arteriography

ROBERT O. BONOW, M.D.
Goldberg Professor of Medicine and Chief, Division of Cardiology, Northwestern University Medical School. Chief, Division of Cardiology, Northwestern Memorial Hospital, Chicago, Illinois
Cardiac Catheterization

HARISIOS BOUDOULAS, M.D.
Professor of Medicine and Pharmacy, Ohio State University College of Medicine. Director, Overstreet Teaching and Research Laboratory (Division of Cardiology), Ohio State University Medical Center, Columbus, Ohio
Renal Disorders and Heart Disease

EUGENE BRAUNWALD, M.D.
Vice President for Academic Programs, Partners HealthCare System; Distinguished Hersey Professor of Medicine, Faculty Dean for Academic Programs at Brigham and Women's Hospital and Massachusetts General Hospital, Harvard Medical School, Boston, Massachusetts
The History; Physical Examination of the Heart and Circulation; Pathophysiology of Heart Failure: Assessment of Cardiac Function; Clinical Aspects of Heart Failure: High-Output Heart Failure; Pulmonary Edema; Management of Heart Failure; Pulmonary Hypertension; Valvular Heart Disease; Coronary Blood Flow and Myocardial Ischemia; Acute Myocardial Infarction; Chronic Coronary Artery Disease; The Cardiomyopathies and Myocarditides; Primary Tumors of the Heart; Traumatic Heart Disease; Hematological-Oncological Disorders and Heart Disease

BRUCE H. BRUNDAGE, M.D.
Professor of Medicine and Radiological Sciences, University of California, Los Angeles, School of Medicine, Los Angeles, California. Chief of Cardiology and Scientific Director, St. John's Cardiovascular Research Center, Harbor-UCLA Medical Center, Torrance, California
Relative Merits of Imaging Techniques

AGUSTIN CASTELLANOS, M.D.
Professor of Medicine, University of Miami School of Medicine. Director of Clinical Electrophysiology, Jackson Memorial Hospital, Miami, Florida
Cardiac Arrest and Sudden Cardiac Death

BERNARD R. CHAITMAN, M.D.
Professor of Medicine, St. Louis University School of Medicine. Chief of Cardiology, St. Louis University Health Sciences Center, St. Louis, Missouri
Exercise Stress Testing

KENNETH R. CHIEN, M.D., Ph.D.
Professor of Medicine and Member, Center for Molecular Genetics, University of California, San Diego, La Jolla, California. Attending Physician, University of California, San Diego, University Hospital, San Diego, California
Principles of Cardiovascular Molecular and Cellular Biology

JONATHAN S. COBLYN, M.D.
Assistant Professor of Medicine, Harvard Medical School. Associate Director, Robert B. Brigham Arthritis Center, Brigham and Women's Hospital, Boston, Massachusetts
Rheumatic Diseases and the Heart

PETER F. COHN, M.D.
Professor of Medicine and Chief, Cardiology Division, State University of New York Health Sciences Center, Stony Brook, New York
Traumatic Heart Disease

WILSON S. COLUCCI, M.D.
Professor of Medicine, Biochemistry and Physiology, Boston University School of Medicine. Associate Chief, Cardiovascular Division, and Director, Cardiomyopathy Program, Boston University Medical Center. Chief, Cardiology Section, Boston Veterans Affairs Medical Center, Boston, Massachusetts
Pathophysiology of Heart Failure; Clinical Aspects of Heart Failure: High-Output Heart Failure; Pulmonary Edema; Primary Tumors of the Heart

ADNAN S. DAJANI, M.D.
Professor of Pediatrics, Wayne State University School of Medicine. Director, Division of Infectious Diseases, Children's Hospital of Michigan, Detroit, Michigan
Rheumatic Fever

CHARLES J. DAVIDSON, M.D.
Associate Professor of Medicine, Northwestern University Medical School. Chief, Cardiac Catheterization Laboratories, Northwestern Memorial Hospital, Chicago, Illinois
Cardiac Catheterization

CHARLES DENNIS, M.D.
Chairman, Department of Cardiology, Deborah Heart and Lung Center, Browns Mills, New Jersey
Rehabilitation of Patients with Coronary Artery Disease

ROMAN W. DeSANCTIS, M.D.
Professor of Medicine, Harvard Medical School. Director of Clinical Cardiology and Physician, Massachusetts General Hospital, Boston, Massachusetts
Diseases of the Aorta

PAMELA S. DOUGLAS, M.D.
Associate Professor of Medicine, Harvard Medical School. Director, Noninvasive Cardiology, Beth Israel Hospital, Boston, Massachusetts
Coronary Artery Disease in Women

KIM A. EAGLE, M.D.
Associate Professor of Internal Medicine, University of Michigan School of Medicine. Director of Clinical Cardiology, University of Michigan Medical Center, Ann Arbor, Michigan
Diseases of the Aorta

URI ELKAYAM, M.D.
Professor of Medicine, Division of Cardiology, University of Southern California School of Medicine. Director, Heart Failure Program, and Director, High Risk Cardiology Perinatal Clinic, Los Angeles, California
Pregnancy and Cardiovascular Disease

JOHN A. FARMER, M.D.
Associate Professor of Medicine, Sections of Atherosclerosis and Cardiology, Baylor College of Medicine. Chief of Cardiology, Ben Taub General Hospital, Houston, Texas
Dyslipidemia and Other Risk Factors for Coronary Artery Disease

HARVEY FEIGENBAUM, M.D.
Distinguished Professor of Medicine, Indiana University School of Medicine. Senior Research Associate, Krannert Institute of Cardiology, Indianapolis, Indiana
Echocardiography

CHARLES FISCH, M.D.
Distinguished Professor Emeritus of Medicine, Indiana University School of Medicine, Indianapolis, Indiana
Electrocardiography

ROBERT F. FISHMAN, M.D.
Assistant Professor of Medicine, Northwestern University Medical School. Attending Physician, Northwestern Memorial Hospital, Chicago, Illinois
Cardiac Catheterization

WILLIAM F. FRIEDMAN, M.D.
J. H. Nicholson Professor of Pediatrics (Cardiology), Department of Pediatrics, and Senior Advisor, Clinical Affairs, to the Provost and Dean, University of California, Los Angeles, School of Medicine, Los Angeles, California
Congenital Heart Disease in Infancy and Childhood; Acquired Heart Disease in Infancy and Childhood

VALENTIN FUSTER, M.D., Ph.D.
Arthur M. and Hilda A. Master Professor of Medicine, Mount Sinai School of Medicine. Director, Cardiovascular Institute. Dean for Academic Affairs and Vice Chairman, Department of Medicine, Mount Sinai Medical Center, New York, New York
Hemostasis, Thrombosis, Fibrinolysis, and Cardiovascular Disease

PETER GANZ, M.D.
Associate Professor of Medicine, Harvard Medical School. Director of Research, Cardiac Catheterization Laboratory, Brigham and Women's Hospital, Boston, Massachusetts
Coronary Blood Flow and Myocardial Ischemia

BERNARD J. GERSH, M.B., D.Phil.
Professor of Medicine and Chief, Division of Cardiology, Georgetown University Medical Center, Washington, D.C.
Chronic Coronary Artery Disease

GARY GERSTENBLITH, M.D.
Professor of Medicine, Johns Hopkins University School of Medicine, Baltimore, Maryland
The Aging Heart: Structure, Function, and Disease

SAMUEL Z. GOLDHABER, M.D.
Associate Professor of Medicine, Harvard Medical School. Physician, Brigham and Women's Hospital, Boston, Massachusetts
Pulmonary Embolism

LEE GOLDMAN, M.D.
Julius Krevans Distinguished Professor and Chairman, Department of Medicine, and Associate Dean for Clinical Affairs, University of California, San Francisco, School of Medicine, San Francisco, California
Cost-Effective Strategies in Cardiology; General Anesthesia and Noncardiac Surgery in Patients with Heart Disease

ANTONIO M. GOTTO, Jr., M.D., D.Phil.
Distinguished Service Professor and Chairman, Department of Medicine, Baylor College of Medicine. Chief, Internal Medicine Service, Methodist Hospital, Houston, Texas
Dyslipidemia and Other Risk Factors for Coronary Artery Disease

ANDREW A. GRACE, Ph.D., M.R.C.P.
Senior Research Fellow, Departments of Medicine and Biochemistry, University of Cambridge, and Director, Cardiac Electrophysiology Service, Papworth Hospital, Cambridge, England. Visiting Scientist, Department of Medicine, University of California, San Diego, La Jolla, California.
Principles of Cardiovascular Molecular and Cellular Biology

WILLIAM GROSSMAN, M.D.
Adjunct Professor of Medicine, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania. Vice President, Clinical Research, Merck and Co., West Point, Pennsylvania
Clinical Aspects of Heart Failure: High-Output Heart Failure; Pulmonary Edema; Pulmonary Hypertension

CHARLES B. HIGGINS, M.D.
Professor and Vice-Chairman, Department of Radiology, University of California, San Francisco, San Francisco, California
Newer Cardiac Imaging Techniques: Magnetic Resonance Imaging and Computed Tomography

ERIC M. ISSELBACHER, M.D.
Instructor in Medicine, Harvard Medical School. Assistant in Medicine, Massachusetts General Hospital, Boston, Massachusetts
Diseases of the Aorta

NORMAN M. KAPLAN, M.D.
Professor of Internal Medicine and Head, Hypertension Division, University of Texas Southwestern Medical Center, Dallas, Texas
Systemic Hypertension: Mechanisms and Diagnosis; Systemic Hypertension: Therapy

WISHWA N. KAPOOR, M.D.
Falk Professor of Medicine, University of Pittsburgh. Chief, Division of Internal Medicine, Presbyterian-University Hospital, Pittsburgh, Pennsylvania
Syncope and Hypotension

ADOLF W. KARCHMER, M.D.
Professor of Medicine, Harvard Medical School. Chief, Division of Infectious Diseases, New England Deaconess Hospital, Boston, Massachusetts
Infective Endocarditis

RALPH A. KELLY, M.D.
Assistant Professor of Medicine, Harvard Medical School. Associate Physician, Division of Cardiology, Department of Medicine, Brigham and Women's Hospital, Boston, Massachusetts
Drugs Used in the Treatment of Heart Failure; Management of Heart Failure

EDWARD G. LAKATTA, M.D.
Professor of Medicine, Johns Hopkins School of Medicine. Professor of Physiology, University of Maryland School of Medicine. Chief, Laboratory of Cardiovascular Science, NIH/NIA/Gerontology Research Center, Baltimore, Maryland
The Aging Heart: Structure, Function, and Disease

THOMAS H. LEE, M.D., M.Sc.
Associate Professor of Medicine, Harvard Medical School and Brigham and Women's Hospital. Medical Director, Partners Community Health Care, Inc., Boston, Massachusetts
Practice Guidelines in Cardiovascular Medicine

CARL V. LEIER, M.D.
James W. Overstreet Professor of Medicine and Pharmacology, Ohio State University College of Medicine. Director, Division of Cardiology, and Director, Cardiac Transplantation Service, Ohio State University Medical Center, Columbus, Ohio
Renal Disorders and Heart Disease

DAVID C. LEVIN, M.D.
Professor of Radiology, Jefferson Medical College. Chairman, Department of Radiology, Thomas Jefferson University Hospital, Philadelphia, Pennsylvania
Radiology of the Heart; Coronary Arteriography

LEONARD S. LILLY, M.D.
Associate Professor of Medicine, Harvard Medical School. Associate Physician, Brigham and Women's Hospital, Boston, Massachusetts
The Heart in Endocrine and Nutritional Disorders

A. MICHAEL LINCOFF, M.D.
Assistant Professor of Medicine, Ohio State University. Director, Experimental Interventional Laboratory, Department of Cardiology, Center for Thrombosis and Vascular Biology, The Cleveland Clinic Foundation, Cleveland, Ohio
Interventional Catheterization Techniques

WILLIAM C. LITTLE, M.D.
Professor of Internal Medicine and Chief of Cardiology, Bowman-Gray School of Medicine of Wake Forest University. Chief of Cardiology and Associate Chief of Professional Services, North Carolina Baptist Hospital, Winston-Salem, North Carolina
Assessment of Cardiac Function

BEVERLY H. LORELL, M.D.
Associate Professor of Medicine, Harvard Medical School. Director, Hemodynamic Research Laboratory, and Associate Director, Cardiac Catheterization Laboratory, Beth Israel Hospital, Boston, Massachusetts
Pericardial Diseases

RICHARD A. MATTHAY, M.D.
Boehringer Ingelheim Professor of Medicine and Associate Director, Pulmonary and Critical Care Section, Department of Internal Medicine, Yale University School of Medicine, New Haven, Connecticut
Cor Pulmonale

ROBERT J. MYERBURG, M.D.
Professor of Medicine and Physiology and Director, Division of Cardiology, University of Miami School of Medicine. Chief of Cardiology, Jackson Memorial Medical Center, Miami, Florida
Cardiac Arrest and Sudden Cardiac Death

LIONEL H. OPIE, M.D., D.Phil., F.R.C.P.
Professor, Department of Medicine, University of Capetown. Director, Hypertension Clinic, Groote Schuur Hospital, Capetown, South Africa
Mechanisms of Cardiac Contraction and Relaxation

JOSEPH K. PERLOFF, M.D.
Streisand/American Heart Association Professor of Medicine and Pediatrics, University of California, Los Angeles, School of Medicine, Division of Cardiology, Departments of Medicine and Pediatrics, UCLA Center for the Health Sciences, Los Angeles, California
Physical Examination of the Heart and Circulation; Congenital Heart Disease in Adults; Neurological Disorders and Heart Disease

MARK G. PERLROTH, M.D.
Professor of Medicine, Division of Cardiovascular Medicine, Stanford University School of Medicine, Falk Cardiovascular Research Center. Professor of Medicine, Stanford University Medical Center and The Lucile Salter Packard Children's Hospital, Stanford, California. Consultant Cardiologist, Palo Alto Veterans Administration Medical Center, Palo Alto, California
Heart and Heart-Lung Transplantation

WILLIAM S. PIERCE, M.D.
Evan Pugh Professor of Surgery, Jane A. Fetter Professor of Surgery, and Chief, Division of Cardiothoracic Surgery, Department of Surgery, Pennsylvania State University College of Medicine, Hershey, Pennsylvania
Assisted Circulation and the Mechanical Heart

REED E. PYERITZ, M.D., Ph.D.
Chair, Department of Human Genetics, and Professor of Human Genetics, Medicine and Pediatrics, and Director, Institute for Medical Genetics, Medical College of Pennsylvania and Hahnemann University, Philadelphia and Pittsburgh, Pennsylvania. Director, Center for Medical Genetics, Allegheny General Hospital, Pittsburgh, Pennsylvania
Genetics and Cardiovascular Disease

BRUCE A. REITZ, M.D.
The Norman E. Shumway Professor and Chairman, Department of Cardiothoracic Surgery, Stanford University School of Medicine. Chief of the Cardiac Surgical Service, Stanford Health Services, Stanford, California. Chief of the Pediatric Cardiac Surgical Service, The Lucile Salter Packard Children's Hospital at Stanford, Palo Alto, California
Heart and Heart-Lung Transplantation

STUART RICH, M.D.
Professor of Medicine, University of Illinois, Chicago. Chief of Cardiology, University of Illinois, Chicago Medical Center, Chicago, Illinois
Pulmonary Hypertension

WAYNE E. RICHENBACHER, M.D.
Associate Professor, Division of Cardiothoracic Surgery, Department of Surgery, University of Iowa, Iowa City, Iowa
Assisted Circulation and the Mechanical Heart

DAVID S. ROSENTHAL, M.D.
Professor of Medicine, Harvard Medical School. Henry K. Oliver Professor of Hygiene, Harvard University. Physician, Brigham and Women's Hospital. Director and Physician, University Health Services, Harvard University, Cambridge, Massachusetts
Hematological-Oncological Disorders and Heart Disease

RUSSELL ROSS, Ph.D.
Professor, Department of Pathology, and Adjunct Professor, Department of Biochemistry, University of Washington School of Medicine, Seattle, Washington
The Pathogenesis of Atherosclerosis

JOHN D. RUTHERFORD, M.B., Ch.B., F.R.A.C.P.
Professor of Medicine, University of Texas, Gail Griffiths Hill Chair of Cardiology. Associate Director, Division of Cardiology, Southwestern Medical Center, Dallas, Texas
Chronic Coronary Artery Disease

HEINRICH R. SCHELBERT, M.D., Ph.D.
Professor of Pharmacology and Radiological Sciences and Vice Chairman, Department of Pharmacology, University of California, Los Angeles, School of Medicine, Los Angeles, California
Relative Merits of Imaging Techniques

FREDERICK J. SCHOEN, M.D., Ph.D.
Professor of Pathology, Harvard Medical School. Director, Cardiac Pathology, and Vice-Chairman, Department of Pathology, Brigham and Women's Hospital, Boston, Massachusetts
Primary Tumors of the Heart

ELLEN W. SEELY, M.D.
Assistant Professor of Medicine, Harvard Medical School. Director of Clinical Research, Endocrine-Hypertension Division, and Director, Ambulatory Clinical Research Center, Brigham and Women's Hospital, Boston, Massachusetts
The Heart in Endocrine and Nutritional Disorders

LAWRENCE N. SHULMAN, M.D.
Assistant Professor of Medicine, Harvard Medical School. Clinical Director, Hematology-Oncology Division, Brigham and Women's Hospital, Boston, Massachusetts
Hematological-Oncological Disorders and Heart Disease

DAVID J. SKORTON, M.D.
Professor of Medicine, College of Medicine, and Professor of Electrical and Computer Engineering, College of Engineering, University of Iowa. Co-Director, Adolescent and Adult Congenital Heart Disease Clinic. Staff Physician, University of Iowa Hospitals and Clinics. Consulting Physician, Department of Veterans Affairs Medical Center. Vice-President for Research, University of Iowa, Iowa City, Iowa
Relative Merits of Imaging Techniques

THOMAS W. SMITH, M.D.
Professor of Medicine, Harvard Medical School. Chief, Cardiovascular Division, and Senior Physician, Brigham and Women's Hospital, Boston, Massachusetts
Drugs Used in the Treatment of Heart Failure; Management of Heart Failure

ROBERT SOUFER, M.D.
Associate Professor of Diagnostic Radiology and Medicine (Cardiovascular Medicine), Yale University School of Medicine. Attending Physician, Internal Medicine, Yale-New Haven Hospital. Director, Positron Emission Tomography Center, Yale University-Veterans Administration PET Center, West Haven, Connecticut
Nuclear Cardiology

ROBERT M. STEINER, M.D.
Professor of Radiology and Medicine, Jefferson Medical College, Thomas Jefferson University Hospital, Philadelphia, Pennsylvania
Radiology of the Heart

LYNNE WARNER STEVENSON, M.D.
Associate Professor of Medicine, Harvard Medical School. Medical Director, Cardiomyopathy and Transplant Center, Brigham and Women's Hospital, Boston, Massachusetts
Management of Heart Failure

ERIC J. TOPOL, M.D.
Professor of Medicine, Cleveland Clinic Health Sciences Center, Ohio State University. Chairman, Department of Cardiology, and Director, Joseph J. Jacobs Center for Thrombosis and Vascular Biology, Cleveland Clinic Foundation, Cleveland, Ohio
Interventional Catheterization Techniques

MARC VERSTRAETE, M.D., Ph.D.
Professor of Medicine and Former Director, Center for Molecular and Vascular Biology, University of Leuven, Leuven, Belgium
Hemostasis, Thrombosis, Fibrinolysis and Cardiovascular Disease

FRANS J. TH. WACKERS, M.D.
Professor of Diagnostic Radiology and Medicine (Cardiology), Yale University School of Medicine. Director, Cardiovascular Nuclear Imaging and Exercise Laboratories, Yale-New Haven Hospital, New Haven, Connecticut
Nuclear Cardiology

HERBERT P. WEIDEMANN, M.D.
Chief, Pulmonary Department, The Cleveland Clinic Foundation, Cleveland, Ohio
Cor Pulmonale

MICHAEL E. WEINBLATT, M.D.
Associate Professor of Medicine, Harvard Medical School. Director of Clinical Rheumatology, Brigham and Women's Hospital, Boston, Massachusetts
Rheumatic Diseases and the Heart

MYRON L. WEISFELDT, M.D.
Samuel Bard Professor of Medicine and Chair, Department of Medicine, Columbia University College of Physicians and Surgeons. Director of the Medical Service and Attending Physician, Presbyterian Hospital, New York, New York
The Aging Heart: Structure, Function, and Disease

GORDON H. WILLIAMS, M.D.
Professor of Medicine, Harvard Medical School. Chief, Endocrine-Hypertension Division, and Director, Clinical Research Center, Brigham and Women's Hospital, Boston, Massachusetts
The Heart in Endocrine and Nutritional Disorders

GERALD L. WOLF, Ph.D., M.D.
Professor of Radiology, Harvard Medical School. Director, Center for Imaging and Pharmaceutical Research, Massachusetts General Hospital, Boston, Massachusetts
Relative Merits of Imaging Techniques

JOSHUA WYNNE, M.D.
Professor of Medicine and Chief, Division of Cardiology, Wayne State University. Chief, Section of Cardiology, Harper Hospital, Detroit Medical Center, Detroit, Michigan
The Cardiomyopathies and Myocarditides

BARRY L. ZARET, M.D.
Robert W. Berliner Professor of Medicine, Professor of Diagnostic Radiology, Chief, Section of Cardiovascular Medicine, and Associate Chair for Clinical Affairs, Department of Internal Medicine, Yale University School of Medicine. Chief of Cardiology, Yale-New Haven Hospital, New Haven, Connecticut
Nuclear Cardiology

DOUGLAS P. ZIPES, M.D.
Distinguished Professor of Medicine, Pharmacology, and Toxicology and Director, Division of Cardiology and Krannert Institute of Cardiology, Indiana University School of Medicine. Attending Physician, University Hospital, Wishard Memorial Hospital, and Roudebush Veterans Administration Hospital, Indianapolis, Indiana
Genesis of Cardiac Arrhythmias: Electrophysiological Considerations; Management of Cardiac Arrhythmias: Pharmacological, Electrical, and Surgical Techniques; Specific Arrhythmias: Diagnosis and Treatment; Cardiac Pacemakers and Antiarrhythmic Devices

PREFACE

As I complete the preparations of this new edition of *Heart Disease,* I am awed by the continued growth and progress in cardiovascular medicine. During my professional lifetime I have been privileged to observe the field's advance to a point at which the safe and accurate diagnosis and the effective treatment of most forms of heart disease is now feasible. While the overall population is aging and the total prevalence of heart disease rising, the age-adjusted mortality rate for cardiovascular disease in the United States has declined by approximately 1 per cent per year for the last 40 years, and this decline appears to be continuing.

The enormous advances in the field in the five years since the publication of the fourth edition have required the most extensive changes yet made in any revision of this text. Despite the need to include an enormous amount of new information, it was possible to retain the basic format of the previous edition of *Heart Disease.* The book is divided into five parts: Part I deals with the examination of the patient in the broadest sense, including clinical findings and the theory and application of modern noninvasive and invasive techniques to elicit information about the heart and circulation. Part II is concerned with the pathophysiology, diagnosis, and treatment of the principal abnormalities of circulatory function, including heart failure, arrhythmias, and abnormalities of arterial pressure. Part III, the longest in the book, consists of descriptions of the principal congenital and acquired diseases affecting the heart, pericardium, aorta, and pulmonary vascular bed in adults and children. Part IV deals with the interfaces between cardiology and broad fields such as genetics, aging, management of the postoperative cardiac patient, and the economics of cardiac care. Part V details the relationship between diseases of other organ systems and the circulation and vice versa.

Twenty-one new chapters—the most for any revision to date—have been added or substituted. Many other important new areas are covered in radically revised chapters.

A number of important areas are covered in this edition: The chapter on Physical Examination prepared with Perloff has been expanded and revised because the intelligent contemporary practice of cardiology requires careful integration of findings obtained from the clinical examination with those from the growing number of diagnostic modalities now available. The chapter on the Relative Merits of Imaging Techniques by Skorton and colleagues provides a rational approach to the intelligent selection among the several techniques now available to image the heart.

A new, and I believe unique, aspect of the fifth edition of *Heart Disease* is Lee's comprehensive chapter on Practice Guidelines in Cardiovascular Medicine. Increasingly, practice guidelines are influencing diagnosis and therapy and are rapidly becoming the basis for reimbursement of health care services. This new chapter provides a summary of the most important guidelines put together by authoritative groups—mostly key committees of the American Heart Association and the American College of Cardiology. In addition to a summary of the guidelines, Lee places them into the perspective of modern patient care. The chapter on Cost-Effective Strategies in Cardiology by Goldman explains how cost-conscious practice need not impair the quality of care.

Also of note is a new chapter on a subject that is attracting a great deal of interest—Coronary Artery Disease in Women—by Douglas, which comple-

ments the chapter on Aging in Cardiac Disease. This pair of chapters deals with two large groups of patients with special needs, problems, and issues, who together constitute an enormous percentage of the total population. Advances in interventional cardiology represent one of the most dramatic developments in the field and they are covered in an excellent new chapter by Lincoff and Topol. Cardiologists increasingly need an understanding of hemostasis, thrombosis, and fibrinolysis in their daily practice. Fuster and Verstraete have teamed up to provide a superb new chapter on this subject.

Because it is now clear that abnormalities of molecular processes may be the basis of many cardiovascular diseases and that genetic influences play critical roles in the development of these abnormalities, three new chapters have been included. Opie describes the basic mechanisms of cardiac contraction and relaxation. Chien and Grace present the impact of cell and molecular biology, while Pyeritz summarizes the genetics of cardiovascular disease. The important role played by genetics in cardiovascular disease is underscored by Figure 49–1, on pages 1652 and 1653, specially prepared for this book by Pyeritz, which shows the chromosomal location of 137 human genes whose mutations have been shown to produce deleterious effects on the cardiovascular system. This field is moving very swiftly indeed; undoubtedly many other genes will be identified and their chromosomal locations determined by the time the sixth edition of *Heart Disease* is published.

An important responsibility of an editor is to establish the boundaries of a book. In approaching this task, I have deliberately taken a broad approach—in the line with this book's subtitle "A Textbook of Cardiovascular Medicine." I believe that modern cardiologists will best serve their patients by being first broadly based physicians and second accomplished technical specialists. Cardiologists must remain the masters—not become the slaves—of the powerful new diagnostic and therapeutic tools now available. They must also understand the enormous influence that heart disease can exert on the function of other organ systems, as well as the equally important effect that disordered function of other organ systems can have on the circulation. Cardiologists must also be able to function effectively as a consultants to generalists, surgeons, and other specialists. The chapter on Pulmonary Embolism, and all of Part V (Heart Disease and Disorders of Other Organ Systems) explore the important interfaces between cardiology and other branches of medicine. The chapter by Antman on the medical management of the patient undergoing cardiac surgery should be helpful to the cardiologist and internist in what is a growing responsibility. Its companion chapter on noncardiac surgery in the patient with heart disease by Goldman provides an approach to an increasing challenge posed to the modern cardiologist and internist.

Considerable revisions have been made in both galley proofs and page proofs to include information about the most recent advances in the field. Particular emphasis has been placed on ensuring a comprehensive and up-to-date bibliography of more than 18,000 pertinent references, including hundreds to publications that appeared in 1996. Many of the 1,436 figures and 444 tables are new to this edition. The fifth edition of *Heart Disease* is approximately 15 per cent longer than the fourth. This has been accomplished with only a modest increase in the number of pages and bulk in the book through a more efficient page layout, the use of somewhat smaller illustrations, and the more liberal use of a special type face.

In order to allow the reader to keep pace with the enormous expansion of cardiovascular knowledge, the fifth edition is supplemented by a number of companion volumes. First, W.B. Saunders has just published the second edition of *Marcus Cardiac Imaging: A Companion to Braunwald's Heart Disease*, edited by Skorton, Schelbert, Wolf and Brundage, which provides an elegant analysis of the most important cardiovascular diagnostic imaging techniques now available. This companion book is especially useful given the profound advances in cardiovascular diagnosis made possible by modern imaging techniques. No area of cardiology has advanced more rapidly than therapeutics, and therefore it seems logical for the second companion to *Heart Disease* to be *Cardiovascular Therapeutics*. The editorial effort was ably led by my col-