BRAUNWALD'S HEART DISEASE

A Texthook of Cardiovascular Medicine

NINTH EDITION

BRAUNWALD 心脏病学

(第9版)

心血管内科学教科书

英文影印版



Robert O. Bonow Douglas L. Mann

Douglas P. Zipes **Peter Libby**



天津出版传媒集团 天津科技翻译出版有限公司



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图书在版编目(CIP)数据

Braunwald心脏病学=Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine: 英文 / (美)波诺 (Bonow, R. O.)等主编. 一影印本. 一天津: 天津科技翻译出版有限公司, 2013.1

心血管内科学教科书

ISBN 978-7-5433-3179-2

I. ①B... Ⅱ. ①波... Ⅲ. ①心脏病学-英文 Ⅳ. ①R541

中国版本图书馆CIP数据核字(2012)第306922号

This edition of Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine (9/E) by Bonow, Mann, Zipes and Libby is published by arrangement with Elsevier Inc.

ISBN-13:978-1-437-70398-6

ISBN-10:1-437-70398-4

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3 Killiney Road, #08-01 Winsland House I, Singapore 239519

Tel:(65)6349-0200 Fax:(65)6733-1817

First Published 2013, 2013年初版

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授权单位: Elsevier (Singapore) Pte Ltd.

出版人:刘庆

出 版: 天津科技翻译出版有限公司

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印 刷:山东鸿杰印务集团有限公司

发 行:全国新华书店

版本记录: 889×1194 16开本 129.5印张 4200千字

2013年1月第1版 2013年1月第1次印刷

定价: 680.00元(上・下卷)

(如发现印装问题,可与出版社调换)



BRAUNWALD'S HEART DISEASE

A Textbook of Cardiovascular Medicine

VOLUME II

NINTH EDITION

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影印版序

在心血管领域,提及Eugene Braunwald这个名字,应该是无人不晓的。他是心脏病学界的泰斗,亦是心脏病学领域的传奇人物! Braunwald教授是一位优秀的心脏病学家、教育家,伟大的研究者。他开创了现代临床心脏病学科,并引领学科临床、科研发展半个世纪。同时他言传身教,著书立说,影响了无数的心脏病学研究学者及临床医生。其主编的《Braunwald心脏病学》,是一本综合的、权威的心血管医学领域的教科书,被称为"所有心血管医生的圣经"!

这部巨著第七版翻译成中文后,被我国心脏病学医生广泛传阅与研读。而如今,随着我国广大医生英语水平的逐渐提高,越来越多的人希望能读到这部心脏病学经典著作原汁原味的英文版本。天津科技翻译出版有限公司了解到读者这一需求,引进出版了这部巨著的影印版本,并且以社会效益为优先考量,以低于原版书一半多的价位,附赠光盘的形式,将其呈现于我国广大读者。

该书自1980年问世以来,已再版修订8次,此次影印的是其最新版本——第9版。全书分为10个部分, 共94章,除了继续保持前几版的风格和传统,内容覆盖心脏病学领域的各个部分,注重介绍疾病预防与 诊治的最新进展之外,还对全书进行了全面的更新。在之前版本基础上新增了9章,而且有24章增加了 新的内容。本版着重阐述了心脏病学最前沿的知识,包括分子成像、血管内超声、心血管再生和组织工程、通过器械检测心衰程度及心衰的器械治疗、房颤的治疗、结构性心脏疾病、Chagasic心脏病、心血 管医学伦理学、临床试验设计和执行,以及许多其他的研究热点。此外本书还对美国心脏病学会心血管 疾病的最新指南进行了总结。

书中各章节均由业界公认的权威学者编写,综合了他们各自最新、最重要的研究成果,涉及分子生物学、遗传学、影像学、介入治疗及药物治疗等。不仅内容全面,论述精辟,而且版式设计合理、图片精美。全书附有约2500幅精美图片和600张表格。为了应对心脏病学领域知识更新的快速节奏,本书紧跟时代步伐,全面总结了心脏病学的基础理论知识、重要的科研结果,以及最新的循证证据,为广大心血管专业医师、内科医师及医学生提供了最权威的指导和最佳的可行性方法。

当前,我国心血管疾病的发病率和死亡率逐年上升,发病年龄提前,心血管疾病已成为影响人们健康的"第一杀手"。作为心血管疾病防治的临床医生,肩负着重大的责任,我们只有与时俱进地不断学习,才能应对更多、更艰难、更复杂的挑战。这部影印版巨著的出版,为我们打开了一扇窗,虽然不见现成的翻译过来的中文文字,但跃过文字转换这一槛,它却可以让我们更近地领略这部经典巨著的风采,更直接地分享这些大家们关于心血管治疗和科学研究的真知灼见!从而提高临床专业知识水平和专业技能,为更多的医生带来帮助,为更多的患者带来福音。

祝愿我国心血管疾病防治取得更大进展!

(P)

Dedication

We are proud to dedicate the ninth edition of *Braunwald's Heart Disease* to its founder, Eugene Braunwald, MD. The first edition of this work, published 30 years ago, established a standard of excellence that is rarely, if ever, achieved in publishing. Dr. Braunwald personally wrote half of the book and expertly edited the rest. He did the same for the next four editions, taking a 6-month sabbatical every 4 to 5 years to accomplish that. For the sixth edition, published in 2001, he invited two of us (PL, DPZ) to share the experience with him, increasing the editors by one (ROB) for the seventh edition. A new editor (DLM) joined for the eighth edition, and Dr. Braunwald no longer directly participated in the day-to-day editing of the print text, while still contributing some of the key chapters. However, he kept his finger on the pulse of the text and for that edition began *twice-weekly* electronic updates. Incorporating the most recent research, reviews, and opinions into the electronic text has continued through this ninth edition, making *Braunwald's Heart Disease* truly a living work and setting it apart from other texts. Dr. Braunwald, through his research, teaching, and mentorship, has shaped much of contemporary cardiovascular medicine, and it is with gratitude and admiration that we dedicate this edition of *his work* to him.

Robert O. Bonow Douglas L. Mann Douglas P. Zipes Peter Libby

Acknowledgments

The editors gratefully acknowledge communication and correspondence from colleagues all over the world who have offered insightful suggestions to improve this text. We particularly wish to acknowledge the following individuals who have provided careful and studious commentary on numerous chapters: Shabnam Madadi, MD, Cardiac Imaging Center, Shahid Rajaei Heart Center, Tehran, Iran; Azin Alizadeh Asl, MD, Tabriz University of Medical Sciences and Madani Heart

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We are also indebted to Dr. Jun-o Deguchi, Dr. Michael Markl, Dr. Vera Rigolin, and Dr. Carol Warnes for the images used on the cover.

Dr. Libby thanks Sara Karwacki for expert editorial assistance.

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Consultant Cardiologist, Chief Academic and Scientific Officer, St. John Providence Health System, Providence Park Heart Institute, Novi, Michigan

Interface Between Renal Disease and Cardiovascular Illness

Darren K. McGuire, MD, MHSc

Associate Professor, Internal Medicine, The University of Texas Southwestern Medical Center at Dallas, Dallas, Texas Diabetes and the Cardiovascular System

Bruce McManus, MD, PhD

Professor of Pathology and Laboratory Medicine, Faculty of Medicine, University of British Columbia; Co-Director, Institute for Heart and Lung Health; Director, NCE CECR Centre of Excellence for Prevention of Organ Failure (PROOF Centre); Director, UBC James Hogg Research Centre, St. Paul's Hospital, University of British Columbia, Vancouver, British Columbia, Canada Primary Tumors of the Heart

Mandeep R. Mehra, MBBS

Dr. Herbert Berger Professor of Medicine and Head of Cardiology; Assistant Dean for Clinical Services, University of Maryland School of Medicine, Baltimore, Maryland

Assisted Circulation in the Treatment of Heart Failure

John M. Miller, MD

Professor of Medicine, Krannert Institute of Cardiology, Indiana
University School of Medicine; Director, Clinical Cardiac
Electrophysiology, Clarian Health Partners, Indianapolis, Indiana
Diagnosis of Cardiac Arrhythmias; Guidelines: Ambulatory
Electrocardiographic and Electrophysiologic Testing; Therapy for
Cardiac Arrhythmias

David M. Mirvis, MD

Professor Emeritus, University of Tennessee Health Science Center, Memphis, Tennessee

Electrocardiography; Guidelines: Electrocardiography

Fred Morady, MD

McKay Professor of Cardiovascular Disease; Professor of Medicine, University of Michigan Health System, CVC Cardiovascular Medicine, Ann Arbor, Michigan

Atrial Fibrillation: Clinical Features, Mechanisms, and Management; Guidelines: Atrial Fibrillation

David A. Morrow, MD, MPH

Associate Professor of Medicine, Harvard Medical School; Senior Investigator, TIMI Study Group; Director, Samuel A. Levine Cardiac Unit, Brigham and Women's Hospital, Boston, Massachusetts STSegment Elevation Myocardial Infarction: Management; Stable Ischemic Heart Disease; Guidelines: Chronic Stable Angina

Dariush Mozaffarian, MD, DrPH

Associate Professor, Division of Cardiovascular Medicine, Brigham and Women's Hospital and Harvard Medical School; Departments of Epidemiology and Nutrition, Harvard School of Public Health, Boston, Massachusetts

Nutrition and Cardiovascular Disease

Paul S. Mueller, MD, MPH

Associate Professor of Medicine, Mayo Clinic, Rochester, Minnesota Ethics in Cardiovascular Medicine

Robert J. Myerburg, MD

Professor of Medicine and Physiology, University of Miami Miller School of Medicine, Miami, Florida Cardiac Arrest and Sudden Cardiac Death

Elizabeth G. Nabel, MD

Professor of Medicine, Harvard Medical School; President, Brigham and Women's Hospital, Boston, Massachusetts

Principles of Cardiovascular Molecular Biology and Genetics

L. Kristin Newby, MD, MHS

Associate Professor of Medicine, Division of Cardiovascular Medicine, Duke University Medical Center, Durham, North Carolina Cardiovascular Disease in Women

Patrick T. O'Gara, MD

Professor of Medicine, Harvard Medical School; Director, Clinical Cardiology, Cardiovascular Division, Brigham and Women's Hospital, Boston, Massachusetts The History and Physical Examination: An Evidence-Based Approach

Jae K. Oh, MD

Professor of Medicine, Mayo Clinic College of Medicine, Consultant in Cardiovascular Diseases; Co-Director of the Echocardiography Laboratory, Mayo Clinic, Rochester, Minnesota Echocardiography

Jeffrey Olgin, MD

Ernest Gallo-Kanu Chatterjee Distinguished Professor; Chief, Division of Cardiology; Chief, Cardiac Electrophysiology, University of California, San Francisco, California

Specific Arrhythmias: Diagnosis and Treatment

Lionel H. Opie, MD, DPhil, DSc

Professor of Medicine and Director Emeritus, Hatter Institute for Cardiovascular Research Institute, University of Cape Town, Cape Town, South Africa

Mechanisms of Cardiac Contraction and Relaxation

Catherine M. Otto, MD

Professor of Medicine, J. Ward Kennedy-Hamilton Endowed Chair in Cardiology; Director, Training Programs in Cardiovascular Disease, University of Washington School of Medicine; Associate Director, Echocardiography Laboratory; Co-Director, Adult Congenital Heart Disease Clinic, University of Washington Medical Center, Seattle, Washington

Valvular Heart Disease; Guidelines: Management of Valvular Heart Disease

Jeffrey J. Popma, MD

Associate Professor of Medicine, Harvard Medical School; Director, Interventional Cardiology Clinical Services, Beth Israel Deaconess Medical Center, Boston, Massachusetts

Coronary Arteriography; Guidelines: Coronary Arteriography; Percutaneous Coronary Intervention; Guidelines: Percutaneous Coronary Intervention

Reed E. Pyeritz, MD, PhD

Professor of Medicine and Genetics; Vice-chair for Academic Affairs, Department of Medicine, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania Inherited Causes of Cardiovascular Disease

B. Soma Raju, MD

Professor & Head, Department of Cardiology, Hyderabad, Andhra Pradesh, India Rheumatic Fever

José A.F. Ramires, MD, PhD

Head Professor of Cardiology and Director of Clinical Cardiology, Division of The Heart Institute (INCOR), University of São Paulo Medical School; Director of Health System and President of Professors Evaluation Committee, University of São Paulo, São Paulo, Brazil Chagas' Disease

Margaret M. Redfield, MD

Professor of Medicine, Division of Cardiovascular Medicine, Mayo Clinic, Rochester, Minnesota Heart Failure with Normal Ejection Fraction

Andrew N. Redington, MD

Professor and Head, Division of Cardiology, Paediatrics, Hospital for Sick Children, University of Toronto, Toronto, Canada Congenital Heart Disease

Stuart Rich, MD

Professor of Medicine, Section of Cardiology, Center for Pulmonary Hypertension, University of Chicago, Chicago, Illinois Pulmonary Hypertension

Paul M Ridker, MD, MPH

Eugene Braunwald Professor of Medicine, Harvard Medical School; Director, Center for Cardiovascular Disease Prevention, Brigham and Women's Hospital, Boston, Massachusetts Risk Markers for Atherothrombotic Disease; Primary and Secondary Prevention of Coronary Heart Disease

Dan M. Roden, MD

Professor of Medicine and Pharmacology; Director, Oates Institute for Experimental Therapeutics; Assistant Vice-Chancellor for Personalized Medicine, Vanderbilt University School of Medicine, Nashville, Tennessee *Principles of Drug Therapy*

Michael Rubart, MD

Assistant Professor of Pediatrics, Indiana University School of Medicine, Indianapolis, Indiana Genesis of Cardiac Arrhythmias: Electrophysiologic Considerations

Marc S. Sabatine, MD, MPH

Associate Professor of Medicine, Harvard Medical School; Vice Chair, TIMI Study Group; Associate Physician, Division of Cardiovascular Medicine, Brigham and Women's Hospital, Boston, Massachusetts Approach to the Patient with Chest Pain

Luis A. Sanchez, MD

Professor of Surgery and Radiology, Section of Vascular Surgery,
Department of Surgery, Washington University School of Medicine,
St. Louis, Missouri
Diseases of the Aorta

Janice B. Schwartz, MD

Clinical Professor of Medicine and Bioengineering and Therapeutic Sciences, University of California, San Francisco; Director, Research, Jewish Home of San Francisco, San Francisco, California Cardiovascular Disease in the Elderly

Christine E. Seidman, MD

Thomas W.Smith Professor of Medicine and Genetics, Department of Medicine and Genetics, Brigham & Women's Hospital, Harvard Medical School, Howard Hughes Medical Institute, Boston, Massachusetts

Inherited Causes of Cardiovascular Disease

J. G. Seidman, PhD

Henrietta B. and Frederick H. Bugher Professor of Genetics, Department of Genetics, Harvard Medical School, Boston, Massachusetts Inherited Causes of Cardiovascular Disease

Dhun H. Sethna, MD

Staff Cardiologist, Carilion Clinic, Christiansburg, Virginia Medical Management of the Patient Undergoing Cardiac Surgery

Jeffrey F. Smallhorn, MBBS, FRACP, FRCP(C)

Professor of Pediatrics; Program Director, Pediatric Cardiology, Department of Pediatrics, University of Alberta, Edmonton, Alberta Congenital Heart Disease

Virend K. Somers, MD, PhD

Professor of Medicine, Division of Cardiovascular Diseases, Mayo Clinic College of Medicine, Rochester, Minnesota Sleep Apnea and Cardiovascular Disease, Cardiovascular Manifestations of Autonomic Disorders

Andrei C. Sposito

Associate Professor of Cardiology, University of Campinas; Past Director of The Heart Institute (INCOR), Brasilia, São Paulo, Brazil Chagas' Disease

Charles D. Swerdlow, MD

Clinical Professor of Medicine, David Geffen School of Medicine at UCLA; Cedars-Sinai Heart Institute, Los Angeles, California Pacemakers and Implantable Cardioverter-Defibrillators; Guidelines: Cardiac Pacemakers and Cardioverter-Defibrillators

Jean-Claude Tardif, MD

Professor of Medicine, University of Montreal; Director, Montreal Heart Institute Research Center; Endowed Research Chair in Atherosclerosis, Montreal Heart Institute, Université de Montréal, Montreal, Canada Intravascular Ultrasound Imaging

Allen J. Taylor, MD

Professor of Medicine, Georgetown University; Director, Advanced Cardiovascular Imaging, Cardiology Section, Washington Hospital Center and Medstar Health Cardiovascular Research Institute, Washington, DC

Cardiac Computed Tomography; Appropriate Use Criteria: Cardiac Computed Tomography

David J. Tester, BS

Senior Research Technologist II-Supervisor, Mayo Clinic, Windland Smith Rice Sudden Death Genomics Laboratory, Rochester, Minnesota

Genetics of Cardiac Arrhythmias

Judith Therrien, MD

Associate Professor of Medicine, Department of Cardiology, McGill University, Montreal, Quebec, Canada Congenital Heart Disease

Paul D. Thompson, MD

Professor of Medicine, University of Connecticut, Farmington, Connecticut; Director, Cardiology, Hartford Hospital, Hartford, Connecticut

Exercise-Based, Comprehensive Cardiac Rehabilitation

Robert W. Thompson, MD

Professor of Surgery, Division of General Surgery, Vascular Surgery Section, Radiology, and Cell Biology and Physiology, Washington University, St. Louis, Missouri Diseases of the Aorta

Marc D. Tischler, MD

Associate Professor of Medicine, University of Vermont College of Medicine; Director, Cardiac Ultrasound Laboratory; Co-Director, Cardiac Magnetic Resonance Unit, Department of Internal Medicine, Burlington, Vermont Pericardial Diseases

Peter I. Tsai, MD

Assistant Professor, Division of Cardiothoracic Surgery, Michael E. DeBakey Department of Surgery, Ben Taub General Hospital, Baylor College of Medicine, Houston, Texas *Traumatic Heart Disease*

Zoltan G. Turi, MD

Professor of Medicine, Robert Wood Johnson Medical School; Director, Section of Vascular Medicine; Director, Cooper Structural Heart Disease Program, Cooper University Hospital, Camden, New Jersey

Rheumatic Fever

James E. Udelson, MD

Professor of Medicine, Department of Medicine; Chief, Division of Cardiology, The Cardiovascular Center, Tufts Medical Center and Tufts University School of Medicine, Boston, Massachusetts Nuclear Cardiology, Appropriate Use Criteria: Nuclear Cardiology

Viola Vaccarino, MD, PhD

Professor and Chair, Department of Epidemiology, Emory University Rollins School of Public Health; Professor, Department of Medicine, Division of Cardiology, Emory University School of Medicine, Atlanta, Georgia

Psychiatric and Behavioral Aspects of Cardiovascular Disease

Ronald G. Victor, MD

Burns and Allen Professor of Medicine; Associate Director, Clinical Research; Director, Hypertension Center, The Heart Institute, Cedars-Sinai Medical Center, Los Angeles, California Systemic Hypertension: Mechanisms and Diagnosis

Alexandra Villa-Forte, MD, MPH

Center for Vasculitis Care and Research, Department of Rheumatic and Immunologic Diseases, Cleveland Clinic, Cleveland, Ohio Rheumatic Diseases and the Cardiovascular System

Matthew J. Wall, Jr., MD

Professor, Michael E. DeBakey Department of Surgery, Baylor College of Medicine; Deputy Chief of Surgery, Ben Taub General Hospital, Houston, Texas

Traumatic Heart Disease

Carole A. Warnes, MD, FRCP

Professor of Medicine, Mayo Clinic College of Medicine; Consultant, Division of Cardiovascular Diseases, Internal Medicine and Pediatric Cardiology, Mayo Clinic College of Medicine, Rochester, Minnesota

Pregnancy and Heart Disease; Guidelines: Pregnancy and Heart Disease

Gary D. Webb, MD

Professor, University of Cincinnati College of Medicine; Director, Cincinnati Adolescent and Adult Congenital Heart Center, Cincinnati Children's Hospital Heart Institute, Cincinnati, Ohio Congenital Heart Disease

John G. Webb, MD

MacLeod Professor of Heart Valve Intervention, University of British Columbia; Director Cardiac Catheterization, St. Paul's Hospital, Vancouver, Canada

Percutaneous Therapies for Structural Heart Disease in Adults

Ralph Weissleder, MD, PhD

Professor, Harvard Medical School; Center for Systems Biology and Department of Radiology, Massachusetts General Hospital, Boston, Massachusetts

Molecular Imaging in Cardiovascular Disease

Jeffrey I. Weitz, MD, FRCP(C)

Professor of Medicine & Biochemistry, McMaster University; HSFO/J.F. Mustard Chair in Cardiovascular Research; Canada Research Chair (Tier 1) in Thrombosis; Executive Director, Thrombosis and Atherosclerosis Research Institute, Hamilton General Hospital Campus, Hamilton, Ontario, Canada Hemostasis, Thrombosis, Fibrinolysis, and Cardiovascular Disease

Christopher J. White, MD

Professor of Medicine; Chairman, Department of Cardiology, Ochsner Clinic Foundation, New Orleans, Louisiana

Endovascular Treatment of Noncoronary Obstructive Vascular

Disease

Stephen D. Wiviott, MD

Instructor of Medicine, Harvard Medical School; Investigator, TIMI Study Group; Associate Physician, Division of Cardiology, Brigham and Women's Hospital, Boston, Massachusetts Guidelines: Management of Patients with ST-Segment Elevation Myocardial Infarction

Clyde W. Yancy, MD

Professor of Medicine; Chief, Division of Cardiology, Northwestern University Feinberg School of Medicine, Chicago, Illinois Heart Disease in Varied Populations

Andreas M. Zeiher, MD

Professor of Cardiology; Chair, Department of Medicine, University of Frankfurt, Frankfurt, Germany

Pharmacology, and Toxicology; Director Emeritus, Division of

Distinguished Professor; Professor Emeritus of Medicine,

Emerging Therapies and Strategies in the Treatment of Heart Failure

Douglas P. Zipes, MD

Cardiology and the Krannert Institute of Cardiology, Indiana
University School of Medicine, Indianapolis, Indiana
Genesis of Cardiac Arrhythmias: Electrophysiologic Considerations;
Diagnosis of Cardiac Arrhythmias; Guidelines: Ambulatory
Electrocardiographic and Electrophysiologic Testing; Therapy for
Cardiac Arrhythmias; Pacemakers and Implantable CardioverterDefibrillators; Guidelines: Cardiac Pacemakers and CardioverterDefibrillators; Specific Arrhythmias: Diagnosis and Treatment;
Atrial Fibrillation: Clinical Features, Mechanisms, and
Management; Guidelines: Atrial Fibrillation; Hypotension and
Syncope; Cardiovascular Disease in the Elderty; Neurologic
Disorders and Cardiovascular Disease