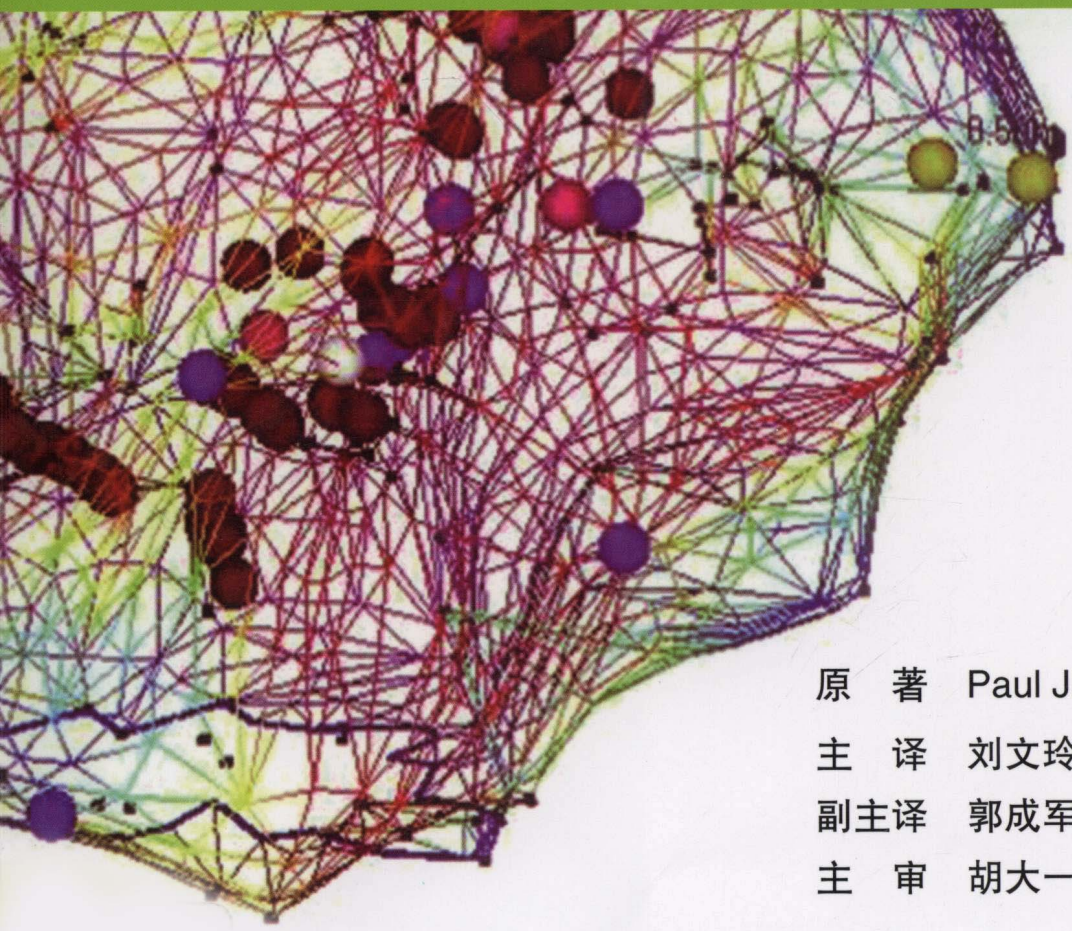
室性心律失常与心脏性猝死

Ventricular Arrhythmias and Sudden Cardiac Death



原　著　Paul J. Wang等

主　译　刘文玲

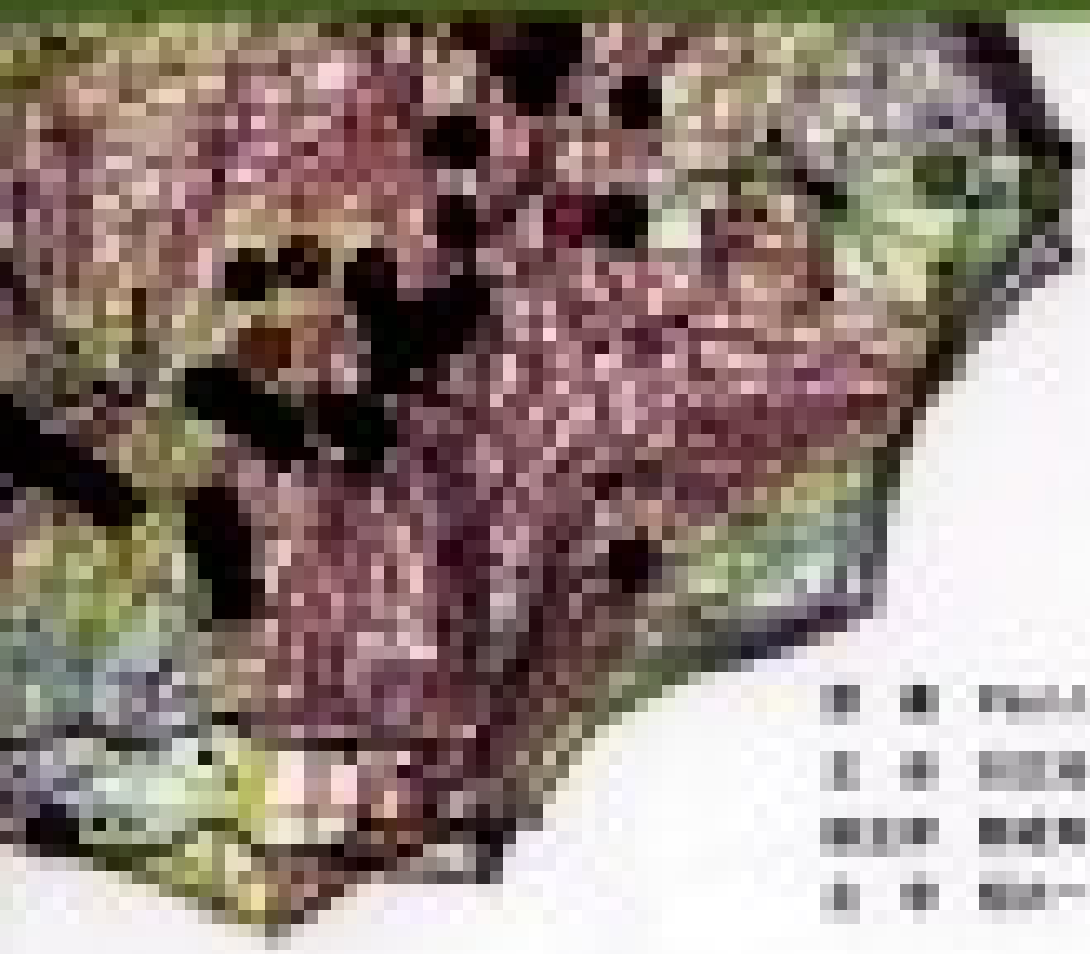
副主译　郭成军

主　审　胡大一

人民卫生出版社

特发性心律失常与心脏性猝死

Idiopathic Arrhythmias and Sudden Cardiac Death



室性心律失常与心脏性猝死

Ventricular Arrhythmias and Sudden Cardiac Death

原　著　Paul J. Wang　Amin Al-Ahmad
　　Henry H. Hsia　Paul C. Zei
主　译　刘文玲
副主译　郭成军
主　审　胡大一
译　者　刘　杰　车文良　马庆春
　　谢文丽　白书玲　崔　建
　　傅媛媛　马占锋　李建辉

人民卫生出版社

图书在版编目（CIP）数据

室性心律失常与心脏性猝死/（美）王（Wang，P. J.）主编；刘文玲译. —北京：人民卫生出版社，2010. 9
ISBN 978-7-117-13210-7

Ⅰ. ①室… Ⅱ. ①王… ②刘… Ⅲ. ①心律失常-诊疗 ②心脏病-猝死-防治 Ⅳ. ①R541

中国版本图书馆 CIP 数据核字（2010）第 134716 号

门户网：www. pmph. com	出版物查询、网上书店
卫人网：www. ipmph. com	护士、医师、药师、中医师、卫生资格考试培训

图字：01-2010-1879

室性心律失常与心脏性猝死

主　　译： 刘文玲
出版发行： 人民卫生出版社（中继线 010-59780011）
地　　址： 北京市朝阳区潘家园南里 19 号
邮　　编： 100021
E - mail： pmph @ pmph. com
购书热线： 010-67605754　010-65264830
　　010-59787586　010-59787592
印　　刷： 尚艺印装有限公司
经　　销： 新华书店
开　　本： 787×1092　1/16　**印张：** 20　**插页：** 14　**字数：** 486 千字
版　　次： 2010 年 9 月第 1 版　2010 年 9 月第 1 版第 1 次印刷
标准书号： ISBN 978-7-117-13210-7/R · 13211
定　　价： 64. 00 元

打击盗版举报电话：010-59787491　E-mail：WQ @ pmph. com
（凡属印装质量问题请与本社销售中心联系退换）

译者序

近几十年来，对室性心律失常的认识有了巨大进展，包括心律失常的机制、诱发因素和影响因素等。心律失常的治疗方面的进展主要在器械治疗方面，如射频消融、ICDs 和 AEDs 等，抗心律失常药物进展相对缓慢。

Hein J.Wellens 组织心律失常及相关领域的专家将积累的 40 年的巨量资料整理成书，包括了室性心律失常在机制、病因学、流行病学、危险分层和处理等方面的进展。使心血管病医生在处理室性心律失常方面能够全面了解相关知识，包括如何选择适合导管消融的患者，何时植入 ICD，以及应该采取怎样的措施减少院外猝死等，内容翔实、先进，反映了当代心律失常治疗的水平。因此，我们进行了翻译，相信本书的中文版会给中国的心血管病医生带来帮助。

本书受 973 计划 2007CB512103 和首都医学发展科研基金 2009-2031 支持。

翻译中可能有不妥甚至错误之处，敬请读者指正。

刘文玲

2010 年 3 月

前 言

40年前，开始使用心内刺激和激动研究分析心律失常时，谁也不能预料，此后几年我们在理解和处理室性心律失常和猝死方面将会取得的进步。

从那时起积累的巨量信息使我们对这些不幸经常发生的、威胁生命的心律失常在机制、病因学、流行病学、危险分层和处理等方面取得了目前的进展。

呈现这些知识并分析各方面之间的关系，最好的方式是把它们整理成书。

我们生活在信息迅速传播的网络时代。 然而，管状视野是这一媒介的危险之一：只寻找所在领域新鲜事物的专科医生可能因为网络的这些内在危险而再也看不到完整的画面。

因此，该书因其涵盖的内容和出版时机而必然受到读者青睐。 编者将心脏病学医生在恰当处理室性心律失常方面应该了解的知识进行了精心、全面的概述，聚集成书。 读者通过阅读这些深入的探讨，将会发现如何选择适合导管消融的患者，何时植入ICD，以及应该采取怎样的措施减少院外猝死。

Hein J. Wellens

编者名单

Amin Al-Ahmad, MD
Cardiac Arrhythmia Service
Stanford University Medical Center
Stanford, CA
USA

Charles Antzelevitch, PhD
Masonic Medical Research Laboratory
Utica, NY
USA

Nitish Badhwar, MBBS, FACC
Section of Cardiac Electrophysiology
UCSF, Division of Cardiology
University of California
San Francisco, CA
USA

Marci S. Bailey, RN
Research Coordinator
Washington University School of Medicine
St. Louis, MO
USA

J. Thomas Bigger, MD
Columbia University College of Physicians and Surgeons
New York, NY
USA

J. David Burkhardt
Cardiac Pacing and Electrophysiology
Department of Cardiovascular Medicine
Cleveland Clinic Foundation
Cleveland, OH
USA

Hugh Calkins, MD
Professor of Medicine
Director of the Arrhythmia Service
Director of the Electrophysiology Laboratory
Director of the Johns Hopkins ARVD
Program Johns Hopkins Medical Institutions
Baltimore, MD
USA

David J. Callans, MD
University of Pennsylvania Health System
Philadelphia, PA
USA

Lan S. Chen, MD
The Department of Neurology
Indiana University School of Medicine
Indianapolis, Indiana
USA

Peng-Sheng Chen, MD
The Krannert Institute of Cardiology
Division of Cardiology
Department of Medicine
Indiana University School of Medicine
Indianapolis, IN
USA

Ralph J. Damiano, Jr. MD
Chief of Cardiothoracic Surgery
John Shoenberg Professor of Surgery
Washington University School of Medicine
St. Louis, MO
USA

Jacques MT de Bakker, PhD
Head, Department of Experimental Cardiology Academic Medical Center; Amsterdam, The Netherlands
The Center of Heart Failure Research, Department of Experimental Cardiology, Academic Medical Center, Amsterdam, The Netherlands
The Heart Lung Center, University Medical Center Utrecht, The Netherlands
The Department of Medical Physiology, University Medical Center Utrecht, The Netherlands
The Interuniversity Cardiology Institute of the Netherlands, Utrecht
The Netherlands

Derek J. Dosdall, PhD
University of Alabama at Birmingham
Department of Biomedical Engineering
Birmingham, AL
USA

N.A. Mark Estes III, MD
Professor of Medicine
Director, Cardiac Arrhythmia Center
Tufts University School of Medicine
Boston, MA
USA

Ilan Goldenberg, MD
The Cardiology Division
Department of Medicine
University of Rochester Medical Center
Rochester, NY
USA

Jeffrey J. Goldberger, MD
The Division of Cardiology
Department of Medicine
Feinberg School of Medicine
Northwestern University
Chicago, IL
USA

Anurag Gupta, MD
Stanford University Medical Center
Stanford, CA
USA

Mark C. Haigney, MD
Uniformed Services University
Bethesda, MD
USA

Munther Homoud, MD
Tufts-New England Medical Center
Boston, MA
USA

Henry H. Hsia, MD
Cardiac Arrhythmia Service
Stanford University Medical Center
Stanford, CA
USA

Jian Huang, MD, PhD
University of Alabama at Birmingham
Departments of Medicine
Birmingham, AL
USA

Mathew D. Hutchinson, MD
University of Pennsylvania Health System
Philadelphia, PA
USA

Raymond E. Ideker, MD, PhD
University of Alabama at Birmingham
Departments of Physiology and Biomedical Engineering Medicine
Birmingham, AL
USA

Rahul Jain, MD
Division of Cardiology
The Johns Hopkins University School of Medicine
MD
USA

Robert E. Kleiger, MD
Washington University School of Medicine
St. Louis, MO
USA

Keane K. Lee, MD
Stanford University Medical Center
Stanford, CA
USA

Mark S. Link, MD
Tufts-New England Medical Center
Boston, MA
USA

Kevin J. Makati, MD
Tufts-New England Medical Center
Boston, MA
USA

Barry J. Maron, MD
Hypertrophic Cardiomyopathy Center
Minneapolis Heart Institute Foundation
MN
USA

Pirooz S. Mofrad, MD
Stanford University Medical Center
Standford, CA
USA

Robert J. Moraca, MD
Fellow in Cardiothoracic Surgery
Washington University School of Medicine
St. Louis, MO
USA

Arthur J. Moss, MD
Professor of Medicine (Cardiology)
Director, Heart Research Follow-Up Program
University of Rochester Medical Center
Rochester, NY
USA

Robert J. Myerburg, MD, FACC
Professor of Medicine and Physiology
Chief, Division of Cardiology
University of Miami
Miami, FL
USA

Andrea Natale, MD
Section Head, Electrophysiology and Pacing
Director of the Electrophysiology Laboratories
The Cleveland Clinic Foundation
Cleveland, OH
USA

Jeffrey Olgin, MD
Section of Cardiac Electrophysiology
Division of Cardiology
University of California, San Francisco
San Francisco, CA
USA

Marco Perez, MD
Stanford University
Stanford, CA
USA

Karen P. Phillips, MB, BS (Hons), FRACP
Clinical Cardiac Electrophysiology Fellow
Department of Cardiovascular Medicine
Cleveland Clinic Foundation
Cleveland, OH
USA

Walid I. Saliba, MD
Director, Electrophysiology Laboratories
Section of Cardiac Pacing and Electrophysiology
Department of Cardiovascular Medicine
Cleveland Clinic Foundation
Cleveland, OH
USA

Mauricio Scanavacca, MD
Heart Institute
University of Sao Paulo Medical School
Sao Paulo
Brasil

Melvin M. Scheinman, MD, FACC
Section of Cardiac Electrophysiology
University of California, San Francisco
San Francisco, CA
USA

Robert A. Schweikert, MD
Director, EP Clinical Operations
Section of Cardiac Electrophysiology and Pacing
Department of Cardiovascular Medicine
Cleveland Clinic Foundation
Cleveland, OH
USA

Kyoko Soejima, MD
Assistant Professor
Division of Cardiology
Keio University
Tokyo
Japan

Eduardo Sosa, MD
Heart Institute
University of Sao Paulo Medical School
Sao Paulo
Brazil

Moshe S, Swissa, MD
Division of Cardiology
Department of Medicine
Kaplan Medical Center, Rehovot
The Hebrew University, Jerusalem
Israel

William G. Stevenson, MD
Director, Clinical, Cardiac Electrophysiology, Program
Cardiovascular Division
Brigham and Women's Hospital
Boston, MA
USA

Usha Tedrow, MD
Associate Director, Clinical Cardiac, Electrophysiology, Program
Cardiovascular Division
Brigham and Women's Hospital
Boston, MA
USA

Zian H. Tseng, MD
Section of Cardiac Electrophysiology
Division of Cardiology
University of California, San Francisco
San Francisco, CA
USA

George F. Van Hare, MD
Professor of Pediatrics, Clinical Professor of Pediatrics; and Director, Pediatric Arrhythmia Center
Stanford University School of Medicine and UCSF
Palo Alto, CA
USa

Harold VM van Rijen
The Department of Medical Physiology
University Medical Center Utrecht
The Netherlands

Paul J. Wang, MD
Stanford University Medical Center
Stanford, CA
USA

Oussama Wazni, MD
Associate Director
Cleveland Clinic Center for Cardiovascular Research
Cleveland Clinic
Cleveland, OH
USA

Jonathan Weinstock, MD
Tufts-New England Medical Center
Boston, MA
USA

Bruce L. Wilkoff, MD
Professor of Medicine and Director, Cardiac Pacing and Tachyarrhythmia Devices
Cleveland Clinic Foundation
Cleveland, OH
USA

Wojciech Zareba, MD, PhD
The Cardiology Division, Department of Medicine
University of Rochester Medical Center
Rochester, NY
USA

Paul C. Zei, MD, PhD
Cardiac Arrhythmia Service
Stanford University Medical Center
Stanford, CA
USA

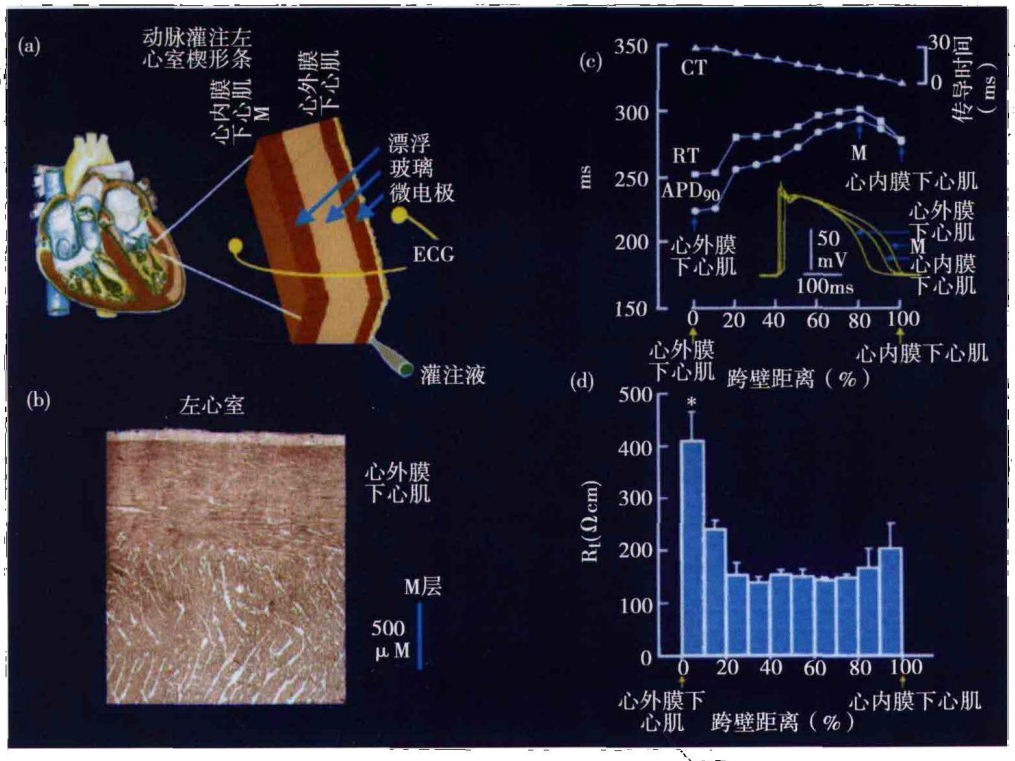


图 1.2　左心室壁的动作电位时程和组织电阻力的跨壁分布

(a)冠脉灌注的犬左心室楔形条示意图。使用 3 个漂浮微电极从心外膜区(Epi)、M 区和心内膜区(Endo)同步记录跨膜动作电位。在同样的跨壁轴向上记录横跨楔形条的心电图，表示整个楔形的电场变化。(b)靠近心外膜边界处左心室壁的切面组织学。细胞排列方向显著变化的区域与(d)中显示的组织高电阻区域和(c)中显示的 APD 显著变化的区域相吻合。(c)犬左心室壁楔形条传导时间(CT)、APD_{90} 和复极时间(RT＝APD_{90}＋CT)的分布，起搏周长为 2000ms。在心外膜和心外膜下层之间存在 APD_{90} 的显著变化。(d)犬左心室壁组织电阻(R_t)的分布。0%和 100%分别表示心外膜和心内膜的跨壁距离。* 表示心外膜与中层的 R_t 相比 $P<0.01$。在心外膜下深层与心外膜之间组织电阻的增加最显著。短竖线表示标准误

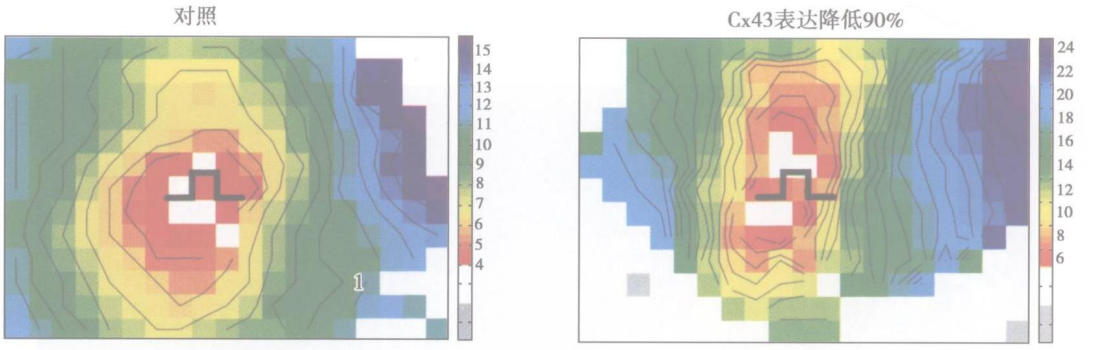


图 2.5 在 Langendorff 灌注的小鼠心脏，Cx43 表达降低 90%（右图）对右心室心外膜激动的影响。集中于等时线表明传导速度减慢。数字以 ms 计，并表示相同的时间间隔内激动的面积

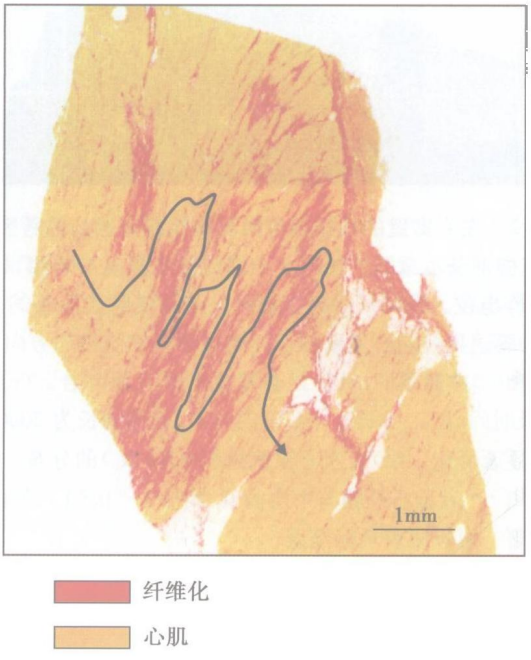


图 2.6 在心肌纤维和纤维化条带相交织的梗死区内，激动必须从顶部向底部穿行的 Z 字形路线

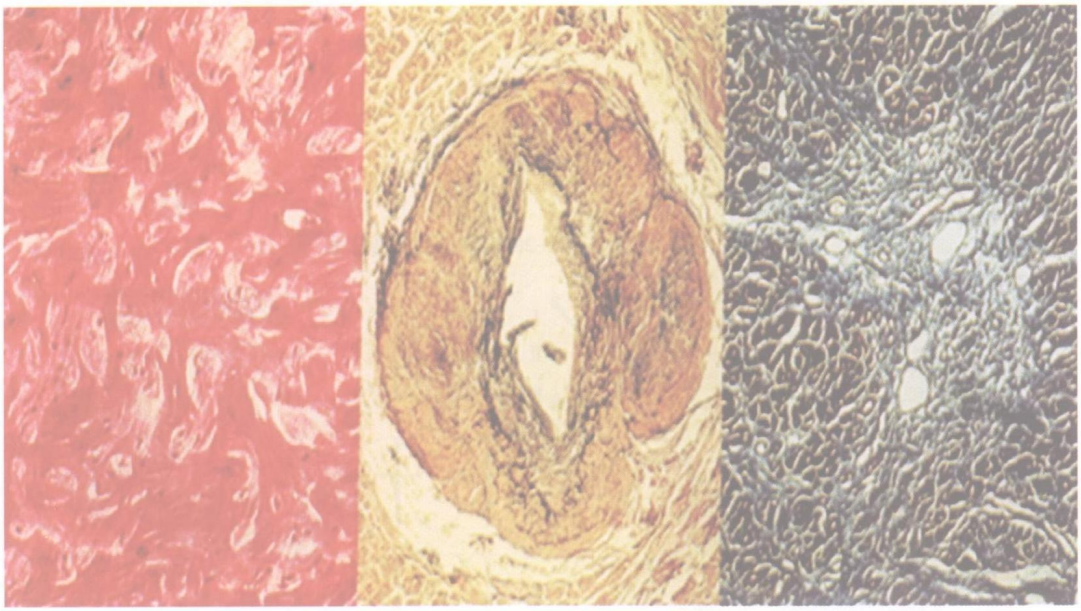


图 6.4 肥厚型心肌病的致心律失常基质

左:细胞排列紊乱的组织结构。中:引起无症状心肌缺血的异常壁内冠状动脉。右:心肌瘢痕:缺血和细胞死亡后的修复过程(小的心肌病变的后果显示于中图)

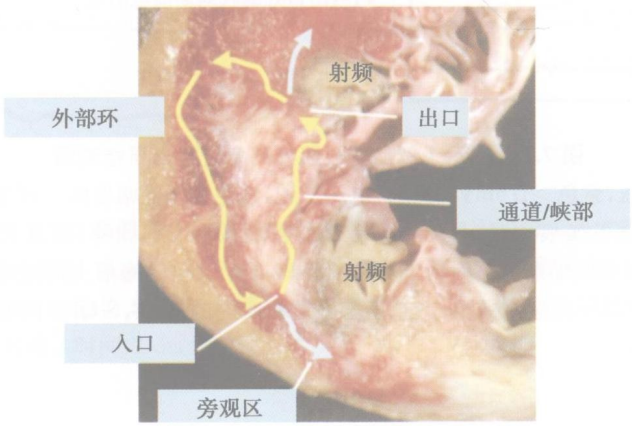


图 7.1 1 例有不能控制的 VT、消融失败的患者的梗死瘢痕断面图

黄色箭头表示理论上的折返环路径。白色的纤维化区域造成了传导阻滞。在梗死区的上部边缘处存在一个带有出口的长的潜在峡部。行进着的波阵面从出口传出后,沿梗死边缘处的组织传播(外部环)。图中也标出了环路以外的旁观区。浅色区和出血区为未成功的射频消融损伤

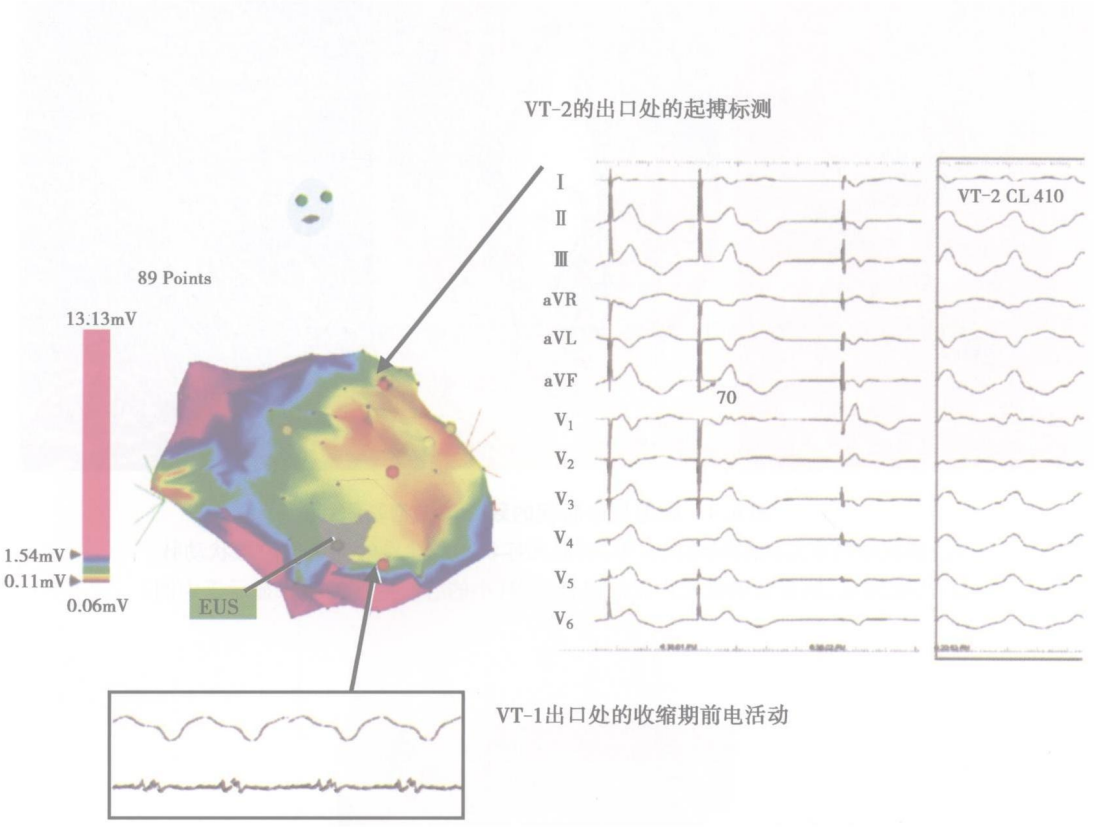


图 7.3 图示 1 例前壁心肌梗死患者的电压标测图

颜色表示双极峰-峰电压，紫色＞1.5mV，与正常电压一致，红色为最低幅度区。该患者有两种形态的 VT。VT-1 因出口位于下间隔的瘢痕边缘，与无电兴奋性的瘢痕区（EUS）相邻，而具有向上的额面电轴。在 VT 期间，在该部位记录到收缩期前电活动（下图）。VT-2 因出口位于瘢痕上部边缘而具有向下的额面电轴。窦性心律期间在该部位的起搏标测，产生了与 VT 相匹配的 QRS，S-QRS 间期为 70ms，与该区域的缓慢传导相一致（右图）

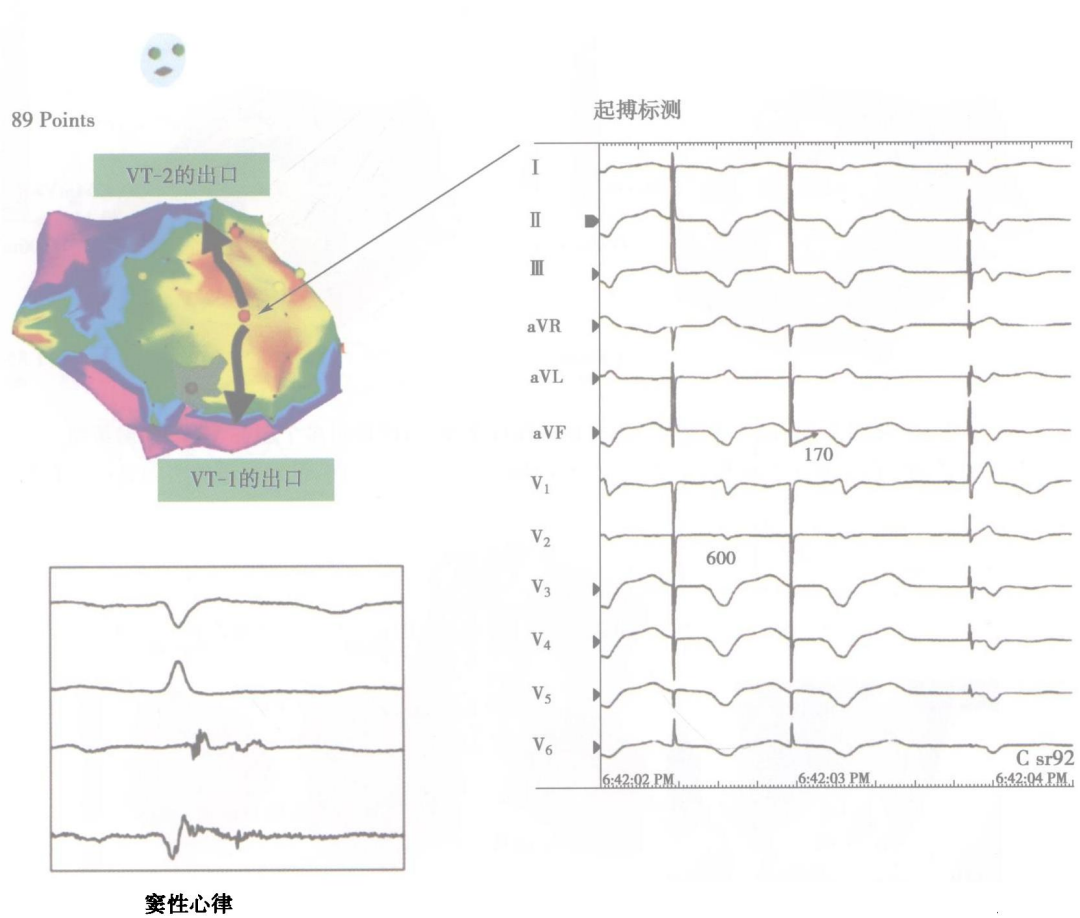


图 7.4　与图 7.2 和图 7.3 为同一患者，示窦性心律电图和瘢痕内峡部起搏电图

窦性心律电图显示有晚电位，提示 QRS 终末部之后的组织除极，与缓慢传导相一致。窦性心律期间在该部位的起搏，产生 170ms 的长 S-QRS，与缓慢传导相一致。QRS 形态与 VT-1 相匹配，表明是靠近 VT 出口区域的峡部起搏。时间以 ms 计

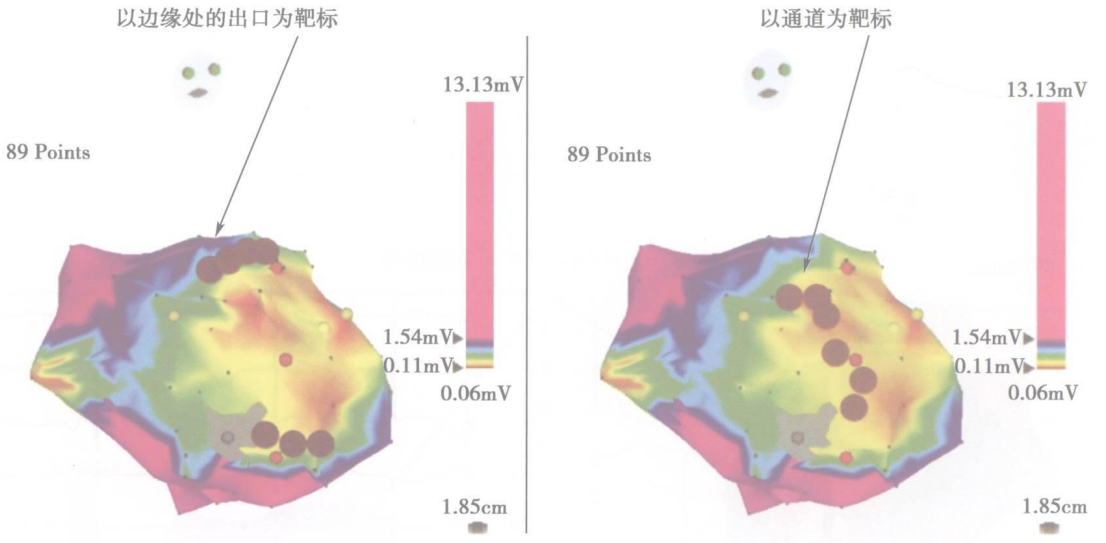


图 7.6 与图 7.2～图 7.5 为同一患者的电压标测图，说明针对多个潜在 VT 的消融策略

潜在的消融损伤用暗红色圆表示。针对出口区域的消融显示于左图，针对通道的消融显示于右图

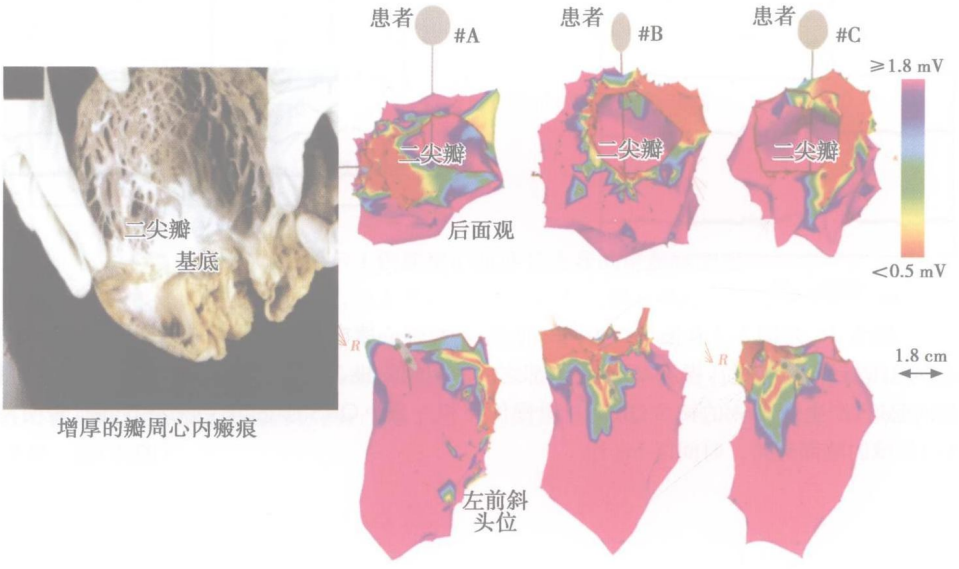


图 8.5 表现为单形性 VT 的非缺血性心肌病患者的心内 3D 电解剖标测

紫色区域为正常心内膜（幅度≥1.8mV），红色表示致密纤维化（幅度＜0.5mV）。边缘带是颜色梯度在红与紫之间的区域（幅度 0.5～1.8mV）。电压图一般显示有限区域的低电压心内电图的异常或瘢痕，位于心室基底部附近的瓣周区。左侧的病理标本显示心室基底部瓣周的瘢痕形成，与电压图上观察到的低电压区相对应

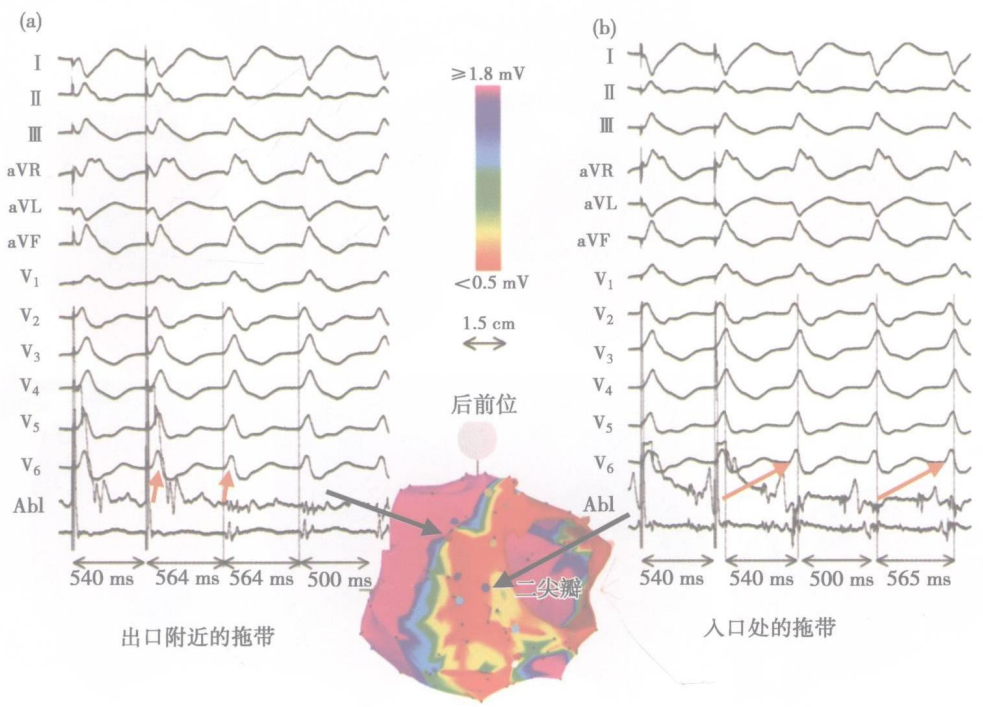


图 8.6 非缺血性心肌病患者(a)与有陈旧心肌梗死的冠心病患者(b)之间心内电压异常的比较

电压图颜色梯度已如前述。非缺血性心肌病患者异常心内瘢痕的总范围(约 1/3)明显小于冠心病患者,主要位于左心室心底部附近