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<p>Investigations of the impact of ventricular arrhythmias in populations have focused primarily on two aspects, ventricular ectopic activity and sudden cardiac death (SCD). The observation that coronary heart disease (CHD) is an important background of death due to ventricular tachyarrhythmia (VTA) remains the dominant belief today. The evidence supports the principle that reduction of deaths due to VTA is multifactorial and results from improved primary prevention, treatment of CHD complications, and secondary prevention. Recent evidence for unfavorable trends for SCD and CHD mortality raises the specter of a reversal in the gains made against fatal VTA in recent decades.</p>	
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<p>Sudden cardiac death caused by malignant ventricular arrhythmias is the most important cause of death in the industrialized world. Most of these lethal arrhythmias occur in the setting of ischemic heart disease. A significant number of sudden deaths, especially in young individuals, are caused by inherited ventricular arrhythmic disorders, however. Genetically induced ventricular arrhythmias can be divided in two subgroups: the primary electrical disorders or channelopathies, and the secondary arrhythmogenic cardiomyopathies. This article focuses on the genetic background of these electrical disorders and the current knowledge of genotype-phenotype interactions.</p>	
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cardiomyopathy. Although other types of structural heart disease and inherited ion channel abnormalities are also associated with a risk of SCD, the risk stratification strategies and data in these entities are diverse and beyond the scope of this article.

Ventricular Arrhythmias in Normal Hearts

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Shuaib Latif, Sanjay Dixit, and David J. Callans

Ventricular tachycardia in the structurally normal heart accounts for approximately 10% of cases. Although the overall prognosis is relatively good, with a benign course in most patients, these arrhythmias can lead to significant symptoms. Our understanding of these arrhythmias has progressed significantly, leading to effective therapies targeting their underlying mechanism. In many cases, catheter ablation is successful and the therapy of choice in patients who have sufficient symptoms. This article reviews outflow tract, idiopathic left ventricular, and automatic ventricular tachycardias.

Ventricular Arrhythmias in Heart Failure Patients

381

Ronald Lo and Henry H. Hsia

Ventricular arrhythmia represents a significant cause of mortality and morbidity. Its pathophysiologic mechanisms and electroanatomic substrates are slowly being elucidated. Clinical management in patients with heart failure has progressed from antiarrhythmic drugs to device therapy. Catheter ablation is an effective adjunct in the management of ventricular arrhythmia but remains a significant challenge. Advances in robotic and magnetic catheter manipulation may shorten procedural time and increase safety. Incorporation of imaging technologies such as CT, MRI, or ultrasound with electroanatomic mapping can enhance the ability to map and ablate ventricular arrhythmia. Novel imaging modalities may provide rapid characterization of the substrate for ventricular dysfunction and arrhythmia development and the capacity for serial assessment of the disease progression, improving risk stratification for ventricular dysfunction and arrhythmia development and the capacity for serial assessment of the disease progression, improving risk stratification.

Role of Drug Therapy for Sustained Ventricular Tachyarrhythmias

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L. Brent Mitchell

Antiarrhythmic drug therapy, broadly defined, is the mainstay of treatment and prevention of ventricular tachycardia (VT)/ventricular fibrillation (VF), which can lead to sudden death. This article evaluates the evidence for and appropriate use of class I antiarrhythmic drugs, class III antiarrhythmic drugs, beta-blockers, nondihydropyridine calcium-channel blockers, statins, angiotensin enzyme inhibitors, angiotensin receptor blockers, aldosterone blockers, and digoxin for antiarrhythmic benefits in patients who have a propensity for VT/VF and therefore are at risk of sudden death.

Use of Traditional and Biventricular Implantable Cardiac Devices for Primary and Secondary Prevention of Sudden Death

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Matthew H. Klein and Michael R. Gold

Sudden cardiac death is the leading cause of cardiac mortality, particularly among high-risk populations with known left ventricular systolic dysfunction. Multiple randomized clinical trials demonstrated a significant mortality benefit of the implantable cardioverter defibrillator (ICD) compared with antiarrhythmic drug therapy or standard medical care. Initial ICD trials showed a mortality improvement for patients who previously had experienced aborted sudden cardiac death or sustained ventricular tachycardia (secondary prevention). Primary prevention trials in selected high-risk patients who had both ischemic and nonischemic cardiomyopathy also demonstrated a mortality benefit associated with ICD treatment. More recently, cardiac resynchronization therapy

with or without defibrillator capability has been shown to reduce morbidity and mortality among advanced heart failure patients with a prolonged QRS duration.

Unresolved Issues in Implantable Cardioverter-Defibrillator Therapy 433
Pamela K. Mason and John P. DiMarco

Over the last 15 years, a series of well-designed randomized clinical trials has clearly demonstrated that implantable cardioverter-defibrillator (ICD) therapy reduces mortality in select high-risk populations. Despite the widespread acceptance of ICD therapy, many questions related to its optimal use remain. This article discusses several key issues now confronting clinicians.

Problems with Implantable Cardiac Device Therapy 441
Marcin Kowalski, Jose F. Huizar, Karoly Kaszala, and Mark A. Wood

Implantable cardioverter-defibrillators (ICDs) improve survival in patients who have left ventricular dysfunction; however, they are associated with numerous problems at implant and during follow-up. The diagnosis and management of these problems is usually straightforward, but more difficult problems may include the management of patients who have elevated energy requirements to terminate ventricular fibrillation or of those who have postoperative device infections. Long-term issues in ICD patients include the occurrence of inappropriate or frequent appropriate shocks. ICD generators and leads are more prone to failures than are pacing systems alone; management of patients potentially dependent on “recalled” devices to deliver life-saving therapy is a particularly complex issue. The purpose of this article is to review the diagnosis and management of these more troublesome ICD problems.

Role of Ablation Therapy in Ventricular Arrhythmias 459
Mithilesh K. Das, Gopi Dandamudi, and Hillel Steiner

Catheter ablation is an effective therapy for symptomatic ventricular arrhythmia (VA) in patients with and without structural heart disease. It is the treatment of choice to cure or reduce recurrent VA in patients who have an implantable cardioverter defibrillator and can be a life-saving procedure in patients who have electrical storm. Catheter ablation for VAs remains a challenging procedure and requires a precise understanding of cardiac electrophysiology, the arrhythmia mechanisms, and mapping techniques. Various mapping techniques such as pace mapping, activation mapping, entrainment mapping, and substrate mapping are used. These techniques complement each other in localizing the critical isthmus of a reentrant VT or the source of origin of a focal VT. Most VAs can be ablated endocardially. Epicardial ablation is needed for VAs with an epicardial circuit or a focal source.

A Comprehensive Approach to Management of Ventricular Arrhythmias 481
Fred Kusumoto

This review presents five cases that highlight the complexity of taking care of patients with ventricular arrhythmias. Three of the cases discuss management of patients with nonsustained ventricular tachycardia in the setting of structural heart disease: dilated cardiomyopathy, hypertrophic cardiomyopathy, and after myocardial infarction. A fourth case asks whether data from implantable cardioverter defibrillator (ICD) trials can be extrapolated to older patients, and the fifth case discusses management of recurrent ventricular arrhythmias in a patient with an ICD.

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