

# **CARDIAC EMERGENCIES**

**DEAN T. MASON, M.D.**

# Cardiac Emergencies

Edited by

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# Cardiac Emergencies

### ***DEDICATION***

To my faculty, fellows and staff, and my professional colleagues elsewhere, whose dedication to excellence in cardiovascular patient care and research made this sourcebook possible; and to my wife, daughters, parents, and friends who have provided the stimulating encouragement and patiently allowed me to share their time in the demanding pursuit of clinical cardiology and new scientific knowledge.

DEAN T. MASON, M.D.

# Preface

The purpose of this textbook is the presentation of recent advances and present status of modern knowledge concerning the highly important and complex subject of cardiovascular emergencies. Current information is provided about the mechanisms, diagnosis, and management of the principal life-threatening conditions encountered in the treatment of heart disease. To accomplish these objectives most effectively, this monograph is carefully organized into 15 sequential chapters. While each of the chapters comprising this book, with hundreds of illustrations, tables and references, affords independent coverage of a specific topic, the chapters are thoughtfully integrated to build upon a purposefully developed body of crucial information which provides a comprehensive appreciation of this multifaceted subject without unnecessary repetition.

Thus an overview of recent progress and future directions is provided in the first chapter. Since cardiopulmonary resuscitation is fundamental to all cardiac emergencies, this technique is thoroughly delineated in the next chapter, prior to discussions of the constellation of specific situations constituting the spectrum of cardiovascular critical care. Next logically follows a section on the evaluation and differential diagnosis of chest pain syndromes. Then the three important areas of acute myocardial infarction complications are presented in three successive chapters: prehospital coronary care, unstable angina pectoris, and congestive heart failure and cardiogenic shock. Next considered are the four emergency situations of acute pulmonary edema, pulmonary embolism and infarction, cardiac tamponade, and the evaluation and management of syncope. Hypertensive crises and acute aortic dissection are then presented in the next two chapters. Finally, this textbook is concluded with three chapters devoted to potential electrical catastrophes of the heart: treatment of tachyarrhythmias, digitalis intoxication, and cardiac pacemaker problems.

Emphasis is placed throughout on the elucidation of the most clinically significant concepts and principles of emergency cardiovascular care so that the physician can approach a particular problem area logically and, as desired and motivated, may further proceed expeditiously into even greater detail in the matter of interest. In addition, a rigorous effort has been made to select major topics written by leading clinical cardiologist-investigators well recognized in the field to provide an authoritative volume on cardiovascular emergencies. To the 34

participating authors who readily agreed to formulate this comprehensive sourcebook, I am deeply grateful for their superb contributions.

In summary, the intent of this textbook is to present an overall survey of recent basic and clinical progress in contemporary knowledge of cardiovascular emergency management important in the advancement of patient care. While complete and comprehensive in scope, the information is provided in a guideline manner useful for the practicing physician in effectively dealing with cardiac emergencies commonly encountered in daily care of patients with heart disease. This publication should be attractive to a wide clinically oriented audience of professionals in medicine, including medical students, physicians-in-training, generalists, internists, and cardiovascular specialists, as well as academic basic and clinical investigators, paramedical personnel, critical care nurses, and practicing physicians in all fields of medicine.

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Dr. Mason has authored more than 500 original articles on several aspects of cardiovascular science and clinical cardiology; he serves on the Editorial Boards of *The American Journal of Cardiology*, *Journal of Clinical Investigation*, *Circulation Research*, *Circulation*, *Chest*, *Drugs*, *Clinical Pharmacology and Therapeutics*, *Catheterization and Cardiovascular Diagnosis*, *Journal of Electrocardiography* and *Heart and Lung*. Dr. Mason is the author of the recent textbook *CONGESTIVE HEART FAILURE* published by Yorke Medical Books of New York City in 1976. He is President of the American College of Cardiology, Past-President of the Western Society for Clinical Research and Member of the American Board of Internal Medicine Cardiovascular Diseases. Dr. Mason is recipient of the American Society for Pharmacology and Experimental Therapeutics' Award in Experimental Therapeutics in 1973, the American Therapeutic Society Research Award in 1965, and the Theodore and Susan B. Cummings Humanitarian Awards in 1972, 1973, and 1975 from the U.S. State Department and the American College of Cardiology.

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## Cardiac Emergencies: Present Progress and Future Directions

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*Dean T. Mason, M.D.*

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Because cardiovascular disease is the leading killer of Americans (causing approximately one million deaths annually) and accounts for the majority (51%) of all deaths in this country, it is clear that the leading health problem nationally is morbidity and mortality resulting from heart disease.<sup>1</sup> Nearly every adult American is afflicted by atherosclerosis, and the various complications of atherosclerosis produce more than four-fifths of all cardiovascular mortality.<sup>2</sup> Coronary atherosclerosis represents the largest cause of death, being responsible for more than one-third of all deaths annually and two-thirds of cardiovascular mortality. Moreover, 60% of coronary deaths are sudden,<sup>2</sup> and even surviving patients with acute myocardial infarction who are fortunate enough to receive modern in-hospital coronary care are at increased risk of subsequent fatal coronary events. Furthermore, sustained or labile hypertension occurs in at least 30% of our adult population and markedly accelerates the incidence of coronary disease, stroke, and heart and kidney failure.<sup>2</sup>

These alarming facts underscore the magnitude and lethal intensity of cardiac disorders; future progress demands innovations in preventive cardiology coupled with improvements in the more traditional approach of managing symptomatic cardiovascular diseases. Despite the recent important advances and clinical expertise in the treatment of overt cardiovascular disorders, the staggering magnitude of the aforementioned statistics concerning morbidity and mortality, considered together with the large scope of economic resources and professional individuals required for therapy in symptomatic patients, clearly indicate that a preventive approach must be given high priority to control the prevalence of the common cardiovascular diseases.<sup>3</sup> Because knowledge is so lacking about the etiology and pathogenesis of atherosclerosis and hypertension, basic research in these areas must also be substantially augmented. Still further, uncertainty exists concerning the proper measures for primary and secondary prevention, as well as effective and efficient methods of applying prophylactic modalities. Nevertheless, the