

HOSPITAL PHYSICIAN®

CARDIOLOGY BOARD REVIEW MANUAL

STATEMENT OF EDITORIAL PURPOSE

The *Hospital Physician Cardiology Board Review Manual* is a peer-reviewed study guide for fellows and practicing physicians preparing for board examinations in cardiology. Each bi-monthly manual reviews a topic essential to the current practice of cardiology.

PUBLISHING STAFF

PRESIDENT, GROUP PUBLISHER
Bruce M. White

EDITORIAL DIRECTOR
Debra Dreger

EDITOR
Robert Litchkofski

ASSISTANT EDITOR
Rita E. Gould

EXECUTIVE VICE PRESIDENT
Barbara T. White

EXECUTIVE DIRECTOR OF OPERATIONS
Jean M. Gaul

PRODUCTION DIRECTOR
Suzanne S. Banish

PRODUCTION ASSISTANT
Kathryn K. Johnson

ADVERTISING/PROJECT MANAGER
Patricia Payne Castle

SALES & MARKETING MANAGER
Deborah D. Chavis

NOTE FROM THE PUBLISHER:

This publication has been developed without involvement of or review by the American Board of Internal Medicine.



Endorsed by the
Association for Hospital
Medical Education

Advances in the Acute Management of Cardiac Arrest

Series Editor and Contributor:

A. Maziar Zafari, MD, PhD, FACC

Assistant Professor of Medicine and Fellowship Program Director, Division of Cardiology, Department of Medicine, Emory University School of Medicine, Atlanta, GA

Director, Critical Care Unit, Atlanta Veterans Affairs Medical Center, Decatur, GA

Contributor:

Michael S. Lloyd, MD

Cardiology Fellow, Division of Cardiology, Department of Medicine, Emory University School of Medicine, Atlanta, GA

Table of Contents

Introduction.....	2
Epidemiology of Cardiac Arrest and Sudden Cardiac Death.....	2
Case Presentation.....	2
Future Directions.....	8
Summary Points.....	10
References.....	10

Cover Illustration by mb cunney

Copyright 2004, Turner White Communications, Inc., 125 Stafford Avenue, Suite 220, Wayne, PA 19087-3391, www.turner-white.com. All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, mechanical, electronic, photocopying, recording, or otherwise, without the prior written permission of Turner White Communications, Inc. The editors are solely responsible for selecting content. Although the editors take great care to ensure accuracy, Turner White Communications, Inc., will not be liable for any errors of omission or inaccuracies in this publication. Opinions expressed are those of the authors and do not necessarily reflect those of Turner White Communications, Inc.

Advances in the Acute Management of Cardiac Arrest

Michael S. Lloyd, MD, and A. Maziar Zafari, MD, PhD

INTRODUCTION

The leading cause of mortality in adults under age 65 years is sudden death from cardiac arrest.¹ Formal efforts at standardizing the acute care of the cardiac arrest victim started in the 1960s during the first conference of cardiopulmonary resuscitation (CPR). The protocols produced at that time were largely based on small clinical trials, animal experimental models, and consensus opinion.² Until the 1990s, relatively few changes were made to what we now know as the advanced cardiac life support (ACLS) guidelines. However, in the past several years there have been major developments in the areas of randomized, controlled clinical data, vasoconstrictor drugs, antiarrhythmic drugs, and cardiac defibrillation. These advances have led to several changes to the ACLS management algorithms published by the American Heart Association (AHA) and the International Liaison Committee on Resuscitation in their most recent guidelines.^{2,3} This manual reviews the acute management of cardiac arrest with discussion of recent changes to the ACLS guidelines.

EPIDEMIOLOGY OF CARDIAC ARREST AND SUDDEN CARDIAC DEATH

Cardiac arrest can be defined as the abrupt loss of consciousness from sudden diminished cardiac function as a result of either ventricular systole (electrical or mechanical) or pulseless ventricular tachycardia (VT)/ventricular fibrillation (VF) that would uniformly lead to death in the absence of acute intervention.⁴ The clinical result of cardiac arrest in the absence of resuscitation is sudden cardiac death (SCD). Although subject to some variation, SCD is generally defined as natural death by cardiac causes heralded by abrupt loss of consciousness (cardiac arrest) within 1 hour of severe symptoms in a person without any previous condition that would appear fatal.⁵ Rigid classifications of cardiac

arrest and SCD are difficult to formulate because 40% of cardiac arrests leading to SCD are not witnessed, making it impossible to accurately determine the cause and clinical circumstances of the event.⁶

The major underlying cause for cardiac arrest and SCD in the industrialized world is coronary artery disease (CAD).⁷ Angiography performed on 79 survivors of cardiac arrest revealed an 81% prevalence of CAD, the majority of which was significant multivessel obstruction.⁸ Cardiac arrest is a common cause of death in those with CAD, accounting for roughly 50% of all deaths in this population.⁹ In addition to CAD, other conditions associated with cardiac arrest can be divided anatomically into causes related to the myocardium, conduction system, valves, and coronary arteries (**Figure 1**).

Despite a significant reduction in mortality from cardiovascular disease, the number of individuals at risk for cardiac arrest is increasing.¹⁰ Although strong risk factors have been identified (left ventricular dysfunction, myocardial infarction, and prior ventricular tachyarrhythmia), this subgroup of patients represents only a minority of the 300,000 to 400,000 individuals who arrest annually in the United States (**Figure 2**). The vast majority of cardiac arrests occur in a population whose risk factors for sudden cardiac death have yet to be defined. Successful resuscitation rates of cardiac arrest victims remain low. Overall survival for cardiac arrest in the United States ranges from 4% to 33% for out-of-hospital arrests and from 0% to 29% for in-hospital arrests.¹¹

CASE PRESENTATION

A 62-year-old man with known CAD collapses at an airport terminal. Two bystanders believe he is pulseless and apneic.

- **Assuming the bystanders have correctly assessed the pulse, which of the following underlying rhythms confers the best chance of resuscitation success?**

See **Figure 3** (page 4) for options.