

# Clinical Strategies in Ischemic Heart Disease

New Concepts and  
Current Controversies

Edited by

Eliot Corday, M.D., F.A.C.C., F.A.C.P.

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一九八一年十二月十二日

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# Clinical Strategies in Ischemic Heart Disease

## New Concepts and Current Controversies

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Baltimore/London

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The Williams & Wilkins Company  
428 E. Preston Street  
Baltimore, Md. 21202, U.S.A.

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Library of Congress Cataloging in Publication Data

Main entry under title:

Clinical strategies in ischemic heart disease.

Includes index.

1. Coronary heart disease. 2. Heart—Infarction. I. Corday, Eliot. II. Swan, Harold James Charles. [DNLM: 1. Coronary disease—Diagnosis. 2. Coronary disease—Therapy. WG300.3 C641]  
RC685.C6C56 616.1'23 78-22068  
ISBN 0-683-02080-3

Composed and printed at the  
Waverly Press, Inc.  
Mt. Royal and Guilford Aves.  
Baltimore, Md. 21202, U.S.A.



# Preface

## The Need for New Perspectives and Clinical Strategies in an Era of Rapid Change



The dynamic investigations in ischemic heart disease of the past decade have contributed considerably to the basic knowledge and clinical management of our nation's biggest killer which continues to claim about 40% of those who die each year in the United States. The progressive disease process which until recently was regarded as an act of fate because little seemed to influence its course might now be considered to be controllable. The drop in mortality statistics of ischemic heart disease during the past decade reflects the fact that the practitioner is now able to salvage thousands of lives with hearts that are just too good to die. However, these advances have come so fast that there is now considerable controversy about the optimal clinical management. This text will deal with these problems in an attempt to provide better clinical strategies in diagnosis and treatment.

The explosion in new knowledge started in 1962 with the simple application of space-age electrocardiographic monitors to detect the onset of ominous cardiac arrhythmias which might precede cardiac arrest after acute coronary occlusion. By December 1965 effective closed chest resuscitation and electrical defibrillation techniques had been perfected. There were some 14 coronary care units established across the continent, but it was not evident whether they were of clinical benefit. Clinical studies reported a narrow 4-minute limit for resuscitation after the onset of cardiac arrest. This meant that if resuscitative measures were not instituted within that short interval, the heart might still be resuscitated, but the brain, which cannot withstand prolonged anoxia, was likely to become so severely damaged that the victim would only survive as a decerebrate. Therefore, a Bethesda Conference of the directors of coronary care units was convened by the American College of Cardiology in December 1965 to determine under what circumstances the coronary care unit could provide actual benefit. The participants realized that only three centers were able to salvage a significant number of victims who sustained cardiac arrest. They were able to accomplish this feat because the nurses who were in constant attendance had been trained to provide immediate cardiac resuscitation using the electric defibrillator and were authorized to defibrillate the patient even in the absence of a physician. The Conference concluded that because the practitioner would not have time to return to the bedside in the narrow time limit, the nursing staff must be trained in all resuscitative techniques, plus electrical defibrillation and pharmacological interventions. These principles were quickly applied across the nation, and by 1968 some 6000 of the larger hospitals in this country had trained their staffs to apply immediate resuscitation in their newly established coronary care



units. Other aggressive principles were soon adopted to treat the ominous arrhythmias which might precede the onset of cardiac arrest and were shown to reduce the number of cardiac arrests.

Stimulated by these dramatic breakthroughs, Robert Grant, Director of the National Heart Institute, pleaded for more extensive basic research which could provide for the gaps in knowledge about myocardial infarction. He was able to obtain a congressional appropriation which provided the funds to institute vast new programs in ischemic heart disease. Unfortunately, he himself was the victim of a fatal heart attack before he could witness the benefits which evolved from his efforts. An important contribution of this NIH myocardial infarction program has been the unique development of the Swan-Ganz flotation catheter which has enabled hemodynamic monitoring and continuous adjustment to maintain optimal ventricular filling pressures as well as the measurement of cardiac output. This metering device permits better management of the failing heart with afterload reducing agents such as nitrates,  $\alpha$ -blocking agents, and other vasodilators and also correction of hypotension with proper volume replacement. Since this development, many lives of those suffering the complications of power failure have been saved.

Starting in 1968, renewed interest was focused upon methods which might preserve jeopardized ischemic myocardium. It was reasoned that if the jeopardized myocardium could be salvaged it would reduce infarct size and thus prevent subsequent sudden cardiac decompensation or death. Although these investigations stimulated great interest, it soon became evident that the literature was becoming controversial because of many divergent claims, and the status of the concept had to be questioned. This text attempts to account for these apparently contradictory opinions which all seem to be correct, but because the conclusions are based on different models and different methods of application of an intervention which must be placed in a proper time reference, it appears that the onset of the intervention is critical because if it is delayed too long after coronary occlusion, the tissue will become so irreversibly damaged that interventions cannot possibly be beneficial in altering the immediate acute necrosis.

The text starts with existing controversies concerning fundamental concepts in causation of acute ischemia which may lead to infarction. It is hoped that this will provide a better pathophysiological approach for the practitioner to help him decide the best clinical strategies of diagnosis and management. Fundamental concepts in the causation of ischemic heart disease are considered by experts on dynamic pathophysiological phenomena such as: When do the irreversible changes supervene? Is there a "twilight" zone? Why does myocardial infarction occur without coronary occlusion? Are infarct size measurements accurate? What is the significance of the collateral circulation? Why the divergent literature regarding benefits or detriments of an intervention? New emerging concepts which are associated with ischemic syndromes are considered, such as abnormal septal contractile patterns and the prolapsing mitral valve syndrome. Current disagreement on the possible benefits of present risk factor interventions are discussed by dedicated authorities who are troubled by the controversies.

A status report on the newly emerging concepts of sudden cardiac death which claims three to four hundred thousand lives each year in the United States is discussed. It reviews arrhythmias which are associated and which might forewarn the patient. It then considers the clinical strategies and interventions which might prevent these catastrophes.

New and already established diagnostic techniques are placed in their proper perspective because the accuracy of ECG stress tests, angiography and enzymology which have been established as the standards for the diagnosis of ischemic heart disease have

recently been questioned. The application of echocardiography for the diagnosis of ischemic heart disease is of particular interest because it appears that this noninvasive method can detect abnormalities soon after the onset of acute ischemia. Nuclear and ultrasonic techniques also have been perfected for the detection of myocardial ischemia and infarction. Although attempts have been made to apply radioisotopic methods to cardiology since 1947, new methods have only recently become of practical significance because of improved imaging techniques. These are now being applied clinically to provide the evidence of acute or chronic ischemia, to localize an infarction, detect transient ischemic events following stress and measure regional wall motion abnormalities, cardiac volume and ejection fractions. A new noninvasive displacement cardiographic technique is discussed which can detect and measure abnormalities in regional wall motion. Hence it is evident that now the clinician can select from a battery of electrocardiographic, ultrasonic, nuclear and displacement methods which can provide him with new confidence in his ability to detect early ischemic dysfunction. In addition, ambulatory electrocardiographic monitoring to detect and produce documentation of transient ischemic changes in the native habitat under the same circumstances which produce the usual distress is vividly described.

Angiography and ventriculography have been used for several decades to localize and measure the degree of obstruction within a coronary artery and for the study of abnormal ventricular wall motion. The text discusses the reasons for differences in angiographic interpretations and strategies the practitioner might use in deciding on the need for coronary bypass surgery.

The text considers the fundamental fact that any measure used to save jeopardized ischemic myocardium must be applied early, while the tissue is still viable. Therefore, from a practical standpoint, it is quite evident that to protect jeopardized tissue, these measures must be applied prophylactically in a long acting form before the ischemic event supervenes, or within an hour after the onset of symptoms. New interventions proposed to salvage jeopardized ischemic myocardium are reviewed. However, because of divergent views about clinical usefulness their application must still be regarded as highly experimental.

A reappraisal of the treatment of power failure of the heart at the differing phases of pathological changes should provide the practitioner with better clinical strategies on how to obtain maximum benefits and avoid possible detrimental effects from interventions. New hemodynamic monitoring techniques which have now become a standard form of therapy are reviewed so that those involved in the management of the critically ill cardiac patient will understand how to apply the new dynamic principles. Fluid volume loading or the reduction of volume of the left ventricle may provide quick and dramatic improvement in the clinical status of the critically ill.

The final sections discuss coronary bypass surgery, whether it is worthwhile, and when it should be used. Recent literature has reported interim results of national cooperative studies in which randomization was used to compare long-term effects of medical or surgical management of patients with stable and unstable angina. This has led to furious controversy. Many investigators agree that disabling angina can be relieved by surgery, so that the patient can improve his life style and be rehabilitated. This in itself could justify surgical intervention. The controversy as to whether surgery will increase longevity must still be clarified. However, the standards of selection and the quality of surgery associated with the national cooperative studies are open to question since the surgical series were accompanied by an inordinately high perioperative mortality and failure to maintain patency of the bypass grafts. Some argue that the results of these prospective studies cannot be compared to the retrospective investigation from other centers that report more satisfactory results. These reports

have built up differences of opinion on which strategy the clinician should use to treat ischemic heart disease. An open discussion to identify the grounds for these differences of opinion could provide better clinical strategies that the practitioner might use in his consideration of surgical bypass surgery.

We are grateful to those critical physicians who have contributed to this text. With their help we are able to provide data for consideration and reconsideration of the many currently accepted strategies in diagnosis and treatment.

We sincerely hope that this text will provide fundamental scientific knowledge which will allow the practitioner a basic foundation for continuing education and provide better clinical strategies for optimal diagnosis and management of patients with ischemic heart disease.

We would like to thank all the participants who provided a manuscript for "Clinical Strategies." Their labor of love should improve the health care of the victim of myocardial ischemia. We thank Ms. Barbara Voigt and Ms. Judi Wald for their help in transcribing the proceedings, and all the secretaries and typists who worked with the contributors. We would like to express our special thanks to Mrs. Jeanne Bloom for her editorial assistance and diligent efforts in the formulation of this volume.

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