

**Introduction
to
Clinical Cardiology**

Introduction to Clinical Cardiology

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*To Ruth, Jill, Jamie, Jennifer and Richard,
I'm proud of you
and what you have accomplished!*

Preface

The contents of this book are not meant to cover the field of cardiology comprehensively. My aim is to provide a concise textbook that students of cardiology can use when evaluating patients with possible cardiac problems. No cardiologist knows everything there is to know about cardiology, but I have tried to include the most important points I have learned and taught over the past 30 years.

Many students, house staff, and cardiology fellow trainees spend 4 to 8 weeks on a cardiology consult or inpatient service. Experience varies, but hospitalized patients as well as office patients are evaluated. A student, house officer, or cardiology trainee on an inpatient consultation service sees patients in acute cardiac units, on the general medical service, and on nonmedical services. Often, the patients on the nonmedical service are seen either for a preoperative assessment of a possible cardiac condition or a postoperative assessment of a symptom, sign, or abnormal laboratory value that may be related to a cardiac condition.

In this context, the student of cardiology is often faced with a complex diagnostic and therapeutic problem rather than a simple problem in physical diagnosis. One rapidly learns that patients with heart disease may have many clinical presentations; for example, some patients present with severe chest pain or life-threatening arrhythmias, while others may be asymptomatic but have an abnormality found on physical examination or routine laboratory tests such as the electrocardiogram.

The goal of this book is to allow the student of cardiology to arrive at a clinical diagnosis based on the history, physical examination, and commonly used laboratory evaluations in cardiovascular medicine.

Because the ability to communicate well with patients and colleagues and an understanding of the role of clinical trials are hallmarks of the excellent physician, I have included chapters on these subjects at the beginning of the book.

Most students, and many physicians, are not familiar with the modern diagnostic tools of cardiology. Thus, early in the book, I devote nine chapters to commonly used cardiovascular diagnostic tests, emphasizing their usefulness and limitations.

Eleven chapters are devoted to the evaluation of patients with specific signs, symptoms, or electrocardiographic abnormalities. Included in this section are chapters on evaluation of the cardiac patient undergoing noncardiac surgery and evaluation of the pregnant patient with cardiac symptoms. I think these latter two chapters will be particularly useful on inpatient consultation services.

Seven chapters are devoted to the definition, pathophysiology, diagnosis, and

management of patients with ischemic heart disease. Included in this section is a separate chapter dealing with drugs commonly used in the treatment of ischemic heart disease. This is a long section, but the length is warranted because of the common occurrence of ischemic heart disease in current medical practice.

Five chapters are devoted to the pathophysiology, clinical and laboratory findings, diagnosis, and treatment of patients with heart failure with and without valvular heart disease. I have also included in this section a chapter on cardiac transplantation for the treatment of patients with end-stage cardiac disease.

Three chapters are devoted to the general principles of management of patients with arrhythmias, including digitalis intoxication.

I have included a chapter on preventive cardiology and one on the treatment of patients with hypertension to emphasize their importance in the management of patients with and without heart disease. Of course, treatment and prevention also apply to patients with heart disease, such as those recovering from acute myocardial infarction or following angioplasty or heart surgery.

Eight chapters are devoted to the diagnosis and management of selected specific conditions, such as mitral valve prolapse, acute rheumatic fever, acute and chronic pericarditis, infective endocarditis, pulmonary embolism, cardiac tamponade, and congenital heart disease in the adult. Of these, pulmonary embolus will be the most commonly seen.

Finally, separate chapters are devoted to cardioversion and principles of cardiopulmonary resuscitation.

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Physical examination or routine laboratory tests such as the electrocardiogram. The goal of this book is to allow the student of cardiology to arrive at a clinical diagnosis based on the history, physical examination, and commonly used laboratory evaluations in cardiovascular medicine. Because the ability to communicate well with patients and colleagues and an understanding of the role of clinical trials are hallmarks of the excellent physician, I have included chapters on these subjects at the beginning of the book. Most students and many physicians are not familiar with the modern diagnostic tools of cardiology. Thus, early in the book, I devote nine chapters to commonly used cardiovascular diagnostic tests, emphasizing their strengths and limitations. Eleven chapters are devoted to the evaluation of patients with specific signs, symptoms, or clinical pathophysiologic abnormalities. Included in this section are chapters on evaluation of the cardiac patient undergoing noninvasive surgery and evaluation of the pregnant patient with cardiac symptoms. I think these latter two chapters will be particularly useful to residents and fellows in internal medicine, obstetrics, and gynecology. Seven chapters are devoted to the treatment, pathophysiology, diagnosis, and

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Thinking About Cardiology

The worst kind of physicians are those who make a diagnosis based on an isolated piece of data and then spend a great deal of time and money trying to prove that they are right. Don't be afraid to change a diagnosis if the facts learned later in the evaluation are not consistent with the initial impression.

—C. R. C.

A LITTLE HISTORY

As recently as 30 years ago, cardiology was not at all the defined discipline it is today. As a medical student and house officer, I learned cardiology by chance rather than by design. There were no formal clinical clerkships for medical students or house officers. If I happened to have a cardiology patient, the general medical attending physician and medical house staff taught me general principles as they related to that specific case. There was little cardiac surgery, and there were few diagnostic procedures of any sort.

Today, cardiology is a defined subspecialty and treatment has expanded greatly. Frequently, patients with cardiovascular disease lead productive, longer lives than in the past. This is accomplished because of better diagnostic techniques, better drug therapy, and better surgery. In addition, patients are better educated about risk factors and their role in maintaining health.

HOW SCIENTIFIC IS CARDIOLOGY?

Cardiology is now a broad specialty that is taught in exhaustive detail and by meticulous design. It is supported by a large and growing array of diagnostic and therapeutic equipment, a better grasp of pathogenesis and pathophysiology, and a vast literature about basic research and clinical trials. However, because of the differences between individuals, it is impossible for principles of cardiology to have the same application in every patient.

Scientific studies, such as clinical trials, provide guidelines for diagnosis and treatment. Unfortunately, no clinical trials are conducted perfectly, and many pa-

tients treated by cardiologists do not fit the study population of the trial. Therefore, even under the best circumstances, the physician must be alert to the individuality of each case. Thus, the science of cardiology cannot be inflexible, and the practice of cardiology is based on experience and judgment.

THINKING LIKE A SCIENTIST

Despite this lack of absolute rules, the good cardiologist can almost always approach a case in a scientific manner by remembering to do the following:

- *Obtain the most information possible* from all sources, particularly the patient and the patient's family.
- *Perform specific tests only to achieve specific goals*, never subjecting the patient to any risk or discomfort unless the possible benefit is measurable.
- *Question casual historical points* (e.g., the patient has a history of myocardial infarction) when there is no documentation.
- *Write in the chart with clarity and accuracy.*
- *Search at all times for new clues*, not only for information that corroborates the initial diagnosis.
- *Search for secondary medical problems*; even if there is an obvious cause for a patient's illness, there also may be other medical problems that must be treated.
- *Pay attention to details* and save them for later consideration if they do not immediately seem pertinent.
- *Pay attention to the entire clinical presentation* rather than focus on single details taken out of context.
- *Reevaluate your clinical impression*—and possibly repeat diagnostic tests—before initiating treatment.
- *Consult with other physicians* if there is doubt about diagnosis or treatment.
- *Monitor treatment* to make sure it remains appropriate and does not trigger new problems in the short term. Long-term monitoring is required to assess the value of treatment in any patient.

REASONABLE EXPECTATIONS

Treatment of patients with cardiovascular disease has two favorable but different results: cure and palliation. Palliation is far more common than cure. Some students are distressed when they realize this, but they become more comfortable when they stop thinking of palliation as a failed attempt at a cure. Take the patient who has life-threatening ventricular arrhythmias who has had one episode of ventricular fibrillation. At present, we do not know how to "cure" the arrhythmia, but drugs usually can be identified that will control it and prevent ventricular fibrillation. Patients may not live as many years as they like, but the chances of living at all and living a reasonably good life on the medication and under close medical supervision

are good. That is not a failure; it is a success. If a coronary artery bypass occludes after 7 years, one must remember that it is the nature of atherosclerosis to cause occlusion, and a "cure" for atherosclerosis does not yet exist. The original surgery was not a failure; it gave the patient seven reasonably good years he otherwise would not have had, and angioplasty or new surgery will probably give him more.

Most of what cardiologists do helps patients to live longer and better, and now that we are more aggressive in the prevention of cardiac disease, the next several years will see even more success.

WHAT IS A CARDIOLOGIST?

A cardiologist is an individual who, in addition to a residency in internal medicine, has participated in a specialized educational program dealing specifically with cardiovascular medicine and surgery. To be eligible to take the cardiovascular subspecialty board examination, the individual must demonstrate not only procedural knowledge but also cognitive knowledge to ensure optimal patient care and treatment.

A good cardiologist will have passed the subspecialty board examination in cardiovascular medicine. In addition, however, the good cardiologist

- Understands the pathogenesis and pathophysiology of cardiovascular disease and uses that understanding to solve problems.
- Has good clinical skills, i.e., is expert at the bedside talking with patients, evaluating them through history, physical examination, and simple laboratory tests.
- Does not order procedures until a diagnosis and plan is formulated based on clinical evaluation, as opposed to ordering procedures and tests in the hope of finding a solution.
- Has a solid foundation of medical knowledge kept up-to-date by reading cardiovascular literature. This allows the good cardiologist to integrate any new information into his or her thinking relating to the care of patients.
- Is not just a great technician who can perform all sorts of procedures.
- Has excellent clinical judgment. Judgment comes from basic knowledge about cardiovascular disease and experience gained by patient contact. The cardiologist with excellent clinical judgment (1) integrates medical facts and data obtained from history, physical examination, and laboratory tests; (2) recognizes his or her limitations; (3) has an awareness of alternative diagnostic or therapeutic procedures; and (4) understands the potential benefits of therapy as well as the potential risks, complications, and unwanted effects of therapy.
- Must be involved in the overall evaluation of a patient, not just the part relating to technical skills.
- Is an educator to the patient and the patient's family and, by doing so in a humanistic way, gains their confidence.

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Communicating With Patients and Physicians

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Nobody should have to go through this six-bypass experience if [it is] not needed. You meet many doctors—cardiologists, surgeons, hematologists, anesthesiologists, and others—in teaching hospitals. . . . Most [of my doctors] were fairly decent fellows.

Each lacked one character trait: the ability to spend time with the patient. Never underestimate the value of time. And, to a man, each had trouble listening. They had lots of information (not unnecessary or unwanted), and were eager to deliver it, if only

I hit on the right question, or even if not. . . . No one wants to talk about death, or even about pain, about mourning one's lost functions. Only one nurse heard me sobbing at one ungodly hour of the morning as I thought about my friends [and] family [and] relived experiences never to be captured again. Inexpertly, she rubbed my arm and gently talked of her similar experiences, until I dozed off. No pills, no shots, no even meaningful words: the continuous touch and soothing voice of a kindly mother with her babe.

—Lawrence Benjamin, Ph.D. (1934–1989)
Associate Professor of Psychology, Albert
Einstein College of Medicine, from a letter to
interns and staff

ment into his or her thinking relating to the care of patients.

is not just a great technician who can perform all sorts of procedures.

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cardiovascular disease and excellent clinical judgment. The cardiologist

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INTRODUCTION

Every physician who works directly with patients diagnoses, evaluates, manages

treatment, refers patients to other doctors, consults with other doctors, and teaches

the patient about illness and responsible recuperation. In addition, many physicians

conduct clinical trials or basic research and publish their results. Every one of these

functions requires expertise in communication, but communication per se is not

taught in medical school. It is something the student is expected to learn along the

way. Since meaningful exchanges with other people are essential in every facet of

the practice of medicine, it is important for the student to know at least what it is he

or she must learn.

TRUTHFULNESS AND OPTIMISM

To be of the greatest help to your patients and colleagues, you must first be honest with yourself. The best physician in the world is the one who is willing to say, "This case is beyond me, and I need help. I'm going to consult with or refer this patient to another physician."

It is also essential to recognize when the patient's emotional needs are beyond your ability or desire to cope with them. Instead of shortening a visit to avoid the patient's distress, make sure you know how to connect that patient with an appropriate expert. This is more than a courtesy; it is good medical practice because anxious, depressed, agitated patients often cannot follow doctors' instructions for self-care.

Before you discuss tests or treatments with the patient, make sure you are aware of exactly what they entail and can answer questions fully. If the patient asks you a question you cannot answer, never brush it aside. Tell the patient you do not know, but you will find out. Then make sure you get back to the patient with the answer as soon as possible.

When discussing the prognosis, try to be gentle and optimistic while also being realistic. Remember that data from clinical trials are rough guidelines for treatment and prognosis and that they should never be used to predict the course of disease or recuperation in the individual patient.

COMPLETENESS

In taking the history, let the patient tell you what is going on. You have to direct the conversation of course, but be as subtle and polite as possible. Do not interrupt the patient who is talking about something he or she feels is important; however, when you notice repetition, you can say, "Let's go back to this other point because I was unclear about that." You can then shift the discussion in a direction that is more helpful for diagnosis. If you cannot make a diagnosis after the initial work-up, review the history with the patient again, and ask the patient's family questions as well.

It is essential that you know whether the treatment is curative or palliative in each case, and that you make sure your patient understands his or her responsibilities for risk factor modification, continuing on drug therapy, and exercise programs. Your communication in this case may have to be not only with the patient but also with the family, and it may have to be written as well as verbal. For example, after surgical repair of an atrial-septal defect, the patient is cured. But after replacement of a stenotic aortic valve, the disease is palliated. The symptoms are relieved and so are the physical findings, but the valve is not perfect. The patient will have to take anticoagulants and, on occasion, antibiotics for the rest of his or her life, and must be informed of this before the surgery and trained for it afterward.