

DIAGNOSTIC AND INTERVENTIONAL RADIOLOGY— Clinical Manual

GREGG M. GAYLORD

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DIAGNOSTIC AND INTERVENTIONAL RADIOLOGY—

A Clinical Manual

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To
Linda and Tristan
Mary and Cecilia



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PREFACE

This manual is intended to help medical students, residents, and primary care physicians decide which of the many imaging modalities are useful for evaluating their patients' problems. The manual was written with the idea that the lofty goal of teaching diagnostic imaging selection and intervention options to physicians cannot be achieved by any method without the knowledge of disease processes, an understanding of patients' needs and goals, a sense of economic reality, and the ability to effectively communicate with patients, nursing personnel, and consultant physicians. With this in mind, it was decided to eschew the algorithmic approach to medicine that offers condensed versions of solutions to particular patient problems, often while ignoring other aspects of the patient's condition that can disrupt a "decision tree" approach. Algorithms are not useful unless patient preparation, anatomy, pathology, and indications for and limitations of a particular examination are well understood. And if a physician has this knowledge already, algorithms are not necessary.

To use this manual effectively one must be prepared to read whole chapters, refer to other sections, and discuss patient problems with other physicians (particularly radiologists). There are no magic formulas, "plans of attack," or rigid schemes for dealing with common medical problems. We will know our effort is successful if, after using this manual, one knows the reasons for choosing one type of examination over another. The ultimate goal is better patient care resulting from well-conceived diagnostic evaluations and treatment.

GREGG M. GAYLORD
LAWRENCE P. DAVIS
STEPHEN R. BAKER

HOW TO USE THIS MANUAL

Once a carefully thought out differential diagnosis based on relevant factors (history, physical examination, laboratory tests, previous imaging studies) has been developed, one can proceed with further diagnostic evaluation. If the cause of the problem is most likely confined to a particular organ system or organ, read the chapter on imaging of that organ or organ system. After reading about all available tests and their various abilities, indications, and limitations, choose an appropriate examination. If necessary, discuss the problem with a radiologist or other specialist and be sure to properly prepare the patient for the examination.

Discussing tests with patients is the best way to gain their confidence and should be a routine part of patient preparation. For additional information about a particular imaging modality, consult the imaging modality chapters.

Although this method is more cumbersome than the algorithmic approach, it should provide a better understanding of the uses and limitations of modern diagnostic methods.

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PART I

DIAGNOSTIC
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PART I

RADIOLOGICAL
DIAGNOSTIC

Radiology and the Radiologist

Stephen R. Baker

In the past two decades, probably no medical specialty has changed as much as diagnostic radiology. Technological advances have enlarged its scope, broadened its challenges, and heightened its rewards. Many diseases that until recently could be recognized with assurance only at surgery or autopsy can now be diagnosed and in some cases treated by using techniques within the purview of the radiologist.

HISTORICAL DEVELOPMENT

Until the early 1960s, diagnostic radiology consisted primarily of the interpretation of radiographs and the performance of relatively simple procedures including fluoroscopic examinations of the upper and lower gastrointestinal (GI) tract; intravenous urography for visualization of the kidneys, ureters, and bladder; and myelography to reveal abnormalities in the spinal column. By the middle 1960s, it was possible to include imaging of organs with radioactive isotopes. Over the years, improvements in instrumentation and chemistry have made isotopic or nuclear medicine studies increasingly sophisticated, especially in the evaluation of heart disease. At about the same time, angiography was developed for clinical use, allowing radiographic visualization of blood vessels using iodinated contrast medium injected into an artery via a catheter introduced through the skin. While angiography carries risks and requires skill, it allows the radiologist to determine the presence and measure the extent of diseases in hitherto inaccessible parts of the body.

In the early 1970s, computed tomography (CT), which combines x-rays with electronic spatial reconstruction technology, quickly became