

niques used in the CT venography portion of the study, such as how the testing was tailored to reduce the radiation exposure of subjects.

These 2 sections pave the way for the discussion of what many diagnosticians find the most challenging problem: the diagnosis of acute pulmonary embolism. With the rapid proliferation of new technologies for the evaluation of pulmonary embolism, physicians, nurses, and therapists are challenged to sort the different laboratory and radiographic tests into a cohesive diagnostic plan. The next 193 pages are divided into 44 chapters that detail the multiple facets of this clinical situation.

Stein first addresses the individual aspects of diagnosis, starting with the history and physical. The next 7 chapters address some of the most challenging and lowest-yield diagnostic tests for pulmonary embolism: electrocardiogram, chest radiograph, arterial blood gas values, alveolar-arterial oxygen difference, fever, leukocytosis, and alveolar-dead-space measurement. He collates the world's literature on each test and leaves the reader with a clear understanding of the utility of these diagnostic tests, often showing how unhelpful these readily available tests are in definitively excluding or including the diagnosis of pulmonary embolism. The section continues with discussion of the role of D-dimer testing, clinical prediction rules, such as the Wells and Geneva scores, and other less-used laboratory tests (eg, plasminogen activator level).

Then Stein presents an analysis of the myriad radiographic techniques used to make the diagnosis of pulmonary embolism. After a brief chapter on the utility of bedside echocardiography in the diagnosis of normotensive and hypotensive patients with suspected pulmonary embolism, Stein embarks on a historical journey, detailing the technique of ventilation-perfusion (\dot{V}/\dot{Q}) imaging, the criteria for \dot{V}/\dot{Q} interpretation prior to PIOPED I, and how that changed with the PIOPED study. Stein continues by detailing the criteria for low probability and the interpretation of \dot{V}/\dot{Q} testing in patients with cardiopulmonary disease.

Stein proceeds logically into a brief chapter on the techniques for pulmonary angiography, and then spends many pages detailing the use of CT angiography, this time using PIOPED II as the transition point. He then describes the methods of the PIOPED II study, how they evaluated the combination of CT angiography with CT venography in

the diagnosis of pulmonary embolism. This study used a complex composite reference standard to exclude pulmonary embolism.

The goals of PIOPED II were to investigate if CT angiography can reliably detect and exclude acute pulmonary embolism and if adding CT venography improves the reliability. To be diagnosed with pulmonary embolism a patient had to have one of: high-probability \dot{V}/\dot{Q} scan (with no prior history of pulmonary embolism), positive pulmonary digital-subtraction angiogram, or positive venous ultrasound (with no prior deep-vein thrombosis at the site of the compression defect). Exclusion of pulmonary embolism required one of the following: negative digital-subtraction angiogram, normal \dot{V}/\dot{Q} scan, or a low-probability \dot{V}/\dot{Q} scan with a clinical Wells criteria < 2 and negative venous ultrasound.

The PIOPED II group determined that CT angiography had good positive predictive value in association with high-probability and intermediate-probability clinical Wells scores, but not in association with low-probability Wells score. The contrapositive also held true: CT angiography had excellent negative predictive value in association with low-probability and intermediate-probability Wells scores, but not in association with a high-probability Wells score. Stein included an extremely useful and practical pre-test and post-test probability chart that uses Bayes theorem and likelihood ratios derived from the study.

A brief chapter on the use of magnetic resonance angiography for the diagnosis of acute pulmonary embolism follows and leads naturally into a chapter on integrating diagnostic testing into a cogent diagnostic approach. In this final chapter of the diagnosis section the flow diagrams show clear approaches to evaluating a patient with suspected pulmonary embolism.

The third section, on treatment and prevention, begins by outlining the various anticoagulants available and their biochemistry. Stein discusses the prevention of venous thromboembolism in various disease states and then the treatment of venous thromboembolism, which is extracted directly from the Seventh American College of Chest Physicians Conference on Antithrombotic and Thrombolytic Therapy.

The next few chapters tackle the challenging and controversial topic of thrombolytic therapy in acute pulmonary embolism. The few studies that provide guidance are outlined and put forth as potential evidence.

Stein does a nice job of explaining the challenges of using intermediate end points in the assessment of efficacy.

Despite this text's thorough and comprehensive approach to pulmonary embolism, there are a few sections that could have been more rigorous. It is apparent that Stein's interest lies in the diagnosis of the disease. The section on therapy is unfortunately brief, as was the discussion of thrombolytic therapy, and both topics are of critical importance to practicing clinicians. Other than this small flaw, the book is a great desktop reference, and a key starting point for any investigation into the risks factors and diagnosis of pulmonary embolism. Stein is clearly one of the world's experts, and this far-reaching volume is a pleasure to read.

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The author reports no conflicts of interest related to the content of this book review.

Computed Tomography and Magnetic Resonance of the Thorax, 4th edition.

David P Naidich MD, W Richard Webb MD, Nestor L Müller MD PhD, Ioannis Vlahos MB, and Glenn A Krinsky MD. Philadelphia: Wolters Kluwer/Lippincott Williams & Wilkins. 2007. Hard cover, illustrated, 897 pages, \$149.

This book encompasses the full spectrum of thoracic imaging. Perhaps a more fitting title would be "Everything You Ever Wanted to Know About Thoracic Computed Tomography and Magnetic Resonance Imaging: An Illustrated Version." The authors present a current and in-depth analyses of thoracic imaging. The material is written clearly and all aspects of imaging are addressed. There are detailed discussions of techniques and protocols, and an emphasis on the appropriateness of the techniques in various clinical settings. Detailed imaging features are provided for numerous disease processes, and the text is accompanied by more than an ample number of images. Both medical and surgical treatments are discussed, accompanied by appropriate images. The advantages and limitations of computed tomography (CT) versus magnetic resonance imaging (MRI) are discussed for var-

ious disease processes and clinical indications, and the rationale for the appropriate application of either MRI or CT in a given disease process is thoroughly explained. Radiological appearance is traced from illness-onset through clinical outcomes. Useful radiological signs accompany the numerous figures and illustrations

This is a useful reference and education tool for radiologists and other physicians using thoracic imaging, at all levels of training and practice. The text is divided into 10 chapters. Six are dedicated to thoracic structure, defined organs, and associated disease processes. Four chapters pertain exclusively to lung disease. Each chapter is further divided into sections that detail imaging techniques, normal anatomy, and pathology. Both acquired and congenital disease processes are presented. A thorough clinical presentation is provided, followed by radiological findings. Contrasting imaging modalities are then discussed, including diagnostic pitfalls and emerging techniques. The chapters are compiled uniformly, with appropriate expansion about important subjects. For example, in Chapter 2, which contains 145 figures and illustrations, 1 table, and 348 references, there is a plethora of information on the aorta and branch vessels. There is a detailed description of CT technique, scan parameters, contrast administration, and triggering methods. For MRI there is list of available sequences and description of optimization of gadolinium-enhanced 3-dimensional magnetic resonance angiography (including coil selection, patient positioning, and examination timing). This is followed by in-depth discussion of reconstruction techniques and possible pitfalls. Normal anatomy of the aorta is followed by a review of the clinical features of and treatment options for congenital and acquired aortic diseases. Medical and surgical options are discussed, including advances in surgical techniques. Post-surgical appearance of various lesions is also discussed.

Chapter 3 is an overview of pulmonary arterial disease. A description of normal anatomy is followed by a thorough discussion of arterial obstruction, including acute embolism and chronic thromboembolism-related hypertension. The section on acute pulmonary artery embolism is particularly well written and includes clinical presentation and the rationale for choosing the appropriate diagnostic modality. Special care for pregnant patients is discussed. The controversial issue of subsegmental pulmonary emboli and negative CT studies are addressed, and data from the Prospective Investigation of Pulmonary Embolism Diagnosis (PIOPED) II study are incorporated. The sections on imaging technique discuss possible pitfalls in image acquisition, display, and interpretation.

Chapter 6 addresses focal lung disease, with emphasis on pulmonary nodules. Issues of nodule detection, image characterization, and therapeutic management are well addressed. Attention is paid to nodules overlooked on CT because of technical and perceptual errors. The section on nodule characterization focuses on morphologic evaluation, primarily on CT. Emphasis is placed on ground-glass versus mixed versus solid attenuation. Calcification, lipid content, cavitation, contour, size, location, and contrast enhancement are all addressed in detail with regard to the likelihood of malignancy. In addition, the role of MRI and positron emission tomography is reviewed. Growth characteristics, as predictors of biologic behavior, and measurement variations in nodules juxtaposed to other surfaces or inspiration artifacts are explained. The section on management provides various diagnostic approaches relative to node dimensions, and special biopsy strategies. The chapter concludes by discussing the future role of computer-aided detection, characterization, and measurement.

Chapters 2, 3, and 6 illustrate the wealth and depth of information presented in this

book. The photographs are of the highest quality. The excellent color images augment the text and will improve readers' understanding. The tables distributed throughout the text concisely summarize imaging features and important radiological and clinical findings. The chapter bibliographies are thorough and include important clinical and radiological studies that support the book's assertions. Note that this is not a quick-reference book; it requires thorough and focused reading.

We found a few flaws and omissions, which primarily relate to the timing of when the book went to print, perhaps for the next edition. For example, there is no reference or discussion of gadolinium administration in patients with renal failure, and the consequent risk of nephrogenic systemic fibrosis. Also not discussed is positron emission tomography for lymphoma follow-up and to differentiate between post-therapy fibrosis, residual tumor, and recurrent disease. Then again, this is a CT and MRI (not positron emission tomography) textbook. A few of the images are not of high quality, such as those of mediastinal masses, which perhaps are from an older-generation CT scanner. However, none of these issues have major bearing on the overall quality of the book.

In summary, this book provides a comprehensive and systematic review of cardiopulmonary imaging, and is a valuable educational reference and an important resource for training and practicing radiologists and cardiopulmonary physicians.

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The authors report no conflicts of interest related to the content of this book review.