LIPPINCOTT
WILLIAMS &
WILKINS

SPIRAL®
MANUAL

(英文原版)

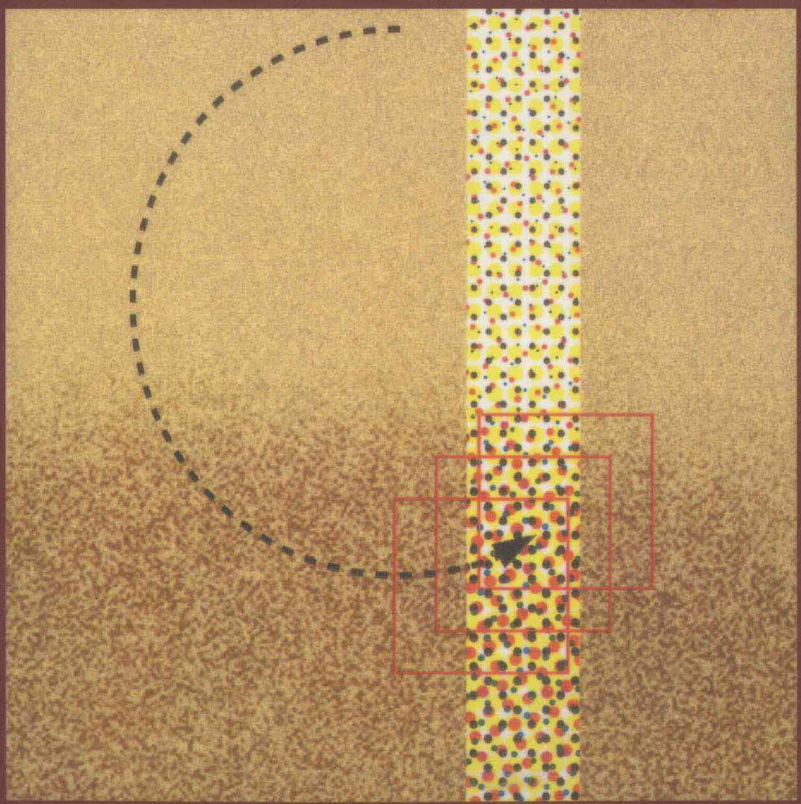
Manual of Urology

Diagnosis and Therapy
Second Edition

配英汉索引

泌尿科学手册

Edited by
Mike B. Siroky
Robert A. Edelstein
Robert J. Krane



Lippincott Williams & Wilkins Inc. 授权

天津科技翻译出版公司出版

LIPPINCOTT
WILLIAMS &
WILKINS

SPIRAL®
MANUAL
(英文原版)

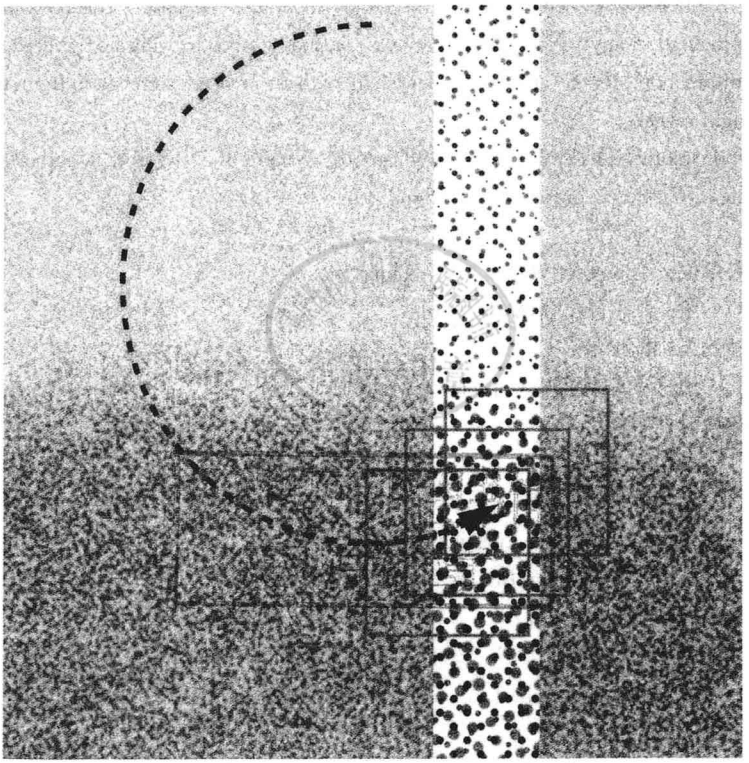
Manual of Urology

Diagnosis and Therapy
Second Edition

配英汉索引

泌尿科学手册

Edited by
Mike B. Siroky
Robert A. Edelstein
Robert J. Krane



Lippincott Williams & Wilkins Inc. 授权
天津科技翻译出版公司出版

著作权合同登记号:图字:02-2002-99

图书在版编目(CIP)数据

泌尿科学手册 = Manual of Urology: Diagnosis and Therapy/(美)西罗基(Siroky, M.B.)等编著. -影印本. -天津:天津科技翻译出版公司,2003.1
(SPIRAL® MANUAL 系列丛书)
ISBN 7-5433-1615-3

Ⅰ.泌... Ⅱ.西... Ⅲ.泌尿科学-手册-英文 Ⅳ.R69-62

中国版本图书馆 CIP 数据核字(2002)第 073097 号

授权单位: Lippincott Williams & Wilkins Inc.
出　　版: 天津科技翻译出版公司
出 版 人: 邢淑琴
地　　址: 天津市南开区白堤路 244 号
邮政编码: 300192
电　　话: 022-87893561
传　　真: 022-87892476
E - mail: tsttbc@public.tpt.tj.cn
印　　刷: 天津市蓟县宏图印务有限公司印刷
发　　行: 全国新华书店
版本记录: 900×1168　32 开本　12.125 印张　360 千字
2003 年 1 月第 1 版　2003 年 1 月第 1 次印刷
定价:30.00 元

(如发现印装问题,可与出版社调换)

Acquisitions Editor: R. Craig Percy
Developmental Editor: Michelle M. LaPlante
Production Editor: Aureliano Vázquez, Jr.
Manufacturing Manager: Kevin Watt
Cover Designer: Mark Lerner
Compositor: Circle Graphics
Printer: Edwards Brothers

227 East Washington Square
Philadelphia, PA 19106-3780 USA
LWW.com

Printed in the USA

Library of Congress Cataloging-in-Publication Data
Manual of urology : diagnosis & therapy / editors, Mike B. Siroky, Robert A. Edelstein, Robert J. Krane. — 2nd ed.
p. cm.
Includes bibliographical references and index.
ISBN 0-7817-1785-X
1. Urology Handbooks, manuals, etc. I. Siroky, Mike B. (Mike Benjamin), 1946– . II. Edelstein, Robert A. III. Krane, Robert J. (Robert Joel), 1943—
[DNLM: 1. Urologic Diseases—diagnosis Handbooks. 2. Urologic Diseases—therapy Handbooks. 3. Genital Diseases, Male—diagnosis Handbooks. 4. Genital Diseases, Male—therapy Handbooks. WJ 39 M2946 1999]
RC872.9.M36 1999
616.6—dc21
DNLM/DLC 99–25403
for Library of Congress CIP

---

10 9 8 7 6 5 4 3 2 1

Manual of Urology
Diagnosis & Therapy
Second Edition

Editors

Mike B. Siroky, M.D.
Professor of Urology
Boston University School of Medicine
Chief of Urology
Veterans Affairs Medical Center
Boston, Massachusetts

Robert A. Edelstein, M.D.
Assistant Professor of Urology
Boston University School of Medicine
Formerly, Attending Physician in Urology
Boston Medical Center
Boston, Massachusetts

Robert J. Krane, M.D.
Professor and Chairman
Department of Urology
Boston University School of Medicine
Urologist-in-Chief
Boston Medical Center
Boston, Massachusetts

LIPPINCOTT WILLIAMS & WILKINS
A **Wolters Kluwer** Company
Philadelphia • Baltimore • New York • London
Buenos Aires • Hong Kong • Sydney • Tokyo

To the memory of

Max K. Willscher, M.D.
November 13, 1944–July 31, 1995

A graduate of
the Boston University Training Program in Urology,
a colleague, and
a friend

CONTRIBUTING AUTHORS

Richard K. Babayan, M.D.
Chapter 10. Urinary Calculi and Endourology
Professor of Urology, Boston University School of Medicine, Attending Physician in Urology, Boston Medical Center, 720 Harrison Avenue, Suite 606, Boston, Massachusetts 02118

Stuart B. Bauer, M.D.
Chapter 19. Pediatric Urology
Associate Professor of Surgery (Urology), Harvard Medical School, Senior Associate in Surgery, Department of Urology, The Children's Hospital, 300 Longwood Avenue, Boston, Massachusetts 02115

Colm Bergin, M.D., M.R.C.P.
Chapter 17. Genitourinary Infection
Fellow in Infectious Disease, Boston Medical Center, 75 East Newton Street, Boston, Massachusetts 02118

Gennaro A. Carpinito, M.D.
Chapter 18. Management of Genitourinary Trauma
Chapter 21. Renal Failure and Dialysis
Associate Professor of Urology, Boston University School of Medicine, Chief, Department of Urology, Harrison Avenue Campus, Boston Medical Center, One Boston Medical Center Pl., Dowl 2, Boston, Massachusetts 02118

Andrew Chan, M.D.
Chapter 19. Pediatric Urology
Chief Resident in Urology, Boston Medical Center, 720 Harrison Avenue, Suite 606, Boston, Massachusetts 02118

N. R. Chandrasekar, M.D.
Chapter 22. Renal Transplantation
Fellow in Transplantation, Veterans Affairs Medical Center, 150 South Huntington Avenue, Boston, Massachusetts 02130

Barry Chang, M.D.
Chapter 19. Pediatric Urology
Chief Resident, Department of Urology, Boston University Medical Center, 88 East Newton Street, Boston, Massachusetts 02118

Caner Z. Dinlenc, M.D.
Chapter 7. Hematuria and Other Urine Abnormalities
Chapter 9. Surgical Disorders of the Adrenal Gland
Chief Resident, Department of Urology, Boston Medical Center, 720 Harrison Avenue, Suite 606, Boston, Massachusetts 02118

Robert A. Edelstein, M.D.
Chapter 3. Endoscopic Instruments and Surgery
Chapter 11. Management of Urinary Incontinence
Assistant Professor of Urology, Boston University School of Medicine, Formerly, Attending Physician in Urology, Boston Medical Center, 720 Harrison Avenue, Suite 606, Boston, Massachusetts 02118

Michael A. Geffin, M.D.
Chapter 8. Evaluation of Renal Mass Lesions
Resident in Urology, Boston Medical Center, 720 Harrison Avenue, Suite 606, Boston, Massachusetts 02118

Irwin Goldstein, M.D.
Chapter 12. Male Erectile Dysfunction
Professor of Urology, Boston University School of Medicine, Attending Physician in Urology, Boston Medical Center, 720 Harrison Avenue, Suite 606, Boston, Massachusetts 02118

Albert Hakaim, M.D.
Chapter 22. Renal Transplantation
Attending Surgeon, Transplantation Service, Veterans Affairs Medical Center, 150 South Huntington Avenue, Boston, Massachusetts 02130

Liam J. Hurley, M.D.
Chapter 14. Neoplasms of the Genitourinary Tract
Assistant Clinical Professor of Urology, Boston University School of Medicine, Staff Urologist, Veterans Affairs Medical Center, Attending Physician in Urology, Lawrence General Hospital, One General Street, Lawrence, Massachusetts 01842

Charles Hyde, M.D.
Chapter 1. Imaging of the Genitourinary Tract
Assistant Professor of Radiology, Boston University School of Medicine, Chief, Ultrasound Section, Veterans Affairs Medical Center, 150 South Huntington Avenue, Boston, Massachusetts 02130

Robert J. Krane, M.D.
Chapter 4. Nontraumatic Genitourinary Emergencies
Chapter 20. Neuro-Urology and Urodynamic Testing
Professor and Chairman, Department of Urology, Boston University School of Medicine, Urologist-in-Chief, Boston Medical Center, 720 Harrison Avenue, Suite 606, Boston, Massachusetts 02118

Raymond McGoldrick, M.D.
Chapter 18. Management of Genitourinary Trauma
Chief Resident in Urology, Boston Medical Center, 720 Harrison Avenue, Suite 606, Boston, Massachusetts 02118

Ricardo M. Munarriz, M.D.
Chapter 21. Renal Failure and Dialysis
Resident in Urology, Boston Medical Center, 720 Harrison Avenue, Suite 606, Boston, Massachusetts 02118

Robert D. Oates, M.D.
Chapter 8. Evaluation of Renal Mass Lesions
Chapter 13. Male Reproductive Dysfunction
Associate Professor of Urology, Boston University School of Medicine, Attending Physician in Urology, Boston Medical Center, 720 Harrison Avenue, Suite 606, Boston, Massachusetts 02118

Rachel A. Powsner, M.D.
Chapter 2. Radionuclide Imaging
Associate Professor of Radiology, Boston University School of Medicine, Staff Physician, Department of Radiology, Boston Medical Center, 88 East Newton Street, Boston, Massachusetts 02118

Dolly Razdan, M.D.
Chapter 15. Medical Management of Genitourinary Malignancy
Attending Physician in Hematology/Oncology, North Shore University Hospital, 300 Community Drive, Manhasset, New York 11030

Sanjay Razdan, M.D.
Chapter 4. Nontraumatic Genitourinary Emergencies
Chapter 15. Medical Management of Genitourinary Malignancy
Fellow in Neuro-Urology, Boston Medical Center, 720 Harrison Avenue, Suite 606, Boston, Massachusetts 02118

Dean J. Rodman, M.D.
Chapter 2. Radionuclide Imaging
Senior Attending Physician, Department of Nuclear Medicine, Sibley Memorial Hospital, 5255 Loughboro Road NW, Washington, D.C. 20016

Hossein Sadeghi-Nejad, M.D.
Chapter 12. Male Erectile Dysfunction
Chapter 13. Male Reproductive Dysfunction
Fellow in Infertility/Sexual Dysfunction, Boston Medical Center, 720 Harrison Avenue, Suite 606, Boston, Massachusetts 02118

Rebecca K. Schwartz, M.D.
Chapter 1. Imaging of the Genitourinary Tract
Instructor in Radiology, Boston University School of Medicine, Section Head, Computed Tomographic Imaging, Veterans Affairs Medical Center, 150 South Huntington Avenue, Boston, Massachusetts 02130

Mike B. Siroky, M.D.
Chapter 5. Fluid and Electrolyte Disorders
Chapter 6. Lower Urinary Tract Symptoms
Chapter 7. Hematuria and Other Urine Abnormalities
Chapter 9. Surgical Disorders of the Adrenal Gland
Chapter 20. Neuro-Urology and Urodynamic Testing
Professor of Urology, Boston University School of Medicine, Chief of Urology, Veterans Affairs Medical Center, 150 South Huntington Avenue, Boston, Massachusetts 02130

Anthony L. Zietman, M.D.
Chapter 16. Radiation Therapy of Genitourinary Malignancy
Associate Professor of Radiation Oncology, Harvard Medical School, Associate Radiation Oncologist, Massachusetts General Hospital, Fruit Street, Boston, Massachusetts 02114

PREFACE

The *Manual of Urology, Second Edition* represents a complete revision of the first edition of this manual, published in 1989. Although there are approximately the same number of chapters, the amount of information has been expanded considerably, arranged in an easily accessible outline format. Furthermore, while the number of radiologic and other photographs has been reduced, the number of tables, charts, and drawings has increased substantially.

Since the first edition 9 years ago, major changes in urologic practice have occurred, and the new material reflects this "mini-revolution." For example, the chapter on genitourinary radiology is a thoroughly modern treatment of this subject, emphasizing ultrasound and cross-sectional imaging. Updated chapters detail the new endoscopic instruments developed in the last decade, as well as innovative techniques in detecting urinary calculi. The diagnosis and treatment of bladder outlet obstruction, urinary incontinence, male erectile dysfunction, male infertility, and neurogenic bladder dysfunction have become varied and sophisticated, and this is reflected in the new chapters on these areas. The chapter on radiation therapy has been entirely rewritten to emphasize the many new treatment modalities that now exist, and the discussion of infectious diseases includes data regarding newer antibiotic agents.

At the same time, the purpose and orientation of the first edition have been maintained by presenting problems and therapeutic principles. The purpose also remains one of serving as a companion to the house officer and medical student responsible for urology patients, and to provide up-to-date, detailed and handy information, instruction, and advice. Open operative procedures are not depicted in great detail, but endoscopic, medical, and diagnostic procedures are well described. Most chapters were written by current and past residents and trainees associated with the Boston University training program in urology, with input from the faculty.

The first edition was well received in this country and was translated into Japanese as well. We hope that medical students, residents, and fellows find this manual useful in the day-to-day care of urologic patients. Of course, we are grateful for the efforts of our contributing authors. We also wish to thank everyone associated with Lippincott Williams & Wilkins for their support during the long process of producing this work, in particular R. Craig Percy and Michelle M. LaPlante.

Mike B. Siroky, M.D.
Robert A. Edelstein, M.D.
Robert J. Krane, M.D.

Manual of Urology
Diagnosis & Therapy
Second Edition

CONTENTS 目 录

1. IMAGING OF THE GENITOURINARY TRACT

Charles Hyde and Rebecca K. Schwartz

An extensive array of modalities and procedures is available for imaging of the genitourinary tract. Selection of the appropriate modality depends on the clinical question at hand in addition to considerations of patient safety, patient comfort, and cost. To make a good choice, one needs a thorough understanding of the utility of the various imaging modalities (see Table 1-1). In our discussion, we focus mainly on the technique and indications for urologic imaging. Interpretation of these studies is beyond the scope of this chapter.

I. Plain Abdominal Radiograph
   A. **Technique.** No preparation is needed. A single supine view is usually adequate; "upright" views, useful in evaluating the bowel, are rarely useful in evaluating the genitourinary system.
   B. **Indications.** The frequently used acronym KUB (kidneys, ureters, and bladder) is a misnomer, as the plain abdominal radiograph does not demonstrate the ureters and only rarely demonstrates the bladder. It is only moderately useful to demonstrate the renal contours. These can be assessed on technically optimal films, which hint at abnormalities such as renal masses and abnormalities of renal size or position. However, the greatest utility of the abdominal radiograph in urology is to evaluate for calculi, check the presence and position of catheters and stents, and obtain a preliminary view before performing other examinations.
   C. **Common findings**
      1. **Bony abnormalities** may include the following types:
         a. Congenital, such as spina bifida and sacral agenesis
         b. Posttraumatic, such as fractures of the spine or pelvis
         c. Postsurgical, such as surgically resected ribs or the presence of vascular clips
         d. Associated with other diseases, such as osteoblastic metastases (typical of prostate carcinoma), osteolytic metastases (the majority of solid tumors), or manifestations of hematologic disorders (sickle cell anemia, myeloma) or Paget's disease
      2. **Abnormal gas collections** include the following:
         a. Gas in the renal parenchyma or collecting system as a result of recent instrumentation or emphysematous pyelonephritis
         b. Gas in the bladder lumen as a result of recent instrumentation, emphysematous cystitis, colovesical or enterovesical fistula, urinary tract infection
         c. Gas in the bladder wall, as seen in emphysematous cystitis

II. Ultrasound

Ultrasound (US) is very useful in evaluating the urinary tract. Widely available, relatively inexpensive, and entailing no use of radiation, US provides generally excellent visualization of the kidneys, intrarenal collecting systems, and bladder. US is used as an initial screening examination of the urinary tract and has assumed much of the role once played by intravenous urography (IVU) in this regard. One significant drawback of US in comparison with other modalities, such as computed axial tomography (CT), magnetic resonance imaging (MRI), and IVU, is that no information other than inferential is obtained about renal function. US can also be of limited use in obese patients or in patients with a very large amount of bowel gas.

US plays a lesser role in ureteral evaluation. Although US can sometimes visualize a dilated proximal or distal ureter, most of the ureter will be obscured by overlying bowel gas, and a nondilated ureter generally cannot be seen at all. The

Table 1-1. Utility of various imaging modalities

	KUB	IVU	Retrograde pyelogram	US	I-CT	I+CT	MRI	NM-Mag3
Renal parenchyma	+	++	0	+++	+++	++++	++++	++
Renal calculi	++	+++	++-++++	+++	++++	++	0	0
Renal function	0	++	0	0	0	++++	++++	++++
Collecting system	0	+++	+++-++++	+++	++	+++	+++	++
Ureter	0	++	++++	0 (nondilated) ++ (dilated)	++	+++	+	++
Bladder	+	+++	(usually performed with cystoscopy)	++++	+++	+++	+++	++

KUB, plain abdominal radiograph; IVU, intravenous urography; US, ultrasound; I-CT, noncontrast-enhanced computed axial tomogram; I+CT, contrast-enhanced computed axial tomogram; MRI, magnetic resonance imaging; NM-MAG3, nuclear renal scan; 0, no use; +, minimally or rarely useful; ++, occasionally useful; +++, useful; ++++, very useful.

prostate is moderately well seen on transabdominal US and is very well visualized on transrectal US (TRUS). Another US examination frequently of interest to the urologist is scrotal US.

A. **Technique.** No special preparation is required. Because the kidneys are situated posteriorly and away from gas-containing structures, renal US, unlike general abdominal US, does not require the patient to be fasting. Whenever possible, imaging of the patient is performed with a urine-distended bladder to improve visualization of the bladder and prostate. We then have the patient void and scan the bladder again, to calculate a postvoid residuum.

   Because US examination is performed in real time, it is particularly useful for imaging children or patients who are uncooperative. With a portable machine, US examinations can be performed at the patient's bedside.

B. **Indications.** US is useful for general screening of the urinary tract. It is the examination of choice in defining renal cysts. It is particularly useful for detecting renal masses, diagnosing and following hydronephrosis, and evaluating the bladder. It is a useful adjunct in demonstrating renal calculi. It is less useful in evaluating lesions of the intrarenal collecting system, perirenal spaces, adrenals, and ureters, and in the setting of trauma.

C. **Renal transplant.** US of renal transplants is a special case. Because of the superficial location of a transplant and the lack of interposition of bowel gas, visualization of the transplant is usually excellent. Doppler tracings of the iliac artery, main renal artery, and intralobar and arcuate arteries give excellent insight into the evaluation of transplant failure and rejection (see Chapter 22).

D. **Scrotal US** is the single best radiologic method for evaluating the scrotal contents, including the testicles and extratesticular structures, and it is an invaluable part of the evaluation of scrotal pathology. Testicular pathology (including masses and inflammation), extratesticular pathology (including hydroceles), and epididymal pathology (including spermatoceles, epididymal masses, and inflammatory conditions) are all routinely imaged. In terms of technique, no preparation is needed. A high-frequency (5- to 10-MHz) linear transducer is used to image the scrotum directly.

E. **TRUS.** Transabdominal ultrasound of the prostate is generally limited to quantifying prostate size. To obtain a detailed image of the prostate and periprostatic structures, TRUS, in which a high-frequency transducer is placed in the rectum, must be performed. The prostatic zones are usually well seen, and the prostate is accurately measured.

   1. **Indications for TRUS** include an abnormality on digital rectal examination, elevated prostate-specific antigen (PSA), or previously abnormal results of a prostate biopsy. It must be emphasized that TRUS is neither sensitive nor specific; a normal result on TRUS examination does not exclude prostate carcinoma, and an abnormal examination result can be seen with benign prostatic hypertrophy (BPH), focal prostatitis, and other conditions. One of the major indications for TRUS is to guide a needle biopsy of the prostate. Important but less frequently applied indications for TRUS are examination of the seminal vesicles and ejaculatory ducts in the evaluation of infertility, and imaging of the prostate for abscess. TRUS can also be used to diagnose or drain a prostatic abscess.
   2. **Technique.** The patient is given a Fleet enema and is asked to void before the examination. We currently give 400 mg of ofloxacin orally 1 hour before the biopsy and twice daily for five additional doses after the procedure. We perform the biopsies with the patient in the left lateral position, although many advocate the lithotomy position for equally good results. We obtain six segmental biopsy specimens with an 18-gauge spring-loaded needle. If a focal abnormality is present, we typically obtain one to three additional biopsy specimens. Some bleeding—usually self-limited—from the rectum or urethra is common following the procedure. We have a 1% incidence of bleeding significant enough to require observation and a 1% incidence of postbiopsy infection.

III. Computed Axial Tomography

CT, like US, has revolutionized the radiologic evaluation of the genitourinary tract. CT allows the radiologist to assess directly the morphology and function of the kidneys, the appearance of the surrounding retroperitoneal soft tissues (lymph nodes, adrenals, aorta, inferior vena cava), and the patency of vascular structures (renal veins and arteries). In the pelvis, CT can evaluate the bladder, prostate, and surrounding soft tissues and lymph nodes, as well as the ureters. CT is limited for the evaluation of the penis and scrotum, and these structures are generally better assessed by US or MRI.

A. **Technique.** CT examinations can be performed with or without oral contrast, and with or without IV contrast. It is important that the specific indications—the specific question to be answered—be discussed with the radiologist before a CT is performed, as the technique used will vary significantly.

The technique used must also vary with the capabilities of the CT scanner. Until recently, most scanning was performed with conventional axial CT, with stepped table movement between tomographic slices. This imaging process is relatively slow, with a scanning time of approximately 2 seconds and an interscan delay of 2 to 8 seconds. At least a minute is required to scan through the kidneys. Problems with this method include motion artifacts, gaps in scanning, and limited ability to evaluate the entire kidney in a uniform phase of enhancement. **Partial volume artifacts**, a particular problem when small peripheral masses are evaluated, occur if the lesion being studied is not in the center of the slice. The CT number (Fig. 1-1) calculated

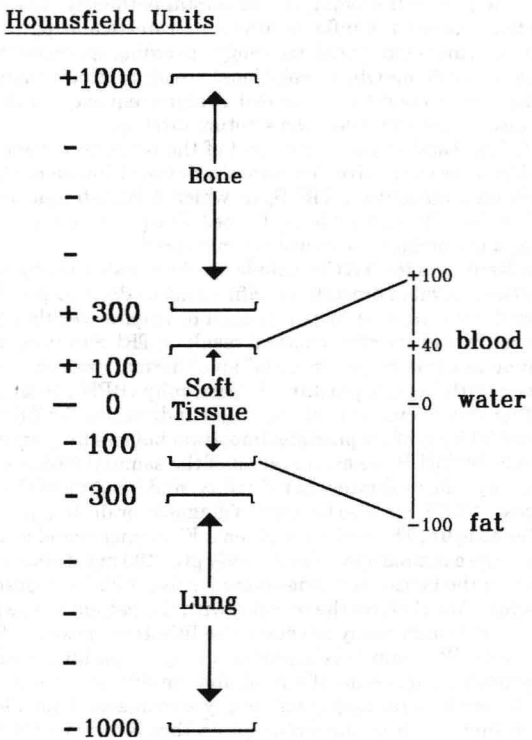


FIG. 1-1. The Hounsfield scale for computed axial tomographic (CT) density.