RADIOPHGRAPIC PATHOLOGY FOR TECHNOLOGISTS
FIFTH EDITION
Nina Kowalczyk
James D. Mace

Mosby
ELSEVIER
http://evolve.elsevier.com
LEARN TO RECOGNIZE CONDITIONS AND INJURIES DIAGNOSED WITH MEDICAL IMAGING

With this comprehensive, well-illustrated reference, you’ll gain familiarity with the most commonly diagnosed diseases and injuries as well as likely prognoses, allowing you to produce optimal radiographs.

Inside you’ll find:
- In-depth coverage of over 150 of the most commonly diagnosed pathologies organized by body system.
- NEW radiographs and illustrations showing images of pathologies in different modalities, including MRI, CT, nuclear medicine, PET, and ultrasound.
- The latest advances in 3-D reconstructions, PET imaging, molecular imaging, monoclonal antibody technology, advances in cardiac imaging, and fusion technologies.
- A NEW chapter on the endocrine system that discusses the importance of radiographic examination in diagnosing metabolic disease.
- Discussions of correlative and differential diagnoses that explain the role of high-quality images in the diagnostic process.
- Summary tables listing the pathologies from each chapter along with the imaging modalities of choice for each pathology.
- A NEW chapter order that mirrors the way a radiographic pathology course is typically taught.
- Reader-friendly features such as key terms, chapter outlines and objectives, and review questions.

The information you need to produce high-quality images!
The fifth edition of *Radiographic Pathology for Technologists* has been thoroughly updated and revised to offer students and medical imaging professionals information on the pathologic appearance of common diseases in a variety of diagnostic imaging modalities. It also presents basic information on the pathologic process, signs and symptoms, diagnosis, and prognosis of the various diseases.

The fifth edition includes the latest information concerning recent advances in genetic and molecular medicine and up-to-date imaging modalities used in daily practice. The authors have attempted to present this material in a succinct but reasonably complete fashion to meet the needs of professionals in various imaging specialties. With each new edition, the authors have also expanded the scope of the material covered in the text to provide the reader with a broader base of knowledge.

### NEW TO THIS EDITION

- The chapter order and arrangement have been changed to accommodate the general revision of existing material.
- A new chapter on pathologies of the endocrine system has been added.
- Over 50 new illustrations have been added to complement new, updated, or expanded material.
- Web address information for the most current statistics has replaced some of the tables from the fourth edition, and other tables have been updated to reflect the most current data.
- Information on the human genome project has been updated in Chapter 1.
- Several new terms have been added to the glossary, and other definitions have been expanded or updated.

### LEARNING ENHANCEMENTS

- Each chapter begins with an outline, followed by key terms and learning objectives.
- Chapter content is followed by a summary table, general discussion questions, and multiple-choice review questions, all of which can be used by the reader to assess acquired knowledge or by the instructor to stimulate discussion.
- Bold print has been used to focus the reader’s attention on the key terms in each chapter, which are defined in the glossary at the end of the book along with other relevant terms.

### USING THE BOOK

The presentation of the fifth edition presumes that the reader has some background in human anatomy and physiology, imaging procedures, and medical and imaging terminology. The reader may build on this knowledge by assimilating information presented in this text.

To facilitate a working knowledge of the principles of radiologic pathology, study materials presented in the fifth edition remain sophisticated enough to be true to the complexity of the subject yet simple and concise enough to permit comprehension by all readers. For student radiographers, sonographers, and nuclear medicine technologists, this text is best used in conjunction with formal instruction from a qualified instructor. The practicing imaging professional may use this book as a self-teaching instrument to broaden and reinforce existing knowledge of the subject matter and also as a means to acquaint himself or herself with changing concepts and new material. The book can serve as a resource for continuing education because it provides an extensive range of information.
ANCILLARIES

Evolve Resources

Evolve is an interactive learning environment designed to work in coordination with *Radiographic Pathology for Technologists*. Included on the Evolve website are instructor resources including key terms, chapter objectives, instructional chapter outlines, suggested activities, general discussion questions, a test bank in ExamView containing approximately 800 questions, an electronic images collection consisting of images from the textbook, and a PowerPoint presentation. Instructors may use Evolve to provide an Internet-based course component that reinforces and expands the concepts presented in class. Evolve may be used to publish the class syllabus, outlines, and lecture notes; set up “virtual office hours” and e-mail communication; share important dates and information through the online class calendar; and encourage student participation through chat rooms and discussion boards. Evolve also allows instructors to post examinations and manage their grade books online. Interactive learning applications, including crossword puzzles and word search puzzles, are included for students so they can further explore the content of the text and improve their confidence in the knowledge they will gain as they progress through the book. For more information, visit http://evolve.elsevier.com/Kowalczyk/pathology/or contact an Elsevier sales representative.

ACKNOWLEDGMENTS

I certainly could not have completed this book without a great team of people who wanted this text to be successful and accomplish its primary mission. I would like to thank my son Nick, for his support; my students, past and present, for their inspiration; and my friends and colleagues for their encouragement. I also want to thank the editorial team at Elsevier for their unending patience, and particularly Alaina Webster, who worked diligently to guide me through the revision process.

The images in this book come from a variety of fine organizations that are to be thanked for graciously allowing us to use their material. They include the American College of Radiology, as well as The Ohio State University Medical Center, Riverside Methodist Hospitals, Grant Medical Center, and Children’s Hospital—all located in Columbus, Ohio.

Nina Kowalczyk
CONTENTS

1 INTRODUCTION TO PATHOLOGY, 1
   Pathologic Terms, 2
   Disease Classifications, 6
   Altered Cellular Biology, 11
   Summary, 12

2 SKELETAL SYSTEM, 14
   Anatomy and Physiology, 15
   Imaging Considerations, 17
   Congenital and Hereditary Diseases, 19
   Inflammatory Diseases, 26
   Vertebral Column, 36
   Neoplastic Diseases, 38

3 RESPIRATORY SYSTEM, 53
   Anatomy and Physiology, 54
   Imaging Considerations, 55
   Chest Tubes, Vascular Access Lines, and Catheters, 65
   Respiratory Failure, 69
   Congenital and Hereditary Diseases, 69
   Inflammatory Diseases, 71
   Neoplastic Diseases, 85

4 ABDOMEN AND GASTROINTESTINAL SYSTEM, 92
   Anatomy and Physiology, 93
   Imaging Considerations, 96
   Congenital and Hereditary Anomalies, 107
   Inflammatory Diseases, 113
   Esophageal Varices, 120
   Degenerative Diseases, 122
   Bowel Obstructions, 125
   Neurogenic Diseases, 129
   Diverticular Diseases, 129
   Neoplastic Diseases, 131

5 HEPATOBILIARY SYSTEM, 140
   Anatomy and Physiology, 141
   Imaging Considerations, 142
   Inflammatory Diseases, 147
   Neoplastic Diseases, 155

6 URINARY SYSTEM, 161
   Anatomy and Physiology, 162
   Imaging Considerations, 163
   Congenital and Hereditary Diseases, 173
   Inflammatory Diseases, 179
   Urinary System Calculations, 183
   Degenerative Diseases, 185
   Neoplastic Diseases, 187

7 CENTRAL NERVOUS SYSTEM, 195
   Anatomy and Physiology, 196
   Imaging Considerations, 199
   Congenital and Hereditary Diseases, 206
   Inflammatory Diseases, 210
   Degenerative Diseases, 213
   Vascular Diseases, 215
   Neoplastic Diseases, 219

8 CARDIOVASCULAR SYSTEM, 233
   Anatomy and Physiology, 234
   Imaging Considerations, 237
   Congenital and Hereditary Diseases, 249
   Valvular Disease, 254
   Congestive Heart Failure, 256
   Cor Pulmonale, 257
   Degenerative Diseases, 257
   Aneurysms, 262
   Venous Thrombosis, 263
   Pulmonary Emboli, 264
9 HEMOPOIETIC SYSTEM, 270
  Anatomy and Physiology, 271
  Imaging Considerations, 274
  Acquired Immunodeficiency Syndrome, 275
  Neoplastic Diseases, 278

10 REPRODUCTIVE SYSTEM, 284
   Female Reproductive System, 285
   Anatomy and Physiology, 285
   Imaging Considerations, 287
   Congenital Anomalies, 291
   Inflammatory Diseases, 291
   Neoplastic Diseases, 292
   Uterine Masses, 296
   Breast Masses, 297
   Disorders during Pregnancy, 301
   Male Reproductive System, 304
   Anatomy and Physiology, 304
   Imaging Considerations, 305
   Congenital Anomalies, 306
   Neoplastic Diseases, 306

11 ENDOCRINE SYSTEM, 313
   Anatomy and Physiology, 314
   Imaging Considerations, 316
   Skeletal Disorders, 318
   Pituitary Gland Disorders, 321
   Adrenal Gland Disorders, 322
   Pancreatic Disorders, 323
   Thyroid and Parathyroid Gland Disorders, 324

12 TRAUMATIC DISEASE, 330
   Level I, II, and III Trauma Centers, 332
   Imaging Considerations, 332
   Trauma of the Vertebral Column and Head, 334
   Skeletal Trauma, 344
   Trauma of the Chest and Thorax, 377
   Abdominal Trauma, 380

ANSWER KEY, 385

GLOSSARY, 387

IMAGE CREDITS AND COURTESIES, 403

BIBLIOGRAPHY, 405

INDEX, 408