

Contents

CHAPTER 1

Recognizing Anything

- An Introduction to Imaging Modalities 1
- From Darkness . . . Light 2
- Conventional Radiography 2
- The Five Basic Densities 2
- Computed Tomography 3
- Ultrasonography 4
- Magnetic Resonance Imaging 5
- Fluoroscopy 5
- Nuclear Medicine 5
- Conventions Used in This Book 6

CHAPTER 2

Recognizing a Technically Adequate Chest Radiograph

- Evaluating the Chest Radiograph for Technical Adequacy 8

CHAPTER 3

Recognizing Normal Pulmonary Anatomy

- The Normal Frontal Chest Radiograph 14
- Normal Pulmonary Vasculature 15
- The Normal Lateral Chest Radiograph 15
- Normal CT Anatomy of the Chest 19
- Normal CT Anatomy of the Lungs 19
- The Fissures 21

CHAPTER 4

Recognizing Normal Cardiac Anatomy

- Evaluating the Heart on Chest Radiographs 24
- General Principles 25
- Evaluating the Heart on Cardiac CT 25
- Normal Cardiac CT Anatomy 25
- Uses of Cardiac CT 29
- Cardiac MRI 31

CHAPTER 5

Recognizing Airspace versus Interstitial Lung Disease

- Classifying Parenchymal Lung Disease 35
- Characteristics of Airspace Disease 35
- Some Causes of Airspace Disease 37
- Characteristics of Interstitial Lung Disease 38
- Some Causes of Interstitial Lung Disease 39

CHAPTER 6

Recognizing the Causes of an Opacified Hemithorax

- Atelectasis of the Entire Lung 45
- Massive Pleural Effusion 46
- Pneumonia of an Entire Lung 47
- Postpneumectomy 48

CHAPTER 7

Recognizing Atelectasis

- What is Atelectasis? 50
- Types of Atelectasis 52
- Patterns of Collapse in Lobar Atelectasis 55
- How Atelectasis Resolves 56

CHAPTER 8

Recognizing a Pleural Effusion

- Normal Anatomy and Physiology of the Pleural Space 58
- Modalities for Detecting Pleural Effusions 58
- Causes of Pleural Effusions 58
- Types of Pleural Effusions 58
- Side-Specificity of Pleural Effusions 59
- Recognizing the Different Appearances of Pleural Effusions 59

CHAPTER 9

Recognizing Pneumonia

- General Considerations 68
- General Characteristics of Pneumonia 68
- Patterns of Pneumonia 69
- Lobar Pneumonia 69
- Segmental Pneumonia (Bronchopneumonia) 69
- Interstitial Pneumonia 70
- Round Pneumonia 70
- Cavitary Pneumonia 71
- Aspiration 71
- Localizing Pneumonia 72
- How Pneumonia Resolves 74

CHAPTER 10

Recognizing Pneumothorax, Pneumomediastinum, Pneumopericardium, and Subcutaneous Emphysema

- Recognizing a Pneumothorax 76
- Recognizing Pneumomediastinum 81
- Recognizing Pneumopericardium 82
- Recognizing Subcutaneous Emphysema 82

CHAPTER 11**Recognizing the Correct Placement of Lines and Tubes and Their Potential Complications: Critical Care Radiology**

- Endotracheal and Tracheostomy Tubes 85
- Intravascular Catheters 87
- Cardiac Devices—Pacemaker, AICD, IABP 91
- GI Tubes and Lines—Nasogastric Tubes, Feeding Tubes 94

CHAPTER 12**Recognizing Diseases of the Chest**

- Mediastinal Masses 97
- Anterior Mediastinum 98
- Middle Mediastinal Masses 100
- Posterior Mediastinal Masses 101
- Solitary Nodule/Mass in the Lung 101
- Bronchogenic Carcinoma 105
- Metastatic Neoplasms in the Lung 107
- Pulmonary Thromboembolic Disease 107
- Chronic Obstructive Pulmonary Disease 108
- Blebs and Bullae, Cysts and Cavities 109
- Bronchiectasis 110

CHAPTER 13**Recognizing Adult Heart Disease**

- Recognizing an Enlarged Cardiac Silhouette 114
- Pericardial Effusion 114
- Extracardiac Causes of Apparent Cardiac Enlargement 114
- Identifying Cardiac Enlargement on an AP Chest Radiograph 115
- Recognizing Cardiomegaly on the Lateral Chest Radiograph 115
- Recognizing Common Cardiac Diseases 115
- Noncardiogenic Pulmonary Edema—General Considerations 119
- Noncardiogenic Pulmonary Edema—Imaging Findings 120
- Differentiating Cardiac from Noncardiac Pulmonary Edema 120
- Hypertensive Cardiovascular Disease 121
- Mitral Stenosis 121
- Pulmonary Arterial Hypertension 122
- Aortic Stenosis 123
- Cardiomyopathy 123
- Aortic Aneurysms—General Considerations 124
- Recognizing a Thoracic Aortic Aneurysm 124
- Thoracic Aortic Dissection 125
- Coronary Artery Disease 126

CHAPTER 14**Recognizing the Normal Abdomen: Conventional Radiology**

- Conventional Radiography 129
- What to Look For 129
- Normal Bowel Gas Pattern 129
- Normal Fluid Levels 131
- Differentiating Large from Small Bowel 131
- Acute Abdominal Series: the Views and What They Show 131
- Calcifications 135
- Organomegaly 135

CHAPTER 15**Recognizing the Normal Abdomen and Pelvis on Computed Tomography**

- Introduction to Abdominal and Pelvic Computed Tomography 140
- Abdominal CT: General Considerations 141

CHAPTER 16**Recognizing Bowel Obstruction and Ileus**

- Abnormal Gas Patterns 147
- Laws of the Gut 147
- Functional Ileus: Localized Sentinel Loops 148
- Functional Ileus: Generalized Adynamic Ileus 148
- Mechanical Obstruction: Small Bowel Obstruction 149
- Mechanical Obstruction: Large Bowel Obstruction (LBO) 154
- Volvulus of the Colon 155
- Intestinal Pseudoobstruction (Ogilvie Syndrome) 155

CHAPTER 17**Recognizing Extraluminal Gas in the Abdomen**

- Signs of Free Intraoperative Air 158
- Air Beneath the Diaphragm 158
- Visualization of Both Sides of the Bowel Wall 159
- Visualization of the Falciform Ligament 161
- Causes of Free Air 161
- Signs of Extraperitoneal Air (Retroperitoneal Air) 162
- Causes of Extraperitoneal Air 162
- Signs of Air in the Bowel Wall 162
- Causes and Significance of Air in the Bowel Wall 163
- Signs of Air in the Biliary System 164
- Causes of Air in the Biliary System 165

CHAPTER 18**Recognizing Abnormal Calcifications and Their Causes**

- Patterns of Calcification 167
- Rimlike Calcification 167
- Linear or Tracklike Calcification 167
- Lamellar or Laminar Calcification 169
- Cloudlike, Amorphous, or Popcorn Calcification 169
- Location of Calcification 173

CHAPTER 19**Recognizing the Imaging Findings of Trauma**

- Chest Trauma 174
- Rib Fractures 174
- Pulmonary Contusions 175
- Pulmonary Lacerations (Hematoma or Traumatic Pneumatocele) 175
- Aortic Trauma 176
- Abdominal Trauma 177
- Pelvic Trauma 180

CHAPTER 20**Recognizing Gastrointestinal, Hepatic, and Urinary****Tract Abnormalities**

- Esophagus 183
- Stomach and Duodenum 186
- Duodenal Ulcer 186
- Small and Large Bowel 186
- Large Bowel 188
- Pancreas 193
- Hepatobiliary Abnormalities 194
- Space-Occupying Lesions of the Liver 196
- Biliary System 199
- Urinary Tract 199
- Pelvis 200
- Urinary Bladder 201
- Adenopathy 201

CHAPTER 21**Ultrasonography: Understanding the Principles and Recognizing Normal and Abnormal Findings**

- How It Works 204
- Doppler Ultrasonography 205
- Adverse Effects or Safety Issues 205
- Medical Uses of Ultrasonography 205

CHAPTER 22**Magnetic Resonance Imaging: Understanding the Principles and Recognizing the Basics***Daniel J. Kowal, MD*

- How Magnetic Resonance Imaging Works 220
- Hardware That Makes Up an MRI Scanner 220
- What Happens Once Scanning Begins 220
- How Can You Identify a T1-Weighted or T2-Weighted Image? 221
- MRI Contrast Agents: General Considerations 223
- MRI Safety Issues 225
- Diagnostic Applications of MRI 226

CHAPTER 23**Recognizing Abnormalities of Bone Density**

- Normal Bone Anatomy 228
- The Effect of Bone Physiology on Bone Anatomy 229
- Recognizing a Generalized Increase in Bone Density 229
- Recognizing a Focal Increase in Bone Density 230
- Recognizing a Generalized Decrease in Bone Density 233
- Recognizing a Focal Decrease in Bone Density 235
- Pathologic Fractures 238

CHAPTER 24**Recognizing Fractures and Dislocations**

- Recognizing an Acute Fracture 240
- Recognizing Dislocations and Subluxations 242
- Describing Fractures 242
- How Fractures are Described—by the Number of Fracture Fragments 242

- How Fractures are Described—by the Direction of the Fracture Line 244
- How Fractures are Described—by the Relationship of One Fracture Fragment to Another 244
- How Fractures are Described—by the Relationship of the Fracture to the Atmosphere 245
- Avulsion Fractures 245
- Stress Fractures 246
- Common Fracture Eponyms 247
- Some Easily Missed Fractures or Dislocations 248
- Fracture Healing 251

CHAPTER 25**Recognizing Joint Disease: An Approach to Arthritis**

- Anatomy of a Joint 254
- Classification of Arthritis 255
- Hypertrophic Arthritis 256
- Erosive Arthritis 260
- Infectious Arthritis 263

CHAPTER 26**Recognizing Some Common Causes of Neck and Back Pain**

- Conventional Radiography, Magnetic Resonance Imaging, and Computed Tomography 266
- The Normal Spine 266
- Back Pain 268
- Malignancy Involving the Spine 272
- MRI in Metastatic Spine Disease 273
- Spinal Trauma 273

CHAPTER 27**Recognizing Some Common Causes of Intracranial Pathology**

- Normal Anatomy 279
- MRI and the Brain 281
- Head Trauma 282
- Intracranial Hemorrhage 285
- Diffuse Axonal Injury 286
- Increased Intracranial Pressure 289
- Stroke 290
- Ruptured Aneurysms 292
- Hydrocephalus 294
- Cerebral Atrophy 296
- Brain Tumors 296
- Other Diseases 299
- Neuroimaging Terminology 300

CHAPTER 28**Recognizing Pediatric Diseases**

- Conditions Discussed in This Chapter 303
- Newborn Respiratory Distress 303
- Childhood Lung Disease 306
- Soft Tissues of the Neck 307
- Ingested Foreign Bodies 309
- Other Diseases 310

