



POCKET **RADIOLOGIST** TM

Chest

Top 100 Diagnoses

Gurney

Winer-Muram

PocketRadiologist™

Chest

Top 100 Diagnoses

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Preface

The **PocketRadiologist™** series is an innovative, quick reference designed to deliver succinct, up-to-date information to practicing professionals "at the point of service." As close as your pocket, each title in the series is written by world-renowned authors. These experts have designated the "top 100" diagnoses or interventional procedures in every major body area, bulleted the most essential facts, and offered high-resolution imaging to illustrate each topic. Selected references are included for further review. Full color anatomic-pathologic computer graphics model many of the actual diseases.

Each **PocketRadiologist™** title follows an identical format. The same information is in the same place - every time - and takes you quickly from key facts to imaging findings, differential diagnosis, pathology, pathophysiology, and relevant clinical information. The interventional modules give you the essentials and "how-tos" of important procedures, including pre- and post-procedure checklists, common problems and complications.

PocketRadiologist™ titles are available in both print and hand-held PDA formats. Currently available modules feature Brain, Head and Neck, Orthopedic (Musculoskeletal) Imaging, Pediatrics, Spine, Chest, Cardiac, Vascular, Abdominal Imaging and Interventional Radiology. 2003 topics will include Obstetrics, Gynecologic Imaging, Breast, and much, much more. Enjoy!

Anne G Osborn MD
Editor-in-Chief, Amirsys Inc

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PocketRadiologist™

Chest

Top 100 Diagnoses

The diagnoses in this book are divided into 14 sections in the following order:

Airspace

Airways

Interstitial

Mediastinum

Carcinoma

Nodule(s)

Pleura

Hyperinflation & Cysts

Heart & Pericardial

Pulmonary Artery

Aorta

Trauma

Portable ICU

Chest Wall

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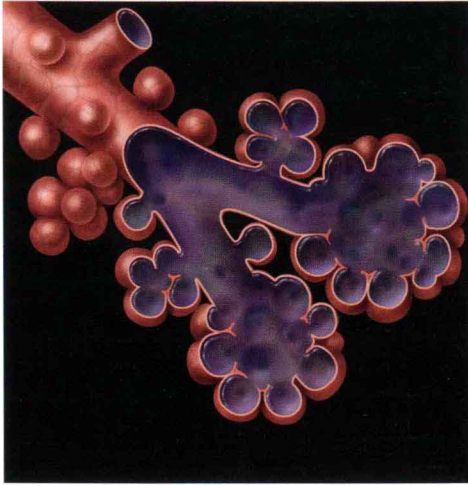
PocketRadiologist™

Chest

Top 100 Diagnoses

AIRSPACE

Diffuse Alveolar Damage



Adult respiratory distress syndrome. Increased capillary permeability with proteinaceous hemorrhagic fluid filling alveoli. Other features include hyaline membrane formation, alveolar atelectasis and small vessel microthromboses.

Key Facts

- Diffuse peripheral pulmonary consolidation
- Lack of Kerley B lines and peribronchial cuffing
- Anterior (nondependent) cysts from barotrauma with positive end-expiratory pressure (PEEP)
- Acute respiratory distress syndrome (ARDS): Clinical definition, severe hypoxemia on high concentrations of O_2 , normal wedge pressure
- Seen with nearly any medical or surgical condition: Toxic fumes, aspiration, shock, postoperative, pancreatitis

Imaging Findings

General Features

- Best imaging clue: Intubated patient with diffuse peripheral consolidation

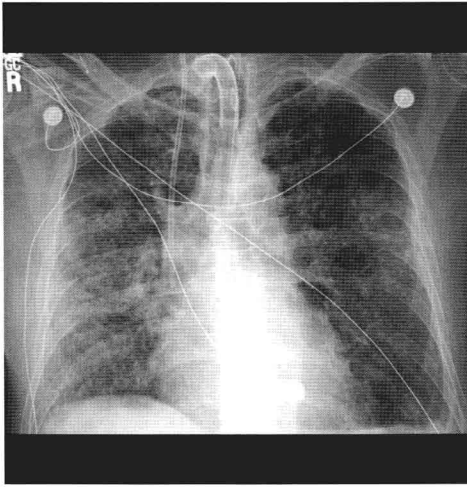
Chest Radiograph

- Diffuse pulmonary consolidation
- Favors the lung periphery
- Kerley B lines infrequent (more frequent with cardiogenic edema)
- Peribronchial cuffing infrequent
- Normal heart size: No pulmonary vascular redistribution
- May have small pleural effusions
- Initial use of PEEP may increase lung volume giving apparent radiographic "improvement"
- Barotrauma common with PEEP
- Superimposed pneumonia common

CT/HRCT Findings

- Surprisingly inhomogeneous
- Gravitational gradient: Ventral to dorsal increase in opacities
- PEEP may overdistend less involved ventral lung, leads to cysts & bullae
- Resolution, coarse reticular thickening and cyst formation in anterior (ventral, nondependent) lung

Diffuse Alveolar Damage



Diffuse interstitial thickening and consolidation. Long term tracheostomy. Cystic lucencies in the left mid lung and left upper lobe may represent ventral cysts from barotrauma.

Imaging Recommendations

- Chest radiography
 - To evaluate extent of parenchymal disease
 - Location of support and monitoring apparatus
 - To detect complications of barotrauma
- CT
 - For complications of barotrauma, i.e., pneumatocele, pneumothorax, pneumomediastinum
 - For complications of infection, i.e., lung abscess, empyema

Differential Diagnosis

General

- Usually patients with ARDS rapidly intubated to support oxygenation even when severity of consolidation mild
- Rather than radiographic differentiation, clinical management based on Swan-Ganz catheter and pulmonary capillary wedge pressure (PCWP)

Cardiogenic Edema

- Separation from cardiogenic pulmonary edema moderately successful
 - Absent Kerley B lines and peribronchial cuffing
 - Peripheral predominance
 - Normal heart size, pleural effusions rare
 - No pulmonary vascular redistribution, normal vascular pedicle

Pneumonia

- May have identical radiographic findings, may result in ARDS

Massive Aspiration

- May have identical radiographic findings, may result in ARDS

Hemorrhage

- May have identical radiographic findings, patient often anemic

Diffuse Alveolar Damage

Pathology

General

- Good correlation between radiographic patterns and pathologic changes
- Common misconception that insult is homogeneous
- 3 phases
 - Exudative phase: Normal at HRCT
 - Proliferative phase: Ground-glass opacities to frank consolidation
 - Even though capillary injury is diffuse, lung opacities most severe in the dependent lung from fluid accumulation and atelectasis
 - Chronic phase: Resolution of consolidation, residual scarring and cysts
 - Cyst formation and coarse reticular thickening, particularly in nondependent lung due to PEEP barotrauma
- Pathophysiology: Inflammatory mediators damage capillary membrane
- Etiology
 - Nearly any major medical or surgical condition
 - Airway insult; aspiration (especially gastric acid); toxic fume inhalation; O_2 toxicity; pneumonia
 - Blood-borne insult; sepsis; transfusion; surgery; shock; eclampsia; pancreatitis

Gross Pathologic Features

- Exudative: Heavy, airless, deep purple lung
- Hepatization of lung fibrosis, cysts: May eventually return to normal

Microscopic Features

- Diffuse alveolar damage (DAD)
 - Exudative: Capillary congestion, microatelectasis
 - Proliferative: Protein-rich interstitial edema, hyaline membranes
 - Chronic: Hyperplasia type II pneumocyte, fibroblastic infiltration

Staging or Grading Criteria

- Stage 1: Exudative (first 24 hours)
- Stage 2: Proliferative (1-7 days)
- Stage 3: Chronic (>1 week)

Clinical Issues

Presentation

- Acute (immediate) or insidious (hours or days) after initiating event
- Dyspnea, tachypnea, dry cough, agitation, cyanosis
- ARDS clinical definition for DAD, $P_aO_2 < 50$ with $F_{IO_2} > 50\%$
- Normal wedge pressure: Decreased lung compliance
- May have no chest radiographic abnormalities in first 12 hours
- Later, chest radiograph diffusely abnormal

Treatment

- Steroids or extracorporeal membrane oxygenation (ECMO) not shown to be beneficial; supportive, mechanical ventilation: PEEP

Prognosis

- High mortality rate
- Survivors may have either restrictive or obstructive functional deficits

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