

POCKET**RADIOLOGIST**TM

Pediatrics

Top 100 Diagnoses

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AMIRSYSTM

PocketRadiologist™

Pediatrics

100 Top Diagnoses

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First Edition

Text - Copyright Lane F Donnelly 2002

Drawings - Copyright Amirsys Inc 2002

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First Printing: April 2002

Second Printing: October 2002

Composition by Amirsys Inc, Salt Lake City, Utah

Printed in China

ISBN: 0-7216-0672-5

袖珍放射专家——儿科的 100 个主要诊断

[美]唐纳利 著

Amirsys Inc 出版

上海世界图书出版公司 重印发行

2004 年 4 月第 1 版

上海市尚文路 185 号 B 楼 邮政编码 200010

各地新华书店经销 (限中华人民共和国内发行)

图字: 09-2004-034 号

ISBN 7-5062-6533-8 /R · 63

定价: 140.00 元

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, specialists in their area. These experts have designated the “top 100” diagnoses 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.

PocketRadiologist™ titles are available in both print and hand-held PDA formats. Our first modules feature Brain, Head and Neck, and Orthopedic (Musculoskeletal) Imaging. Additional titles include Spine and Cord, Chest, Breast, Vascular, Cardiac, Pediatrics, Emergency, and Genital Urinary, and Gastro Intestinal. Enjoy!

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

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PocketRadiologist™

Pediatrics

Top 100 Diagnoses

The diagnoses in this book are divided into **7** sections in the following order:

- Chest**
- Airway**
- Cardiac**
- Gastrointestinal**
- Genitourinary**
- Musculoskeletal**
- Neuro**

PocketRadiologist™

Pediatrics

100 Top Diagnoses

CHEST

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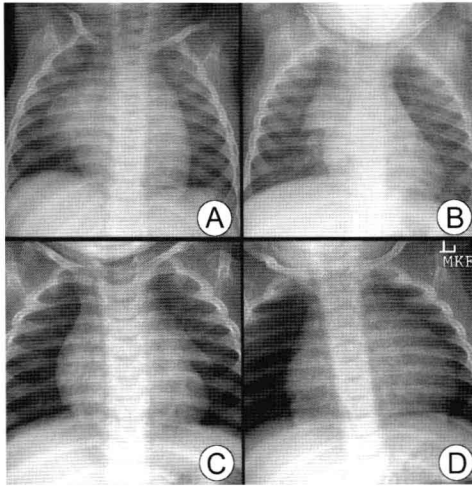
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Normal Thymus



Variations shown in the radiographic appearance of the normal thymus. (A) and (B) show infants with prominent rightward thymus. (C) shows a prominent leftward thymus and (D) shows a prominent thymus draped over the cardiac silhouette.

Key Facts

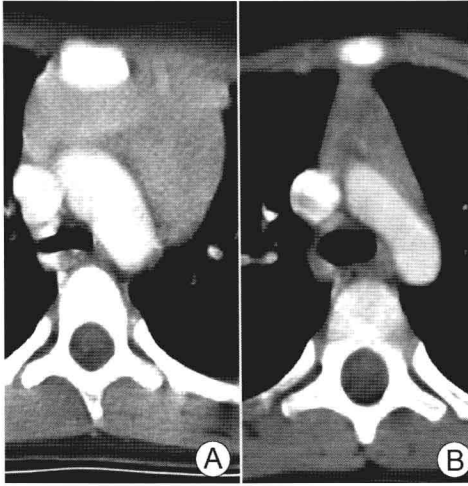
- Misinterpretation of the normal thymus as a potential mediastinal mass is not uncommon
- Normal thymus can be very prominent in size on radiography up to 5 years of age
- Historically, misinterpretation of prominent thymus as abnormal leads to unnecessary thymic irradiation therapy of numerous children

Imaging Findings

Features Associated with Normal Thymus

- Age
 - Can be quite large up to 5 years of age
 - Decreases in prominence by end of 1st decade of life
 - Should not appear as prominent mass during 2nd decade
- Gender
 - Prominent thymus much more common in boys
 - 80% of prominent thymuses are in boys
- Contour
 - Normal: Convex, undulating
 - Abnormal: Lobulated, poorly defined, irregular
- Shape
 - Variable
 - Can drape over cardiac silhouette and make heart look prominent
 - Can have prominent triangular extension leftward or rightward called "sail sign"
- Spinnaker sail sign refers to when a pneumomediastinum lifts the thymus superior off of the cardiac silhouette
 - On cross-sectional imaging
 - Young children: Quadrilateral
 - Older children: Triangular

Normal Thymus



CT findings of normal thymus. Thymus is homogeneous in attenuation with smooth borders. During early childhood (A), the thymus has a quadrilateral shape. During the second decade of life (B) the thymus has a more triangular shape.

- Consistency
 - Homogeneous
 - No calcifications, areas of low attenuation
- Relationship to adjacent structures
 - Normal thymus "soft"
 - Does not compress adjacent structures
 - Airway
 - Superior vena cava
- Associated findings that favor abnormal thymus
 - Pleural or pericardial effusion
 - Lung disease

CT Findings

- As above

MR Findings

- As above

Ultrasound Findings

- High frequency transducers demonstrate normal thymic septa as echogenic linear or dot-like echogenicities
- Considered characteristic for normal thymus
- Can be used to diagnose ectopic thymus or document normal but prominent thymus

Imaging Recommendations

- If chest radiograph demonstrates prominent thymus that is questionably normal for age, imaging options include
 - Repeat chest radiograph in 6 weeks
 - CT of chest with contrast
 - Ultrasound to demonstrate normal architecture

Normal Thymus

Differential Diagnosis

Lymphoma

- By far most common cause of anterior mediastinal mass in children
- ### Germ Cell Tumor (teratoma)

- Calcifications and fat attenuation

Thymic Cyst

- Calcifications and fat attenuation

Langerhans Cell Histiocytosis

- Thymic involvement common in autopsy series
- Thymic mass with calcifications or low attenuation
- Lung cysts
- Hepatomegaly, periportal low attenuation, liver masses

Pathology

General

- Normal thymus prominent in relationship to relative size of thorax at birth and during first 5 years of life
- Begins to become smaller relative to chest by the end of 1st decade of life
- Continues to decrease in size for remainder of adulthood

Clinical Issues

General

- Differentiation of normal thymus from abnormal causes of anterior mediastinal masses

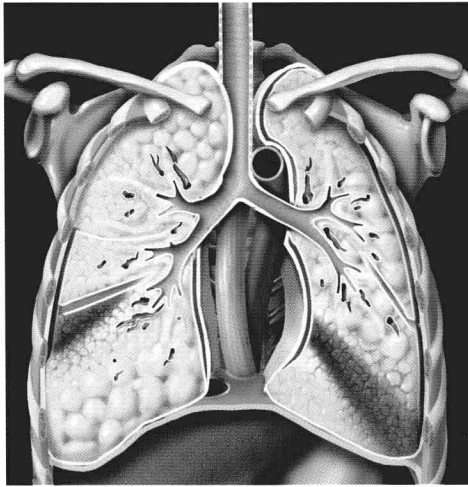
Treatment

- None

Selected References

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Meconium Aspiration Syndrome



Meconium aspiration syndrome. Diagram demonstrates findings: Asymmetric areas of hyperinflation and atelectasis as well as increased, ropelike perihilar densities.

Key Facts

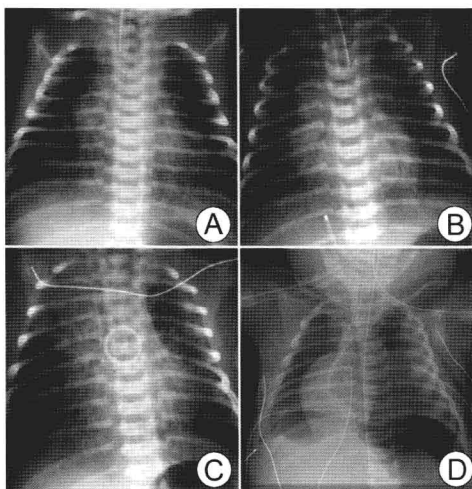
- Synonym(s): MAS
- Definition: Respiratory distress that occurs secondary to intrapartum or intrauterine aspiration of meconium
- Classic imaging appearance: Asymmetric hyperinflation and areas of lung consolidation with ropelike perihilar densities
- Aspirated meconium causes obstruction of small airways secondary to tenacious nature
- Aspirated meconium also causes chemical pneumonitis
- Airway obstruction and chemical pneumonitis lead to asymmetric areas of hyperinflation and consolidation
- Airway obstruction can lead to airblock complications such as pneumothorax
- More commonly occurs in full term or postmature infants, rather than premature infants

Imaging Findings

Radiographic Features

- Best imaging clue: High lung volumes, ropelike perihilar densities
- Differential for diffuse lung disease in neonates categorized based on lung volumes: High or low
- MAS associated with high lung volumes, often asymmetric
- Areas of asymmetric, patchy consolidation, atelectasis
- Areas of hyperinflation alternating with areas of atelectasis
- Ropelike perihilar densities
- Pleural effusion
- Airblock complications: Pneumothorax in 20–40 %

Meconium Aspiration Syndrome



Four neonates with meconium aspiration syndrome. Neonates shown in (A-C) show varying degrees of ropelike perihilar densities and increased lung volumes. Neonate in (D) shows left pneumothorax with rightward mediastinal shift and partial left lung collapse.

Differential Diagnosis: Neonatal Lung Disease with High Lung Volumes

Neonatal Pneumonia

- Patchy asymmetric perihilar densities and hyperinflation

Transient Tachypnea of the Newborn

- Occurs secondary to delayed clearance of fetal pulmonary fluid (often in cesarean section)
- Key feature is benign course
- Findings of CHF on radiographs often with high lung volumes

Pathology

General

- Meconium aspirated either intrapartum or intrauterine secondary to stress, such as hypoxia
- Aspirated meconium causes obstruction of small airways secondary to tenacious nature
- Aspirated meconium also causes chemical pneumonitis
- Airway obstruction and chemical pneumonitis lead to asymmetric areas of hyperinflation and consolidation
- Airway obstruction can lead to airblock complications such as pneumothorax

Clinical Issues

Presentation

- More commonly occurs in full term or postmature infants, rather than premature infants
- Present with respiratory distress

Natural History

- Degree of respiratory distress may be severe