Interpreting Pediatric Chest X-Rays

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For People Who Write Notes

- Write down my email address: alan.brody@cchmc.org
- Put down your pen or pencil
- Write me for anything you need

- Slides at:
  http://www.cincinnatichildrens.org/research/div/radiology/present.htm
Three Talks This Morning

• Interpreting pediatric chest X-rays
• High-resolution CT scanning in children
• After the chest X-ray, what to do next
Interpreting Pediatric Chest X-Rays
Chest X-rays

- Provide a great deal of information
- Are less expensive than other imaging and use very, very little radiation
- Often provide the information that tells us we need to do additional imaging
- Can be hard to interpret in children
Interpreting Pediatric Chest X-Rays

- Chest X-rays look different in children
- Children have different diseases
- There are special places to look when reading a pediatric chest X-ray
Children Are Different

- Chest X-rays change with age
- Cooperation may be limited
- The thymus can cause confusion
Chest X-rays Change with Age
Normal 3 Year Old
One View or Two?
Foreign Body Aspiration
Foreign Body Aspiration
More Than 2 Views
Lateral Decubitus X-rays
Cooperation May Be Limited
Heart Size

• In newborns, can be a little more than half the width of the chest
• The lateral film is often more accurate than the frontal film
• A good breath is required to judge heart size
Lung Volume Affects the Appearance of the Heart
Heart Size Changes Much More On the Frontal than the Lateral
Large Heart??
Improving Interpretation of Children’s Chest X-rays

• Make a file of chest X-rays of normal children at different ages
• Get 2 views of the chest
• Repeat low volume or rotated X-rays
• Someone who enjoys working with children will get better X-rays
The Thymus
The Normal Thymus

Infant

Adolescent
The Thymus

- Increases in size from birth to puberty, but the child grows more, so the thymus appears smaller in older children
- Is highly variable in size and appearance
- Can shrink within hours due to illness
- May increase suddenly in size, especially after chemotherapy
The Sail and Wave Signs
Thymic Rebound

Child with Acute Leukemia

During Treatment

After Treatment
Two Special Places to Look
"Experience is a hard teacher because she gives the test first, the lesson afterwards."
-- Vernon Saunders Law
A Test – Five Children

• One has a vascular abnormality
• One is suffering
• One has cancer
• One has pneumonia
• One is normal
Infant with Noisy Breathing
8 Month Old with Tachypnea
One Year Old with Lethargy
Two Year Old with Cough
3 Year Old with A Palpable Mass
Diagnoses

- Vascular ring caused by a double aortic arch
- Rib fractures from child abuse
- Paraspinous neuroblastoma
- Round pneumonia
- Bifid anterior rib
Vascular Ring
Vascular Ring
Right Aortic Arch
Rib Fractures from Child Abuse
Posterior Rib Fractures
Neuroblastoma
Neuroblastoma
Round Pneumonia
Round Pneumonia

- Symptoms of pneumonia
- Lower lobe location
- Children 8 years old or younger
- No evidence of chest wall abnormality
- Pneumococcus
- Another chest X-ray in 1 to 2 weeks should show improvement
Bifid Right 4th Rib
Bifid Rib

- Common anatomic abnormality
- Frequently presents as an asymptomatic hard mass
- Anterior chest wall masses with normal chest X-rays do not require further imaging

Conclusion

- Pediatric chest X-rays are challenging
- Reference images and high quality studies help with interpretation
- Take an extra look at the ribs and the trachea
Thank You for Your Attention

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