Disorders of the Chest Wall

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Disclosures

• I have no financial disclosures

Initial Modalities

• Radiographs
  – Usually initial study
  – Good for “big picture,” particularly for diffuse/global abnormalities

• US
  – Great initial study for focal abnormalities, better for non-osseous pathology
  – Solid vs cystic, vascularity

Secondary Modalities

- **CT**
  - Characterizing osseous pathology
  - Usually follow-up to XR or US
  - Assessing intrathoracic involvement including lungs

- **MR**
  - Problem-solving modality
  - Great for suspected *multicompartmental* pathology – malignancy or vascular malformation

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Congenital

- **Pectus Excavatum**
  - Most common congenital chest wall deformity
  - Posterior, mild leftward tilt of the sternum
  - Often cosmesis, though pain, dyspnea and restrictive lung disease possible

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Pectus Excavatum

- Lateral XR – posterior tilt of sternum
- AP – obscured right heart margin may mimic PNA

Pectus Excavatum

- Low-dose CT with limited slices for characterization
- Haller Index: Transverse / AP
  - <2.6 is normal
  - >3.2 requires surgery

Pectus Excavatum

- Typically repaired by Nuss procedure – convex retrosternal bar (Nuss bar)
- Complications:
  - Pneumothorax (most common), infection, hardware displacement
Infected

Osteomyelitis

- Rare in children
- S. aureus most common, fungal in immunocompromised
- MR usually best, CT for cortical destruction
- MR: T1 hypo, T2/STIR hyper, enhancement, +/- abscess


Osteomyelitis – 11 yo F
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Focal Bone Lesions - Fundamentals
- Age of patient
- Unifocal vs multifocal
- Margins/zone of transition
- Calcifications – chondroid? osteoid?
- Cortical breach, periostitis, soft tissue component, etc...

Benign Bone Lesions
Osteochondroma
- Most common benign bone tumor of chest wall
- Exostosis or osseous protuberance
- XR usually enough
- CT/MR – cortical continuity, cartilage cap

Enchondroma
- Benign cartilaginous, most common in hands/feet
- XR/CT – lytic, well-defined, chondroid calcs (rings/arcs, dense, punctate)
- MR – T2 hyper with hypocalcs

Atypical Enchondroma
Fibrous Dysplasia

• Replaced medullary cavity by immature fibro-osseous stroma
• ~80% monostotic, ribs common
• Polyostotic – one side of body, syndromes (McCune-Albright)
• “Ground-glass” classic, often variable lucent/sclerotic on XR/CT – CT usually needed

Malignancy

Ewing Sarcoma Family

• Malignant small round cell tumors: Ewing, PNET, Askin
• Share 11:22 translocation
• Most common chest wall malignancy
• XR/CT – large mass, aggressive osteolysis
• MR – T2 bright, hetero enhancement (necrosis)
Ewing Sarcoma Family

5 yo M with PNET

Ewing Sarcoma Family

14 yo M with left 4th rib Ewing sarcoma

Other Malignancies

Rhabdomyosarcoma

Osteosarcoma

www.orthopaedicsone.com
Summary

- **Pectus excavatum**
  - Posterior sternal tilt, mimics RML PNA
  - Haller index >3.2 needs surgery – Nuss bar, PTX

- **Osteomyelitis**
  - MR – edema, enhancement, +/- abscess/phlegmon

Summary

- **Benign**
  - Osteochondroma – exostosis with cartilage cap
  - Enchondroma – well-defined lytic lesion with chondroid calcifications
  - Fibrous dysplasia – monostotic or polyostotic, ground-glass density classic but variable lysis/sclerosis

- **Malignant** – Ewing/PNET, Rhabdo, Osteosarcoma

Thank you!