Pearls and Pitfalls in Pediatric Radiology

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Radiographs
Cervical spine
- NEXUS in children
  o Painful, distracting injury
  o Altered mental status
  o Intoxication
  o Neurologic abnormality
  o Tenderness midline
- NEXUS nonverbal children
  o High-risk mechanism: high speed MVC, fall >8 ft, spearing or loading injuries
  o Neurologic abnormality at time of injury
  o Distracting injury
- Plain films vs (modified) CT
- Pseudosubluxation – normal variant in up to 40% patients, more pronounced in flexion
  o XR should be obtained in neutral or slightly extended position
  o Line of Swischuk (<2 mm)
- Presence of subluxation in extension = injury

Soft tissue neck
- Epiglottitis
  o 4 “D”: drooling, dyspnea, dysphagia, dysphonia ➔ direct visualization in OR
  o Lateral neck with hyperextension during inspiration
  o More common in adults now with effective immunization
  o Rx: ceftriaxone, cefuroxime
- Retropharyngeal abscess
  o Fever, trismus, dysphagia, neck pain
  o Pre-vertebral space should never be greater than adjacent vertebrae
    ▪ 7mm at C2, 14mm at C6 (22mm in adults)
  o Rx: clindamycin, cefazolin
Chest radiographs
- Cardiomegaly
  - Anterior trachea line – line drawn from anterior trachea to diaphragm should not intersect vertebrae on lateral film
- Mediastinal Masses
  - Anterior
    - Thymus (typically regress by age 3 years, soft, molds to ribs (“scalloping”), sharp smooth borders, “sail sign”)
    - Teratoma
    - Thyroid
    - Terrible lymphoma
  - Middle
    - Inflammatory lymph nodes or lymphoma
    - Foregut abnormalities
    - Prominent vessels
    - Pericardial abnormalities
  - Posterior
    - Neural-based tumors
    - Congenital pulmonary or pleural lesions
- Pitfalls:
  - Button batteries: look closely for double ring!
  - Inspiration vs forced expiration (or lateral decubitus) films for foreign bodies
  - Consider pneumonia in school-aged children complaining of abdominal pain with benign abdominal exams
  - Obtain adequate films (upright, inspiratory)

Abdominal radiographs
- Infant with bilious emesis = malrotation with volvulus until proven otherwise!
- Enlarged gastric bubble with projectile vomiting = pyloric stenosis
- Intussusception: 3 view plain films
  - Paucity of distal gas
  - “Target” sign

Salter-Harris Fracture Classification: “SALT-CRUSH”
- Type 1: fracture physis, often clinical (“straight”)
- Type 2: fracture of metaphysis and physis (“above”)
- Type 3: fracture epiphysis and physis (“lower”)
- Type 4: fracture epiphysis to metaphysis (“through and through”)
- Type 5: Crush injury
Ossification centers of the elbow (in order of appearance): “CRITOE”
- Capitellum
- Radial head
- Internal condyle (medial)
- Trochlea
- Olecranon
- External condyle (lateral)

- Pitfalls:
  - Varying age of appearance, but *always* appear/ disappear in same order
  - Anterior humeral line (requires true lateral view) – passes middle third of capitellum
  - Radiocapitellar line – proximal radius *always* intersects with capitellum in *any* view
  - Posterior fat pad = *always* pathologic

Additional Pearls and Pitfalls:
- Consider hip pathology in children with knee pain without abnormal knee exam
  - Legg-Calve-Perthe Disease (aseptic necrosis of the femoral head)
    - Age 2-14 years, peak 5y
    - Pain with external rotation, limited internal rotation and abduction
  - Slipped Capital Femoral Epiphysis (SCFE)
    - Klein’s Line – line along lateral edge of superior femoral neck on AP view should intersect epiphysis
    - Rare < 9 years of age
    - Obtain AP and frogs leg views
- Children more likely to fracture than “sprain”
- Non-accidental trauma:
  - Posterior rib fractures
  - Classic metaphyseal lesions
  - Spiral fracture in nonambulatory child
  - Fractures of varying stages of healing

Additional websites:
- www.pediatricimagingonline.com
- www.learningradiology.com
- www.med-ed.virginia.edu/courses/rad/peds/
- www.cchs.net/onlinelearning/cometvs10/pedrad/default.htm
- www.hawaii.edu
  - Search: pemxray