

Common Respiratory Infections in Children

Gwen McIntosh, MD, MPH
Department of Pediatrics

Common Cold

- Pathogenesis:
 - Viral agent passed by fomite or direct contact
 - Virus inoculates/invades resp epithelium
 - Incubation 2-5 days then symptoms begin
 - Average duration of symptoms 6-10 days

Common Cold: Common Viruses

- Rhinovirus (1/3 of all cases)
- Adenovirus
- Parainfluenza virus
- RSV
- Corona virus
- Influenza virus

Common Cold: Symptoms

- Nasal congestion
- Rhinorrhea
- Fever (usually within first 3 days)
- Sore throat
- Hoarse voice
- Sneezing
- Poor sleep, irritability

Common Cold: Treatment

- Push fluids
- Rest
- Humidification
- Saline nose drops and suctioning
- Antipyretics/analgesics pm
 - Acetaminophen
 - Ibuprofen
- Hand washing!

OTC Cold Medications

- *Antihistamine*: may reduce mucous secretion (diphenhydramine, chlorpheniramine)
- *Decongestant*: vasoconstriction may decrease mucous membrane swelling and mucous secretion (phenylephrine, pseudoephed)
- *Expectorant*: thin respiratory secretions
- *Cough suppressant*: may act on medullary cough center to reduce cough (dextromethorphan)

Sinusitis: Imaging

- Indications for sinus CT or MRI
 - Accompanying intracranial or intraorbital complications
 - To confirm diagnosis of recurrent sinusitis
 - To evaluate severe, persistent sinusitis
 - Considering sinus surgery

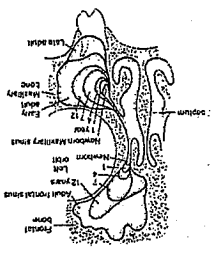
Sinusitis: Imaging

- Routine imaging (plain film) is not indicated in sinusitis
 - Common cold often includes radiologic involvement of sinus mucosal thickening
 - In young children, lack of developed sinuses makes plain film difficult to interpret
 - Be wary of cranial irradiation in children

Sinusitis: Diagnostic Criteria

- Persistent nasal congestion, nasal discharge and cough
- Without improvement
- For more than 10-14 days
- OR
- More severe URI signs and symptoms
 - Fever >39, facial swelling, facial pain

Development of the Sinuses



- Ethmoid sinus: present at birth
- Maxillary sinus: age 6 months
- Frontal and sphenoid sinus: age 4-9 years

Sinusitis

- Preschool child = 8 colds/year
- Average cold lasts 7-10 days
- Sinusitis complicates less than 5% of all pediatric colds
- It is critical to distinguish recurrent cold from sinusitis

OTC Cold Medications

- Very little data to support the efficacy of OTC cold meds in children
- Common side effects: sedation, tachycardia, agitation, mucous plugging, hypertension
- Overdose is a common problem

Sinusitis: Common Pathogens

- Strep pneumoniae: 30-66%
- non-typable H. flu: 10-20%
- M. catarrhalis: 10-15%
- Respiratory viruses: less than 10%

Sinusitis: Treatment

- Amoxicillin is first line agent in children
 - Augmentin if poor response to amoxicillin or recurrent infection
 - Other choices for second line agents
 - Cephalosporins
 - Erythromycin-sulfisoxazole
 - Clindamycin
- Duration of treatment: 10-21 days

Acute Otitis Media: Definitions

- Myringitis: acute OM without effusion
 - TM erythematous, opaque
 - bullae may be present
- Acute otitis media: suppurative process
 - purulent effusion present
- OM with effusion: serous effusion
 - nonsuppurative effusion present
 - patient often asymptomatic

Acute Otitis Media

- A frequent pediatric problem
 - By age 3 years, 80% have ≥ 1 episode
 - 24.5 million office visits annually
 - Most common reason antibiotics prescribed to children

Acute Otitis Media: Risk Factors

- Day care attendance infection
- Smoke exposure
- Males > females
- Race: native american, eskimo
- Craniofacial malformation
- Family history of recurrent OM
- Feeding in flat, supine position
- Young age at first OM

Acute Otitis Media: Organisms

- Strep pneumo 40%
- Non typable H flu 27%
- Moraxella cat 15%
- Viral 10%

Strep Pharyngitis: Epidemiology

- Rare in children under age 2
- Usually age 5 - 15 years
- Most common in winter and early spring

Pharyngitis: Strep

- Typical clinical picture:
 - Acute onset of sore throat with dysphagia
 - Headache
 - Abdominal pain
 - Fever
 - Nausea
 - History of exposure to strep
 - Absence of other URI symptoms

Pharyngitis: Viral vs. Strep

	Viral	Strep
Onset of ST	Gradual	Sudden
Rhinorrhea	Yes	No
Cough	Yes	No
Conjunctivitis	Yes	No
Hoarseness	Yes	+/-
Headache	+/-	Yes
Patatal petechiae	No	Yes
Scarlatiniform rash	No	Yes

Pharyngitis: Etiology

- Viral
 - Adenovirus
 - EBV
 - Influenza
 - Enterovirus
 - Coronavirus
 - Rhinovirus
- Bacterial: group A Strep 15-30%
 - group C, G, F strep
 - Neisseria
 - Chlamydia
 - Mycoplasma

Acute Otitis Media: Complications

- Mastoiditis
- Cholesteatoma
- Lateral sinus thrombosis
- Meningitis
- Abscess formation
- Possible conductive hearing loss
- Complications are rare: less than 1% of cases

Acute Otitis Media: Treatment

- Symptomatic care, analgesics
- First line antibiotics: amoxicillin > high dose 80 - 90 mg/kg/d
- Second line: amox/clavulanic acid (with high dose amox)
- Third line: cephalosporin, macrolide

Strep Pharyngitis: Diagnosis

- Throat culture: takes 24-48 hours
95% sensitivity
- Rapid strep: takes 10-15 minutes
80% sens, 95% specif
more expensive than cx
- ASO titer/
Anti DNaseB takes 1-2 weeks
useful to evaluate a post-
strep illness (PSGN, RF)

Strep Pharyngitis: Treatment

- Pen VK is the treatment of choice, 10 days
 - No GABHS resistance to PCN
 - Narrow spectrum of activity
 - Inexpensive
 - Proven to prevent rheumatic fever
- Alternatives if Pcn allergic
 - Azithromycin 12 mg/kg x 5 days
 - Erythromycin estolate
 - Cephalosporins (cephalexin, cefpodoxime)

Strep Pharyngitis: Treatment Failure

- Reasons for treatment failure:
 - Poor compliance
 - Recurrent infection
 - Carrier state
 - Antibiotic failure < 10%

Strep Pharyngitis: Complications

- Peritonsillar abscess
- Retropharyngeal abscess
- Toxic shock syndrome
- Acute rheumatic fever

- Post strep glomerulonephritis (M12 serotype)

Croup

- Acute laryngotracheitis
- Inflammation in the subglottic area
- Signs/symptoms
 - brief viral URI prodrome 1-2 days
 - voice changes- hoarse, muffled
 - barking cough
 - inspiratory stridor
 - respiratory distress

Croup

- Diagnosis: *history and clinical exam*
- AP Neck films: steeple sign
tapering subglottic narrowing
normal epiglottis
- Etiology: viral
 - Parainfluenza 75%
 - RSV
 - Influenza

Bronchiolitis

- Inflammation of the bronchioles
- Clinical picture: usually child younger than 2
- nasal congestion and rhinorrhea
- cough, low grade fever
- wheezing and rhonchi
- respiratory distress
- Begins as URI, over several days, lower tract becomes involved
- Symptoms peak on 4-5th day of illness

EpiGlottitis: Treatment

- Do not agitate patient!
- Avoid any uncomfortable procedures (Eg. phlebotomy, tongue depressor to examine mouth, xray)
- STABILIZE and MAINTAIN the AIRWAY
- Usually to OR for direct visualization and intubation by anesthesia or ENT
- Antibiotics

EpiGlottitis: Diagnosis

- Diagnosis is largely clinical
- Plain films of neck: swollen epiglottitis = thumb sign
- thickened aryepiglottic folds

EpiGlottitis: Clinical course

- Acute onset fever, toxicity with rapid progression to resp distress
- Apprehension, drooling, dysphagia
- Hoarse or muffled voice
- Child resists lying down
- Tripod position
- Cough is usually not present

EpiGlottitis

- Inflammation of epiglottis & adjacent tissues
- Dramatic decrease in incidence since 1990's
- Age: 1-8 years old, mostly under age 5
- Etiology: H. flu
- Strep pneum
- H. parainfluenza
- Staph aureus

Croup: Treatment

- Humidified air- cool mist humidifier
- warm steamy bath/shower
- "croup tent"
- cool air
- Inhaled epinephrine:
 - alpha adrenergic vasoconstriction to reduce airway edema
 - Rapid onset of action within 30 minutes
 - Short acting duration \leq 2 hours
- Dexamethasone: IM or oral

Bronchiolitis: Etiology

- Respiratory syncytial virus 80%
- Parainfluenza
- Influenza
- Adenovirus
- Infection is highly contagious
- Increased severity of symptoms with younger age
- Epidemics late fall through winter (March)

Bronchiolitis: Diagnosis

- Based largely on clinical picture, time of year and known presence of RSV in community
- RSV rapid antigen testing
 - Sensitivity 80-90%
 - Specificity 90%
 - Limited clinical utility because treatment is directed at symptoms
 - Recommended only for cases when dx is unclear

Bronchiolitis: Diagnosis

- CXR: Non specific
 - Hyperinflation
 - Flattened diaphragms
 - +/- patchy peribronchial infiltrates
 - May see small areas of atelectasis
 - Not indicated for routine cases

Bronchiolitis: Treatment

- Supportive Care
 - Nasal hygiene and suctioning
 - Supplemental O₂
 - IV fluids if severe distress
 - Monitoring for high risk infants
- Inhaled bronchodilators
 - Albuterol: small subset will respond
 - Epinephrine: may be considered

Bronchiolitis: Hospitalization

- Most common reason for hospitalization for children under age 1
- Indications for hospitalization (high risk)
 - Prematurity (34 weeks or less)
 - Infant less than 1 month old
 - Severe tachypnea RR > 70
 - Presence of other underlying cardiac or pulmonary disease

Bronchiolitis: Prevention

- Monoclonal anti-RSV antibody
- For high risk populations only
- Very expensive
- Good hand washing!
- Isolation

