

# **Pneumonia in Healthy Canadian Children and Youth: Practice Points for Management**

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## **DIAGNOSIS AND MANAGEMENT**

Uncomplicated acute community – acquired pneumonia in healthy immunized children with no underlying pulmonary pathology aside from mild reactive airways disease.

## FACTS

- 1/20 children <5yrs
- Vaccines have reduced incidence
  - pneumococcal
  - haemophilus influenzae
- Preschooler---Viruses -- RSV
- School-aged---Bacteria-StrepPneumoniae, Strep A, Staph aureus, Mycoplasma, Chlamydia pneumoniae

## DIAGNOSIS

- Signs and symptoms
- Investigations
  - Imaging
  - Detection of Pathogen
  - Bloodwork

## SIGNS and SYMPTOMS

- Nonspecific
- Cough and Fever
- SOB
- Chest or Abdominal pain
- Rigors (bacterial)
- Signs of Consolidation (may be difficult)
- Beware-Transmitted Upper Airway sounds
- Fever and Tachypnea
- Age-specific criteria for tachypnea
- Sepsis and Dehydration

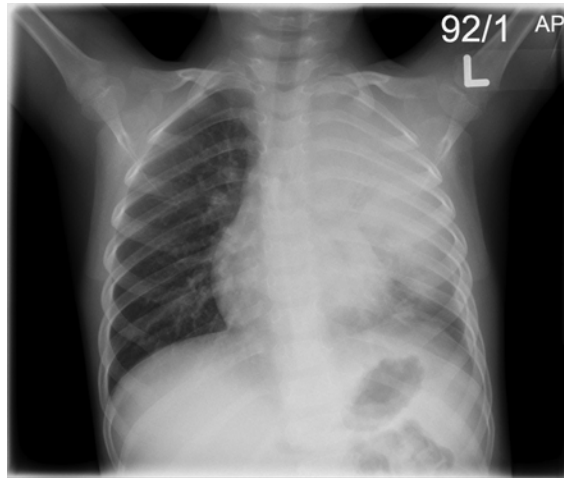
## IMAGING

### CXR

- encouraged
- support diagnosis
- pneumonia overdiagnosed clinically
- child deteriorates(complications)
  
- Viral - patchy infiltrates,bilateral,hyperinflation
- Bacterial - lobar/segmental consolidation,effusion
- Mycoplasma,C.pneumoniae - extensive infiltrates>clinical findings

**Follow up CXR not indicated if clinically improving**

## CXR



## DETECTION of PATHOGEN

- Difficult
- Few are bacteremic
- Sputum collection difficult
- NPW
- Pleural fluid

## BLOODWORK

### Hospitalized and Deteriorating Children

1. Blood Culture: positive 3 - 10%

2. CBC/diff

3. Mycoplasma workup

- seroconversion takes 2-4 weeks
- cold agglutinins(IgM):sens. 50-90%,spec.75%
- PCR sens.80-90%,spec.98%

## GUIDELINES FOR REFERRAL TO HOSPITAL / ADMISSION

- Most cases - Rx outpatient
- Respiratory distress
- SaO<sub>2</sub><92%
- Decreased oral intake
- Septic / Hypotensive
- Social situation
- Child < 6months old

# Management

## MANAGEMENT

- Clinical and CXR = Bacterial Pneumonia
- Supportive
- Empirical Antimicrobials
- Uncomplicated pneumonia 7 – 10 days
- 5 days with Azithromycin
- Complicated pneumonia --- longer
- Oral step-down when afebrile and improved

## MANAGEMENT

- NPW and CXR = Viral Pneumonia
- Supportive - Fluids, Oxygen
- No antibiotics, unless secondary bacterial infection
- Antivirals - if Influenza is suspected, illness <48hrs, sick or high risk patient

Guidelines for **empiric antimicrobial therapy** in community- acquired, radiologically- proven pneumonia of suspected bacterial pneumonia in previously healthy children aged 3months to 17yrs

- Refer to table

## Antimicrobial Guidelines

**Step 1:** Assess severity and features of pneumonia

- A. Most cases non-severe pneumonia  
High dose(75mg/kg/day tid) Amoxicillin po or Ampicillin IV
- B. Non-severe with atypical pneumonia features  
Clarithro- or Azithromycin Po
- C. Severe Pneumonia  
Ceftriaxone IM/IV or Cefotaxime IV plus Clarithro- / Azithromycin

## Antimicrobial Guidelines

**Step 2:** Assess for clinically proven or suspected INFLUENZA with secondary bacterial infection

- A. Non-severe pneumonia  
Amoxicillin/clavulanate po or IV cefuroxime
- B. Severe Pneumonia  
Ceftriaxone IM/IV or Cefotaxime IV plus clarithro- / azithro  
Or add Cloxacillin

## Antimicrobial Guidelines

### **Step 3:** Pleural Effusion

- A. Small Effusion---Follow carefully for clinical deterioration and use antibiotics as in steps 1 and 2
  
- B. Moderate to Large effusion—CeftriaxoneIM / IV or Cefotaxime or antibiotics in Steps 1 and 2 and Clindamycin  
Consider Pleural tap  
Clindamycin, Vancomycin --- MRSA

### **EXPECTED CLINICAL COURSE AND FOLLOW UP FOR UNCOMPLICATED PNEUMONIA**

- Bacterial --- 48hrs
- Viral --- longer
- **If not improving**
  - CXR- complication(empyema, effusion)
  - Correct Diagnosis?-(FB,Asthma with atelectasis,TB, unrecognized immunodeficiency with opportunistic infection)
  - Correct treatment?(MRSA, etc)
  - Infection at other sites (joints, urine, cardiac, etc)

PEDIATRIC ASTHMA

WHITEHORSE CME  
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## OBJECTIVES

- REVIEW DIFFERENTIAL DIAGNOSIS OF ASTHMA
- CASE REPORT
- CURRENT PEDIATRIC ASTHMA GUIDELINE
  - ◆CMAJ
  - ◆CANADIAN THORACIC SOCIETY
  - ◆BRITISH THORACIC SOCIETY
- WHEN TO REFER

## CASE REPORT

- 10yr Vietnamese boy
- Chronic cough
- Fever
- Difficult asthma to Rx since 3 years age
- 3 episodes of pneumonia
- FH + asthma

## CASE REPORT

- EXAMINATION:
- Growth parameters on 10% height and weight
- Clubbed
- Vitals normal
- Resp-Bilateral crackles

???? RED FLAGS

## CASE REPORT

- CXR  
Extensive ,diffuse bronchial wall thickening  
? Bronchiectasis

Sputum Culture  
Pseudomonas Aeruginosa

Lung Function  
Abnormal FVC and FEV

Additional test confirmed diagnosis.....



## DIFFERENTIAL DIAGNOSIS

Failure to thrive, steatorrhea	Cystic Fibrosis
Frequent, persistent, unusual infections	Immunodeficiency
Wet cough	Bronchiectasis
Chronic rhinitis; severe, recurrent otitis media, +/- situs inversus	Primary Ciliary Dyskinesia
Severe regurgitation or vomiting	GERD
Heart Murmur	CHR
Noisy Breathing; increased secretions	Swallowing problem (developmental delay)

## SYMPTOM OVERLAP



## ACHIEVING CONTROL OF ASTHMA IN PRESCHOOLERS

Thomas Kovesi MD, Suzanne Schuh MD, Sheldon Spier MD, Denis Bérubé MD, Stuart Carr MD, Wade Watson MD, R. Andrew McIvor MD MSc

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## PATTERNS OF ASTHMA

- ◆ The pattern of asthma in young children (*transient or persistent*) should be determined, as this pattern can help to predict which children are less likely to “outgrow” their asthma

## PATTERNS OF ASTHMA

*Transient asthma* is associated with

- ◆ Exacerbations triggered by viral respiratory infections
- ◆ Absence of symptoms between exacerbations
- ◆ Absence of other atopic diseases or family history of atopy.

Most children with this pattern “outgrow” their asthma.

## PATTERNS OF ASTHMA

*Persistent asthma* is associated with

- ◆ Exacerbations triggered by viral respiratory infections and exposure to allergens
- ◆ Presence of asthma symptoms between major exacerbations
- ◆ Presence of other atopic diseases and a family history of atopic disease.

This pattern is less likely to be “outgrown”

## AGE OF ONSET

- Transient asthma ----- < 3years
- Persistent asthma ---- > 3years

## MANAGEMENT OF INTERMITTENT ASTHMA

- ◆ Intermittent use of inhaled corticosteroids, administered in standard doses, appears ineffective and is therefore not recommended for the treatment of intermittent wheezing
- ◆ Regular therapy with inhaled corticosteroids should be used for children with severe or prolonged symptoms and those who have visited the emergency department or been admitted to hospital
- ◆ Although inhaled corticosteroids can be used to control asthma symptoms, they do not prevent progression to persistent asthma
- ◆ A leukotriene receptor antagonist can be used continuously during the viral season, or at the onset of viral infections, to reduce symptoms and visits to health care providers

## MANAGEMENT OF PERSISTENT ASTHMA

- ◆ Inhaled corticosteroids are the anti-inflammatory drugs of choice for the management of persistent asthma and should be administered daily (including between exacerbations) for a minimum of 1 season at a time
- ◆ Inhaled corticosteroids are very effective when used optimally; therefore, if such therapy is unsuccessful, the diagnosis of asthma should be questioned or the possibility of a comorbid condition should be considered

## MANAGEMENT OF PERSISTENT ASTHMA

- ◆ If asthma control remains inadequate with a moderate dose of inhaled corticosteroids, the dose should be increased or a leukotriene receptor antagonist should be added
- ◆ There is evidence to support adding a long-acting beta 2-agonist to inhaled corticosteroids for adolescents, but there is minimal evidence to support this approach for preschool and school-aged children
- ◆ Referral to a pediatric asthma specialist should be considered for patients who require add-on therapy

## MINIMUM CRITERIA FOR ACCEPTABLE CONTROL OF ASTHMA IN PRESCHOOLERS

ADAPTED FROM CANADIAN PEDIATRIC ASTHMA CONSENSUS GUIDELINES

Daytime Symptoms	< 4 days/week
Nighttime Symptoms	< 1 night/week
Physical Activity	none
Use of short-acting bronchodilator	< 4/week (unless before exercise)
School or Childcare	None missed
Exacerbations	Infrequent (<1/year)

## MANAGEMENT IN THE EMERGENCY DEPARTMENT

- ◆ A metered-dose inhaler and valved holding chamber should be used for inhaled delivery of medication for almost every child in the emergency department
- ◆ Systemic corticosteroids should be started rapidly for patients with moderate or severe asthma exacerbation who are seen in the emergency department

## MANAGEMENT IN THE EMERGENCY DEPARTMENT

- ◆ Published severity scales should be used, as they allow greater objectivity in evaluating the severity of the exacerbation
- ◆ Before discharge home, asthma education must be provided. Such education should include instruction in using the inhaler device, signs of an acute exacerbation and appropriate use of preventive therapy to avoid future visits to the emergency department

## KEY HISTORICAL AND CLINICAL RED FLAGS INDICATING RAPID DETERIORATION OR SEVERE EXACERBATION

- ◆ Previous admission to intensive care unit for asthma
- ◆ Excessive use of inhaled bronchodilators before presentation<sup>16</sup>
- ◆ Already receiving oral corticosteroids for the index episode<sup>16</sup>
- ◆ Multiple recent visits to the emergency department or multiple recent admissions to hospital for asthma<sup>71</sup>
- ◆ Poor compliance with maintenance therapy

## PHYSICAL FINDINGS SUGGESTIVE OF SEVERE EXACERBATION

- ◆ Breathlessness severe enough to prevent child from talking in sentences or eating properly
- ◆ Nasal flaring and marked use of sternocleidomastoid muscles
- ◆ Tachypnea
- ◆ Markedly decreased entry of air and silent chest
- ◆ Excessive anxiety, restlessness or lethargy; inappropriate fatigue

## WHEN TO ORDER PFTS

- ◆ > 6 years age
- ◆ Diagnostic accuracy
- ◆ Not respond to therapy

## WHEN TO REFER

- ◆ UNSURE OF DIAGNOSIS
- ◆ SEVERE ASTHMA
- ◆ REFRACTORY TO TREATMENT

## TREATMENT DEVICES

- ◆ < 6years      MDI with spacer
- ◆ >6years      Dry powder device
- ◆ Nebulizer vs MDI

## ASTHMA TREATMENT

## POOR TECHNIQUE

## INHALER TECHNIQUE

- [http://www.youtube.com/watch?v=-5eEa4l\\_Uck](http://www.youtube.com/watch?v=-5eEa4l_Uck)

QUESTIONS ???