Uncomplicated Pneumonia in Healthy Canadian Children and Youth – CPS Guideline
Summary


The following was adapted from the Canadian Paediatric Society’s statement on “Uncomplicated pneumonia in healthy Canadian children and youth: Practice points for management” (Dec 2015). Please see the full statement for the full recommendations from the Canadian Paediatric Society.

Background:

Pneumonia is an acute inflammation of the parenchyma of the lower respiratory tract caused by a microbial pathogen. An estimated 1 in 20 children younger than five years of age will contract pneumonia each year. These guidelines apply to uncomplicated, community-acquired pneumonia in healthy, immunized children. They should not be used for children with severe pulmonary pathology, chronic or recurrent pneumonia, aspiration pneumonia or in immunocompromised children as they may require more intensive management. For management of complicated pneumonia or empyema, click here.

Etiology:

Uncomplicated pneumonia can be caused by three broad categories of pathogens. The likelihood of different etiologies varies based on the child's age, the season and the community.

- Viral Pneumonia – Respiratory syncytial virus (RSV), Parainfluenza virus, Human metapneumovirus and Influenza.
- Typical Bacterial Pneumonia: Streptococcus pneumoniae most commonly. Rarely Haemophilus influenzae type b (in vaccinated children), Group A Strep, or Staphylococcus aureus (including MRSA in high-risk communities)
- Atypical Bacterial Pneumonia: Mycoplasma pneumoniae and Chlamydia pneumoniae.

In infants and preschool children, viruses are the most common cause, but some infections may be caused by typical bacteria. In school-age children atypical bacteria emerge that are rarely seen in younger children, and viruses (with the exception of influenza) become less common.

Signs and Symptoms:

In contrast to adult presentations of pneumonia, pediatric pneumonia can be very non-specific, especially in infants and younger children. Acute onset of a fever, cough, difficulty breathing, vomiting, poor feeding or simply a lack of interest in normal activities are common symptoms. Children may present with chest or abdominal pain. Rigors favour a bacterial cause. Preceding malaise and headache may suggest an atypical cause, while preceding fever and myalgias may suggest influenza during flu season.
The clinical exam should specifically note presence/absence of fever, signs of increased work of breathing, tachypnea and hydration status. Normal O\textsuperscript{2} saturation DOES NOT exclude pneumonia. Signs of consolidation include dullness to percussion, increased tactile fremitus, reduced vesicular breath sounds and increased bronchial breath sounds. Signs of effusion include dullness to percussion, decreased tactile fremitus, decreased or absent breath sounds.

Investigations

Chest radiographs (CXR) should be used to diagnosis pneumonia whenever possible (particularly for avoiding of over-prescription of antibiotics). They should also be repeated to re-assess deterioration, or lack of improvement following a diagnosis. CXRs are NOT indicated to track illness improvement. The radiographic changes associated with pneumonia take 4-6 weeks to fully resolve. Thus, when a patient is showing clinical improvement, there is no indication to repeat a CXR. Viral pneumonia may be more likely if the CXR shows poorly defined nodules, patchy areas of opacity, variable hyperinflation with NO evidence of effusion.

Predominant wheeze suggests that asthma or bronchiolitis is a more likely cause than pneumonia and a CXR should not be ordered.

Other investigations, including CBC with differential, blood culture, sputum samples, pleural fluid culture or nasopharyngeal (NPA) swabs are generally not required, but may be used for children who are worsening or hospitalized. If NPA serology is completed and identifies a viral pathogen, antibiotic therapy should not be administered. However, especially with the possibility of a secondary bacterial infection, it is important to closely monitor the patient for appropriate clinical improvement.

Management:

Most children with pneumonia can be managed as outpatients. Admission is generally indicated if a child has inadequate oral intake, is unable to oral medications, has respiratory compromise or complicated pneumonia.

If viral pneumonia is the most probable cause based on the season and CXR findings or confirmed on NPA, manage with supportive care and no antibiotics. Consider antivirals if influenza suspected, particularly in hospitalized children.

If clinical picture and CXR are compatible, with bacterial pneumonia should receive antibiotic therapy to cover \textit{S. pneumoniae}.

- Outpatient – Oral Amoxicillin
- Inpatient (Moderate) – IV Ampicillin
- Inpatient (Severe) – IV Ceftriaxone or Cefotaxime. Consider adding Vancomycin in MRSA suspected.

If another pathogen is detected in pleural fluid or blood, modify antibiotics based on susceptibility. The role of antibiotics in atypical pneumonia is unknown as most children recover without macrolides. Reserve macrolide antibiotics for children who are more seriously ill.
Expected clinical course and follow-up:

Clinical improvement should be evident within 48 hours of treatment with bacterial pneumonia, but may take longer for viral pneumonia. If clinical improvement occurs, repeat CXR is not recommended as radiographic resolution can take four to six weeks. If the child does not improve as suspected, repeat a CXR to look for complications or other causes.

Key Take-Home Points

1. Recognize that the clinical presentation of pneumonia can be very non-specific, especially in infants and younger children.
2. Chest radiographs should be used to diagnosis pneumonia whenever possible. They should also be repeated to re-assess deterioration, or lack of improvement following a diagnosis.
3. Chest radiographs are NOT indicated to track illness improvement.
4. Nasopharyngeal swabs for viral serology are not indicated for outpatients with mild to moderate symptoms, but should be completed in any child admitted to hospital.
5. Bacterial pneumonia should improve within 48 hours of initiation of appropriate antibiotic therapy, (viral may take slightly longer). Be sure to re-evaluate diagnosis if this improvement is not observed.

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