SASKATCHEWAN REGISTERED NURSES' ASSOCIATION

RNs WITH ADDITIONAL AUTHORIZED PRACTICE
CLINICAL DECISION TOOL
DECEMBER 1, 2016

COMMUNITY ACQUIRED PNEUMONIA (CAP) ADULT

DEFINITION

Community acquired pneumonia (CAP) is an infection of the lungs. The condition is associated with fever, respiratory symptoms, and altered findings on physical examination and infiltrates on chest x-ray. Pneumonia typically follows an upper respiratory tract infection that promotes invasion of the lower respiratory tract of viruses, bacteria, fungi, or parasites.

CAP occurs outside the hospital or is diagnosed within 2 days after hospitalization in a client who has not resided in a long-term care facility for 2 weeks or more prior to the onset of symptoms.

Approximately 70-80% of clients who develop CAP is ≥ 60 years of age or has a coexisting medical condition.

Patterns of Pneumonia

- Lobar pneumonia: localized to one or more lobes of the lung
- Bronchopneumonia: inflammation around medium-sized airways, which causes patchy consolidation of parts of the lobes
- Interstitial pneumonia: inflammation of lung tissue between air sacs, usually generalized, often viral

IMMEDIATE CONSULTATION REQUIRED IN THE FOLLOWING SITUATIONS

- ≥ 50 years of age
- Clients with some or all of the following regardless of age:
  - Altered mental status
  - Pulse > 125; respiratory rate > 30; systolic blood pressure < 90 mm Hg; or temperature > 40°C oral or < 35°C oral
  - Gross hemoptysis
  - Unable to tolerate oral fluid/food or medication
  - Immunocompromised client

CAUSES

The most common cause of CAP is the gram-positive bacteria *Streptococcus pneumoniae* (*S. pneumoniae*), also referred to as pneumococcal pneumonia.

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Bacterial causes CAP	
Previously healthy < 65 years	*Streptococcus pneumoniae* (pneumococcal) and Mycoplasma are the most common organisms; also, less frequently, *Chlamydia pneumoniae* and *Haemophilus influenza*
Elderly and/or comorbid illness	*Haemophilus influenzae*, *Klebsiella pneumoniae*, *Legionella pneumophila*, *Moraxella catarrhalis*, *Mycobacterium tuberculosis*, *Staphylococcus aureus* and, less commonly, *Streptococcus pneumonia*
Immunocompromised clients	Cytomegalovirus (CMV) and herpes simplex viruses (HSV), *Pneumocystis carinii* (especially those with AIDS)

PREDISPOSING AND RISK FACTORS

- Asthma
- Chronic obstructive pulmonary disease (COPD)
- Congenital heart disease
- Bronchopulmonary dysplasia
- Neuromuscular disorders (swallowing disorders that pose a risk for aspiration)
- Gastroesophageal reflux (recurrent pneumonia may present)
- Tracheoesophageal fistula (recurrent pneumonia may present)
- Immunodeficiency disorders
- Alcoholism
- Smoking
- Residents of long-term care facilities and students living in close quarters

HISTORY

The "typical" pneumonia syndrome is that which is seen in pneumococcal pneumonia as well as pneumonia caused by *Haemophilus influenzae* (*H. influenzae*) and *Staphylococcus aureus* (*S. aureus*). It is characterized by the sudden onset of fever, cough, and chest pain. Clients may produce sputum that has a "rusty" colouration. Other characteristics include:

- Fever, chills (as high as 40°C oral with peaks in the afternoon or evening)
- Shortness of breath
- Nausea, vomiting
- Diarrhea
- Malaise
- Headache

Respiratory and non-respiratory symptoms are less commonly reported by older clients with pneumonia. This is most commonly seen in a reduced febrile response (chills and fevers) and for pain (myalgia, chest pain, and headache). Although these symptoms may not be present in older clients, this should not be misconstrued as an indication that such clients are less ill.

Generally, pneumonia caused by Mycoplasma, Chlamydia, viruses, and *Pneumocysitis carinii* has a slower, more insidious onset. The client may not appear as acutely ill and may have a lower fever, dry cough, and scanty sputum production.

PHYSICAL FINDINGS

Physical examination of a client with typical pneumonia syndrome usually reveals an acutely ill person who complains of chest pain and splints one side of the chest. Other signs include:

- Fever (flushed, diaphoretic if fever is high)
- Tachycardia
- Increased respiratory rate (> 20 breaths/minute)
- Productive cough
- Nasal congestion
- Decreased oxygen saturation [< 90% indicates need for supplemental oxygen and referral to a physician/RN(NP)]
- Tactile fremitus (vibrations with spoken word "99")
- Decreased breath sounds/air entry (over area of atelectasis or consolidation)
- Crackles (rales, rhonchi, crepitation) over affected lobes or scattered with bronchopneumonia and interstitial pneumonia
- Bronchial breath sounds (louder than normal, short inspiration with long, higher pitched expirations over consolidation)

- Wheezing
- Bronchophony (clearly heard syllables when listening to chest with stethoscope with spoken word "99")
- Dullness to percussion in lobar pneumonia
- Decreased unilateral chest excursion over area of lobar pneumonia
- Findings suggestive of pleural effusion:
  - Dullness to percussion
  - Pleural friction rub
  - Distant breath sounds
- Upper quadrant pain, secondary to effusion/pneumonitis
- Signs of dehydration (secondary to increased fluid needs from fever/tachypnea and decreased oral intake)

DIFFERENTIAL DIAGNOSIS

- Acute bacterial bronchitis
  - Both CAP and acute bacterial bronchitis will cause fever and a productive cough.
  - On auscultation, the client with bronchitis will likely have clear lung sounds except for a few scattered rhonchi.
  - The client with CAP will likely have crackles, dullness to percussion, and abnormal breath sounds.
- Tuberculosis (TB) (pulmonary)
  - Client presents with a history of fever, weight loss, and pulmonary symptoms congruent with TB. These are late signs.
  - There is TB present in the community.
- Chronic obstructive pulmonary Disease (COPD)
- Underlying lung cancer
- Aspiration pneumonia
- Lung abscess
- Atelectasis

COMPLICATIONS

- Decompensation of other medical problems
- Respiratory failure from hypoxia

- Sepsis (bacteremia)
- Metastatic infection such as meningitis, endocarditis, pericarditis, empyema
- Renal failure
- Cardiac failure

INVESTIGATIONS AND DIAGNOSTIC TESTS

- Oxygen saturation
- Lung auscultation and percussion
- Chest x-ray

A chest x-ray is important for three reasons:

1. It may help to distinguish whether pneumonia is bacterial or viral in nature. Lobular infiltrates strongly suggest a bacterial infection.
2. It will help to rule out a pleural effusion.
3. Cavities can be seen on x-rays in clients with pneumonia caused by anaerobes such as *Mycobacterium tuberculosis.*

In some locations, a chest x-ray is not readily available and the client will need to travel to obtain one. A chest x-ray needs to be considered in any client with moderate to severe pneumonia or where the diagnosis is uncertain. The need for an x-ray should be determined in consultation with a physician/RN(NP).

MAKING THE DIAGNOSIS

- A typical client with pneumonia is acutely ill, has a productive cough, and is splinting one side of his/her chest due to pain from coughing. Other signs and symptoms are listed under physical findings.

MANAGEMENT AND INTERVENTIONS

Degree of severity of the condition will determine the site of care:

- CRB-65 is one severity of illness score which can be used to identify clients who are mild-moderate or severe.
- Criteria scores, such as CRB-65, should always be supplemented with determination of subjective factors (e.g., reliability to take oral medication, availability of outpatient support) in consultation with a physician/RN(NP).

CRB-65 Criteria

- C (confusion - new onset disorientation)
- R (respiratory rate > 30 breaths per minute)
- B (low blood pressure < 90 systolic and/or < 60 diastolic)
- > 65 years of age

Scoring:

- Score one point for each criterion.

Severe CAP

- Score is ≥ 3, should be admitted to hospital urgently.

Moderate CAP

- Score is 2. Same day assessment and support is available and can be managed in the community in consultation with a physician/RN(NP).

Mild CAP

- Score is 0-1. Treatment at home may be appropriate depending on support available and clinical judgment of the provider and consultation.

Goals of Treatment

- Relieve symptoms
- Early identification of respiratory compromise
- Prevent complications
- Antimicrobial therapy as appropriate
- Improve or prevent respiratory distress

Appropriate Consultation

Consult a physician/RN(NP) if any of the following apply:

- Client who appears acutely ill
- Hemoptysis
- Respiratory distress
- Significant comorbid condition (e.g., COPD, diabetes mellitus, heart disease, renal disease, or cancer)
- Failure to respond to oral antibiotics within 24-48 hours

Non-Pharmacological Interventions

- Increased rest
- Adequate fluid intake: 6-8 glasses of fluid per day

Pharmacological Interventions

For fever, pain, and muscle ache:

- Acetaminophen 325-500 mg, 1-2 tabs orally q6h (maximum dose 4 g/day)
  Or
- Ibuprofen 200-400 mg, 1-2 tabs orally q4-6h (maximum dose 3200 mg/day)

Antibiotics

- Providers are encouraged to be aware of local antimicrobial susceptibility patterns to facilitate antibiotic selection.
- It is important to obtain a client's antibiotic history. Review antibiotics prescribed for any infection within the last 3 months; if there has been regular exposure to a particular antibiotic class then select an agent from an alternate class, particularly for the macrolides and fluoroquinolones.

CAP - mild to moderate (no comorbidity/modifying factors)

- Comorbidity/modifying factors include hospitalization in the past 3 months and/or chronic heart, lung or renal disease, diabetes mellitus, alcoholism, malignancies, asplenia, immunosuppression.

First line:

- Amoxicillin 1 g orally q8h for 5-7 days
- Erythromycin 500 mg orally q6h for 5-7days
- Clarithromycin 500 mg orally q12h or 1000 mg (extended release) orally daily
- Azithromycin 500 mg orally daily on first day then 250 mg orally daily for 4 days or 500 mg orally daily for 3 days

CAP - mild to moderate with comorbid/modifying factors (in consultation with a physician/RN(NP))

First line:

- Amoxicillin 1 g orally q8h for 5-7 days

- Amoxicillin /Clavulanate 500 mg orally q8h or 875 mg orally q12h for 5-7 days
- Cefuroxime - AX 500 mg orally q12h for 5-7 days
- Cefprozil 500 mg orally q12h for 5-7 days

Any one of the beta-lactam agents **ABOVE PLUS ONE** of the following:

- Clarithromycin 500 mg orally q12h or 1000 mg (extended release) orally daily for 5-7days
- Azithromycin 500 mg orally on first day then 250 mg orally for 4 days
- Doxycycline 100 mg orally q12h on first day then 100 mg orally daily for 6 days

Or any of the following:

- Levofloxacin 750 mg orally daily for 5 days
- Moxifloxacin 400 mg orally daily for 5 days

CAP - Severe

- Management will be provided in consultation with a physician/RN(NP).

Client and Caregiver Education

- Explain the nature, course, and expected outcomes of the illness.
- Advise client or caregivers of the signs of respiratory distress.
- Advise to give adequate fluids to prevent dehydration.
- Advise client to rest.
- Counsel client/caregiver about appropriate use of medications (dose, frequency, side effects, etc.).
- Return to the clinic if any concerns or client's condition deteriorates.
- Recommend influenza vaccination on an annual basis.
- Recommend pneumococcal vaccine to clients over the age of 65 years and to patients with co-morbid conditions (e.g., COPD, diabetes) regardless of age.

Monitoring and Follow-Up

- Arrange follow-up within 24 hours for reassessment or before if worsening symptoms or shortness of breath develops. Follow-up again after the course of antibiotics is completed.

Referral

- Usually not necessary for clients with mild symptoms unless their condition is worsening, complications occur, or they have significant comorbid conditions (heart failure, cerebrovasular disease, renal disease, or liver disease).
- Clinical judgment should be used for all clients, incorporating the CRB-65 scores as a component of the decision for referral.

DOCUMENTATION

- As per employer policy

REFERENCES

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