Guidelines

For The Management Of

Pneumonia

By

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Clinical Standards & Guidelines

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2009 AD 2709 K

Kurdistan Higher Council

For Medical Specialties

Bordi Kurdistan Bo Psporayati Pziski

Setting Clinical and Professional Excellence

Pneumonia is an infection of the lung parenchyma.
Community-acquired pneumonia **CAP** refers to pneumonia acquired outside of hospitals or extended-care facilities.
Nosocomial pneumonia & hospital-acquired pneumonia describe infections acquired in the hospital setting.

Typical bacterial pathogens

(*S. pneumoniae, H. influenzae*, and the enteric G^- organisms) usually manifest acutely with high fever, chills, tachypnea, tachycardia, and productive cough. Examination findings are localized to a specific lung zone and can include rales, rhonchi, bronchial breath sounds, dullness, increased fremitus, and egophony.

Atypical pathogens

*****_Mycoplasma, Chlamydophilia_ and viruses can manifest in a subacute fashion with fever, nonproductive cough, constitutional symptoms, and absent or diffuse findings on lung examination.

*****Rapid progression of disease to respiratory failure can be seen in severe pneumococcal or *Legionella* pneumonia.

*****Influenza may be complicated by bacterial pneumonia caused by *S. aureus* or *S. pneumoniae*.

*****Severe acute respiratory syndrome-associated-coronavirus SARS manifests with high fever and myalgia for 3 - 7 days, followed by a nonproductive cough and progressive hypoxemia, with progression to mechanical ventilation in 20% of cases. This can be distinguished from other viral infections by the higher fever and lack of conjunctivitis, sneezing, rhinorrhea, and pharyngitis.

*****Inhalation anthrax can manifest with flulike symptoms of myalgia, fatigue, and fever before rapidly progressing to respiratory distress, mediastinitis, meningitis, sepsis, and death.

Clinical presentation

*****CAP typically presents as a constellation of suggestive features including cough, fever, sputum production, and pleuritic chest pain, along with the presence of an acute infiltrate on chest radiograph, with or without microbiological data

*****The presentation in old patients is often less florid than in younger adults, with more-advanced disease and sepsis, despite minimal fever and sputum production.

*****Extrapulmonary physical findings can provide clues to the diagnosis. Poor dentition and foul-smelling sputum can indicate the presence of a lung abscess with an anaerobic component.

*****Bullous myringitis *(*an inflammatory condition of the eardrum, characterized by painful fluid-filled vesicles on the tympanic membrane) can accompany infection with *Mycoplasma pneumonia*.

*An absent gag reflex or altered sensorium raises the question of aspiration.

*Encephalitis can complicate pneumonia caused by *M. pneumoniae* or *Legionella pneumophila*.

*Cutaneous manifestations of pneumonia can include

Erythema nodosum *(*Streptococcal infections, *Mycoplasma pneumonia, M. tuberculosis, Campylobacter* infection and *Chlamydophila pneumoniae)*

Erythema multiforme *(M. pneumoniae)*

Ecthyma gangrenosum (*P. aeruginosa*)

Diagnostic Testing for Community-Acquired Pneumonia

All patients with suspected pneumonia should have:

Chest radiography, Complete blood count, complete biochemical profile, C-reactive protein, Blood gases or pulse oximetry

Chest x-ray A cornerstone of diagnosis:usually reveals an infiltrate at presentation or focal lesion large pleural effusion:bacterial or secondary bacterial infection complicating underlying pathology) cavitary :bacterial abscess, unresolved pneumonia, fungi, AFB

military:AFB, fungi

multifocal:*Legionella*, *Pneumococcus*, *Staphylococcus*

Interstitial:Viruses, *Mycoplasma, Pneumocystis jiroveci* (The older name Pneumocystis carinii now only applies to the Pneumocystis species that is found in rats)

Microbiological investigations are not recommended routinely, sputum examinations & blood cultures(two sets before antibiotics) are indicated only if:

a) No response to empirical antibiotic therapy

b) TB is suspected.

c) Severely ill, immunocompromised patients or patients with anatomic lung disease

d) Deterioration with no definite cause

Serological investigations may be considered during outbreaks (e.g. Legionnaires' disease, epidemic mycoplasma) or when there is a particular clinical or epidemiological reason.

C-reactive protein can help to distinguish pneumonia from exacerbations of COPD using an arbitrary cut off of 100 mg/l. Serial measurements of CRP may be especially useful for:

a) monitoring the response to treatment

b) Failure to achieve 50% reduction within 4 days suggests failure of treatment or the development of complications

Bronchoscopy (bronchoalveolar lavage, transbronchial biopsy)

Thoracoscopic or open-lung biopsy

Radiographically guided transthoracic aspirate

Tuberculin skin testing

Management decision

"Core" clinical adverse prognostic features (**CURB**)

Confusion: new mental confusion

Urea: raised > 42mg/dL (7 mmol/l) (for patients being seen in hospital)

Respiratory rate: raised ≥30/min

Blood pressure: low blood pressure (systolic blood pressure <90 mm Hg *and/or* diastolic blood pressure ≤60 mm Hg)

"Additional" clinical adverse prognostic features

Age ≥ 65 years

Presence of coexisting disease

Hypoxaemia (SaO_2 <92% or PaO_2 <8 kPa)

Bilateral or multilobe involvement on the chest radiograph

Both leucopenia (white cell count $<4 \times 10^9$) and leucocytosis ($>20 \times 10^9$)

Curb score :

0-1: Home treatment

2 : Hospital supervised treatment include

a) Short stay inpatient b) Hospital supervised outpatient

≥3: Hospital treatment with ICU admission if CURB 4 or 5

Indications for referral to ICU

- CURB score 4-5 failing to respond rapidly to initial management
- Persisting hypoxia (PaO_2 < 8 kPa (60 mmHg)) despite high concentrations of oxygen
- Progressive hypercapnia
- Severe acidosis
- Circulatory shock
- Reduced conscious level

***** Regular assessment of disease severity is recommended for all *patients* following hospital admission

General management

IN HOSPITAL

- Vital sign monitoring

-O_2

a) Aiming to maintain SaO_2 ≥92%.

b) High concentrations of oxygen 35 % can safely be given in uncomplicated pneumonia. Limited oxygen therapy 24% in patients with pre-existing chronic obstructive pulmonary disease

c) Patients with ventilatory failure should be guided by repeated arterial blood gas measurements.

-Maintain adequate hydration

Hospital treated, not severe: *All oral*

Amoxicillin 500 mg–1.0 g tds ***plus***

Erythromycin 500 mg qds **or** Clarithromycin 500 mg bd

Alternative Levofloxacin 500 mg od **or** Gemafloxacin, 320 od **or** Moxifloxacin 400 mg od

Hospital treated, not severe: *All intravenous (patient cannot take oral)*

Ampicillin 500 mg qds ***or*** Benzylpenicillin 1.2 g qds ***plus***

Erythromycin 500 mg qds ***or*** Clarithromycin 500 mg bd

Alternative Levofloxacin 500 mg od *infusion* ***or*** Moxifloxacin 400 mg od *infusion*

Hospital treated, severe: *All intravenous*

Co-amoxiclav 1.2 g tds ***or*** Cefuroxime 1.5 g tds ***or*** Cefotaxime 1 g tds ***or*** Ceftriaxone 2 g od ***plus***

Erythromycin 500 mg qds ***or*** Clarithromycin 500 mg bd

Alternative Benzylpenicillin 1.2 g qds ***plus*** *Levofloxacin* 500 mg bd infusion

If *pseudomonal infection* is a specific concern: antipneumococcal-antipseudomonal β-lactams such as Cefepime, Cefoperazone, Imipenem, Meropenem, or Piperacillin-Tazobactam should be given ***in combination*** with Ciprofloxacin or Levofloxacin.

Aspiration Pneumonia

-Clindamycin 450- 900 mg IV every 8 hours is preferred for treating anaerobes

-When large-volume aspiration is documented in the hospital:

β-lactam–β-lactamase inhibitor combination (Amoxicillin-clavulanate,, Ampicillin-sulbactam, Ticarcillin-clavulanate and piperacillin-tazobactam)

or the combination of Clindamycin and an antipseudomonal agen (Pipracillin Ticarcillin, Carbenicillin) should be used.

Anthrax

Suspected or proven inhalation anthrax should be treated with ciprofloxacin or doxycycline **+** two of the following: Rifampin, Vancomycin, Penicillin, Ampicillin, Chloramphenicol, Imipenem, Clindamycin, Clarithromycin

IN THE COMMUNITY

Patients with should be advised, to rest, drink plenty of fluids & not to smoke

Pleuritic pain should be relieved using analgesia or NSAID

Nutritional supplements should be considered in prolonged illness.

Review of patients in the community with CAP is recommended after 48 hours or earlier, those who fail to improve after 48 hours of treatment should be considered for hospital admission

Home treated, not severe: ***All oral***

Amoxicillin 500 mg–1.0 g tds

Alternative Erythromycin 500 mg qds ***or*** clarithromycin 500 mg bd ***or*** doxycycline 100 mg bd

Failure to Respond to Initial Therapy

Worsening of clinical status despite adequate antibiotic therapy should trigger a reassessment of the original clinical impression.

1. Other disease condition must be questioned such as cancers, pulmonary edema, pulmonary embolus, pulmonary hemorrhage, connective tissue diseases, or drug toxicity can mimic the clinical and radiographic appearance of pneumonia.
2. Organisms with inherent (fungi, mycobacterial, P. jiroveci) or acquired (Pseudomonas aeruginosa) resistance to drugs. .
3. A secondary infection, such as postinfluenza staphylococcal pneumonia, might prove resistant to initial therapy.
4. Immunodeficiency (HIV, hematologic malignancy)
5. Local or distant complications: parapneumonic effusion, empyema, lung abcess, phlebitis, septicaemia, metastatic infection, adult respiratory distress syndrome

Discharge Criteria

Patient can be discharged safely***:***

a) PaO_2>92%

b)Temperature<37.5°

c) Respiratory rate<24/min

d) Pulse <100 beats/min

e) Systolic blood pressure >90 mm Hg

f) Ability to maintain oral intake.

Prevention

Vaccination against pneumococci & influenza virus can play a critical role in preventing pneumonia, particularly in patients with co morbid disease, immunocompromised & elderly.

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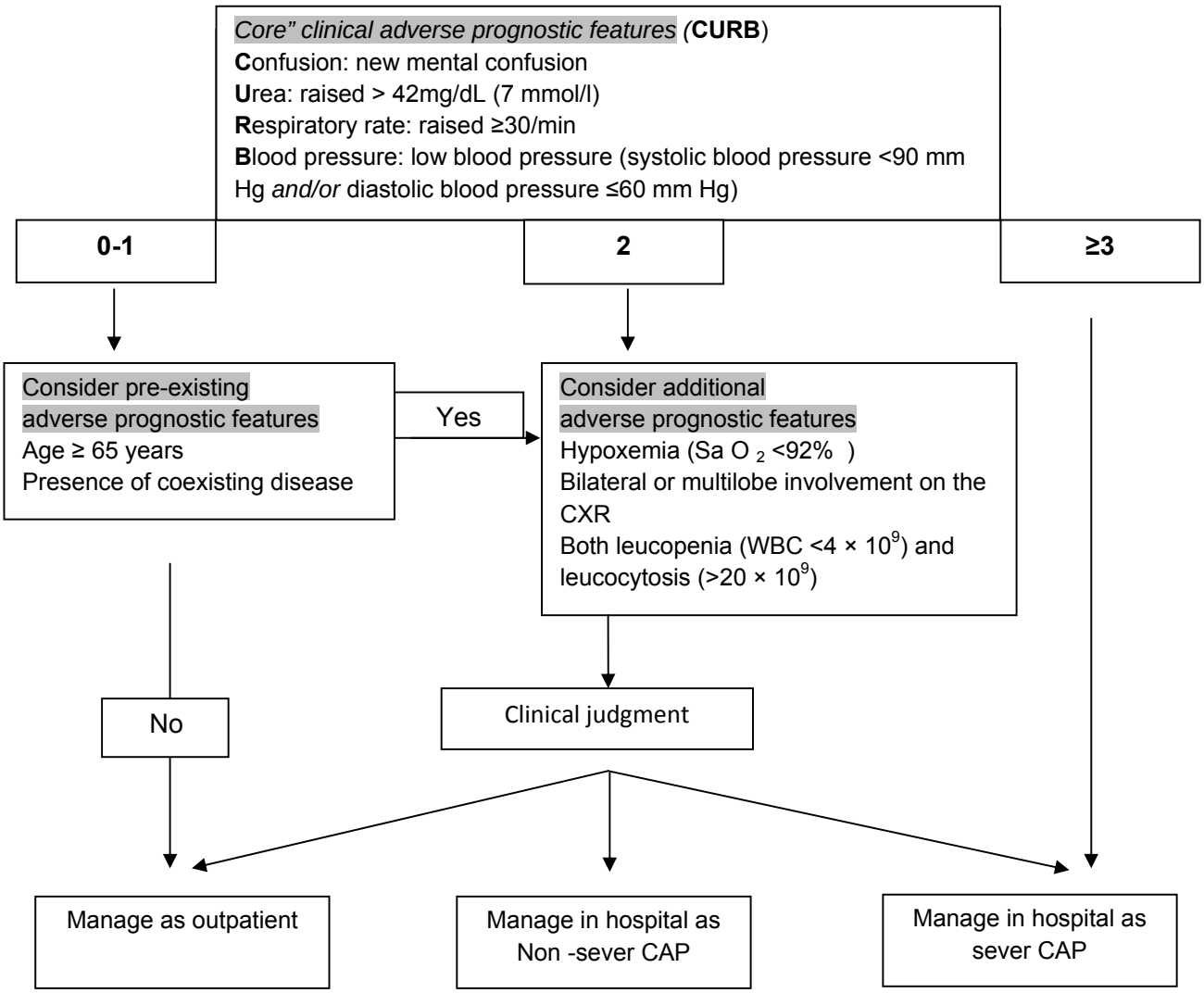

Severity assessment used to determine the management of CAP in patients admitted to hospital.
The social circumstances and the wishes of the patient and general practitioner should also be considered.