CAP

Common causes

Streptococcus pneumoniae (pneumococcus) and respiratory viruses are the most frequently detected pathogens in patients with CAP

Typical bacteria

- S. pneumoniae (most common bacterial cause)
- Haemophilus influenzae
- Moraxella catarrhalis
- Staphylococcus aureus
- Group A streptococci
- Aerobic gram-negative bacteria (eg, Enterobacteriaceae such as Klebsiella spp or Escherichia coli)
- Microaerophilic bacteria and anaerobes (associated with aspiration)

Atypical bacteria ("atypical" refers to the intrinsic resistance of these organisms to beta-lactams and their inability to be visualized on Gram stain or cultured using traditional techniques)

- Legionella spp
- Mycoplasma pneumoniae
- Chlamydia pneumoniae
- Chlamydia psittaci
- Coxiella burnetii
- Respiratory viruses
- Influenza A and B viruses
- Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)
- Other coronaviruses (eg, Middle East respiratory syndrome CoV, severe acute respiratory syndrome CoV, CoV-229E, CoV-NL63, CoV-OC43, CoV-HKU1)
- Rhinoviruses
- Parainfluenza viruses
- Adenoviruses
- Respiratory syncytial virus
- Human metapneumovirus
- Human bocaviruses

Making the diagnosis

- The diagnosis of CAP generally requires the demonstration of an infiltrate on chest imaging in a patient with a clinically compatible syndrome (eg, fever, dyspnea, cough, and sputum production)
- For most patients with suspected CAP, obtain PA and lateral chest radiographs. Radiographic findings consistent with the diagnosis of CAP include lobar consolidations, interstitial infiltrates, and/or cavitations.
- For selected patients in whom CAP is suspected based on clinical features despite a negative chest radiograph, obtain chest CT.

For most patients with moderate CAP admitted to the general medical ward, obtain the following:

- Blood cultures
- Sputum Gram stain and culture
- Urinary antigen testing for S. pneumoniae
- Testing for Legionella spp (polymerase chain reaction [PCR] when available, urinary antigen test as an alternate)
- SARS-CoV-2 testing

DIFFERENTIAL DIAGNOSIS

Noninfectious illnesses that mimic CAP or co-occur with CAP and present with pulmonary infiltrate and cough include:

- Congestive heart failure with pulmonary edema
- Pulmonary embolism
- Pulmonary hemorrhage
- Atelectasis
- Aspiration or chemical pneumonitis
- Drug reactions
- Lung cancer
- Collagen vascular diseases
- Vasculitis
- Acute exacerbation of bronchiectasis
- Interstitial lung diseases (eg, sarcoidosis, asbestosis, hypersensitivity pneumonitis, cryptogenic organizing pneumonia)

Inpatient antibiotic therapy

Without suspicion for MRSA or Pseudomonas

●Combination therapy with ceftriaxone (1 to 2 g IV daily), cefotaxime (1 to 2 g IV every 8 hours), ceftaroline (600 mg IV every 12 hours), ertapenem (1 g IV daily), or ampicillin-sulbactam (3 g IV every 6 hours) plus a macrolide (azithromycin [500 mg IV or orally daily] or clarithromycin [500 mg twice daily] or clarithromycin XL [two 500 mg tablets once daily]). Doxycycline (100 mg orally or IV twice daily) may be used as an alternative to a macrolide.

●Monotherapy with a respiratory fluoroquinolone (levofloxacin [750 mg IV or orally daily] or moxifloxacin [400 mg IV or orally daily] or gemifloxacin [320 mg orally daily]) is an appropriate alternative for patients who cannot receive a beta-lactam plus a macrolide.

With suspicion for Pseudomonas

Acceptable regimens include combination therapy with an antipseudomonal/antipneumococcal beta-lactam antibiotic and an antipseudomonal fluoroquinolone, such as the following regimens:

●Piperacillin-tazobactam (4.5 g every 6 hours) or Imipenem (500 mg every 6 hours) or Meropenem (1 g every 8 hours) or Cefepime (2 g every 8 hours) or ●Ceftazidime (2 g every 8 hours; activity against pneumococcus more limited than agents listed above)

PLUS ●Ciprofloxacin (400 mg every 8 hours) or ●Levofloxacin (750 mg daily)

With suspicion for MRSA

- Empiric therapy for CA-MRSA: gram-positive cocci in clusters seen on sputum Gram stain, known colonization with MRSA, risk factors for colonization with MRSA (eg, end-stage kidney disease, contact sport participants, people who inject drugs, those living in crowded conditions, men who have sex with men, prisoners), recent influenza-like illness, antimicrobial therapy (particularly with a fluoroquinolone) in the prior three months, necrotizing or cavitary pneumonia, or presence of empyema.
- For treatment of MRSA, empiric regimens should include either vancomycin or linezolid (600 mg IV every 12 hours).
- In all patients treated empirically for MRSA, obtain a rapid nasal PCR for MRSA (when available) in addition to Gram stain and culture of sputum or other respiratory tract infection to help guide subsequent therapy.

Influenza therapy

- Antiviral treatment is recommended as soon as possible for all persons with suspected or confirmed influenza requiring hospitalization or who have progressive, severe, or complicated influenza infection, regardless of previous health or vaccination status

Antibiotic Therapy for Adults Hospitalized With Community-Acquired PneumoniaThe Clinical Utility of Methicillin-Resistant Staphylococcus aureus (MRSA) Nasal Screening to Rule Out MRSA Pneumonia

Treatment of CAP

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