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ELDER CARE

A Resource for Interprofessional Providers

Pneumonia in Skilled Nursing Facility Patients

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Pneumonia is a common infection among residents of skilled nursing facilities, and it is a major cause of death. Thirty day mortality rates are estimated at between 10 and 30 percent and the incidence increases with age.

Etiology

Pneumonia in skilled nursing facility (SNF) patients was categorized as a form of healthcare-acquired pneumonia (HCAP) in the past, but current ATS/IDSA and European and Latin American guidelines no longer recognize HCAP as a distinct entity, since the incidence of multidrug resistant pathogens in this population is low. The infecting microorganism in pneumonia in SNF patients may be bacterial or viral and is often not identified in routine clinical practice.

Streptococcus pneumoniae and *Hemophilus influenzae* are probably the most common bacterial causes. The SARS-CoV-2 virus and influenza viruses are the most common viral causes. A detailed discussion of the SARS-CoV-2 virus and COVID-19 pneumonia is beyond the scope of this article. In more severe pneumonia cases, such as those that require hospitalization, enteric gram-negative organisms and *S. aureus* may be present. Gram negatives and *S. aureus* can be associated with antimicrobial resistance, especially if a patient received antibiotics within the preceding 90 days, if there is a high incidence of antibiotic resistance in the community or facility, or if the patient is on dialysis or is immunosuppressed.

Diagnosis

The symptoms of pneumonia in SNF patients can be subtle, but common presentations include cough, subjective fever, chills, sputum production and dyspnea. Elderly patients may also demonstrate confusion or decreased functional status. One meta-analysis found that the most specific signs were the physician's overall suspicion, egophony, any abnormal vital sign (especially tachypnea), any abnormal lung finding and a measured fever. Another review found that if patients had normal vital signs and a normal lung exam, they were unlikely to have pneumonia.

Diagnosis is based on a new or progressive infiltrate on chest radiography plus clinical findings consistent with pneumonia. These include fever >100.4°F (>38° C), leukocytosis, purulent sputum, dyspnea, cough or hypoxemia (Table 1). Fever may not be present. Imaging may not be practical in some community settings if severe symptoms are absent but pneumonia is strongly suspected. If no infiltrate is present on a chest x-ray but pneumonia is suspected, then a chest CT can be considered, though CT is not always easily available. Lung ultrasonography may be a useful imaging modality in some settings. Sputum gram stain and culture, blood cultures and urinary antigen testing should only be considered for severe cases or if there is a high suspicion for multidrug resistant pathogens. Criteria for severe pneumonia include mechanical ventilation or the need for vasopressors (in addition to other factors). Procalcitonin is not recommended. Testing for influenza and SARS-CoV-2 may also be appropriate.

Table 1. Guideline Recommendations for Diagnosis of Pneumonia in SNF Patients (ATS)

- **New infiltrate on chest x-ray**
- **PLUS any one or more of the following:**
  - * New-onset fever >100.4°F (>38°C)
  - * Dypnea
  - * Purulent sputum
  - * Cough

Treatment

Treatment of pneumonia in SNF patients is tailored to the likely cause of the infection and whether treatment will be provided in a hospital. The IDSA recommends utilizing the Pneumonia Severity Index to help determine if hospitalization is needed, but the British Thoracic Society recommends the simpler CURB-65 (confusion, BUN, respiratory rate, blood pressure, >65 years of age) or CRB-65 (same measures as CURB-65 excluding BUN) tools. Empiric antibiotic coverage for MRSA or *Pseudomonas aeruginosa* is recommended only if the patient has had a prior infection with these agents or if the patient has recently been hospitalized and treated with parenteral antibiotics, depending on local resistance rates.

In the SNF For patients who do not require hospitalization, there is little evidence to support the superiority of one antibiotic over another. Macrolide antibiotics are no longer

TIPS ABOUT DIAGNOSIS AND MANAGEMENT OF PNEUMONIA IN SNF PATIENTS

- Be alert for subtle signs of pneumonia in SNF patients – cough, tachypnea, crackles or egophony on lung exam. Fever may not be present. The only sign may be a decrease in level of function or confusion.
- Diagnose pneumonia when a chest x-ray shows a new infiltrate in combination with clinical signs.
- Treat mild cases of pneumonia in the SNF with oral antibiotics (see Table 2).
- Treat more severe cases of pneumonia with IV antibiotics, generally in the hospital.

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routinely recommended as monotherapy due to *Streptococcus pneumoniae* resistance. See Table 2 for ATS/IDSA antibiotic recommendations in outpatients.

In the Hospital According to the 2019 ATS/IDSA guidelines, hospitalized SNF patients with pneumonia should be treated with a beta-lactam plus a macrolide, or a respiratory fluoroquinolone. A beta-lactam should be added to the fluoroquinolone in severe cases requiring mechanical ventilation or vasopressors. Empiric coverage for MRSA with vancomycin or linezolid is recommended for patients with prior MRSA infection but can be stopped if testing is negative. If the patient has recently been hospitalized and treated with parenteral antibiotics, then MRSA treatment should be added for severe cases or if cultures are positive (depending on local resistance patterns).

Empiric treatment for *Pseudomonas aeruginosa* with piperacillin/tazobactam, cefepime, ceftazidime or imipenem should be added if there is a history of prior *Pseudomonas* respiratory infection or if the patient has recently been hospitalized and treated with parenteral antibiotics (depending on local resistance patterns). Coverage can be discontinued if testing is negative.

Local resistance patterns may influence antibiotic selection. Antibiotics are frequently given intravenously initially but can often be changed to oral as the patient stabilizes. Similarly, initial broad antibiotics can be de-escalated if etiologic agents are identified. Antibiotics should be started within four to eight hours of diagnosis. Antibiotics given within the last 90 days should not be used again because of possible resistance to those agents. Antibiotics can be discontinued after five days if the patient is improving or has stabilized.

Table 2. Antibiotics for Treating Pneumonia in the SNF

Patients with no comorbid conditions:

- Amoxicillin, 1 g TID x 5 days OR
- Doxycycline 100 mg BID x 5 days OR
- Macrolide (if local S. Pneumoniae resistance rates < 25%)
  - * Azithromycin 500 mg on day 1, followed by 250 mg on days 2-5 or
  - * Clarithromycin 500 mg BID x 5 days

Patients with comorbid conditions (such as chronic heart, lung, liver, kidney disease, alcohol use disorder, malignancy immunosuppression)

- Amoxicillin/clavulanate 875/125 mg or 2000/ 125 mg BID x 5 days OR a 3rd generation cephalosporin

AND

- Macrolide (as above) or
- Doxycyline (as above)

OR

- **Respiratory fluoroquinolone**
  - * Levofloxacin 750 mg once daily x 5 days
  - * Moxifloxacin 400 mg once daily x 5 days
  - * Gemifloxacin 320 mg once daily x 5 days

Special Considerations

Patients in SNF settings often have multiple medical problems and take many medications, which may complicate antibiotic dosing. Drug interactions can be problematic, and each antibiotic should be assessed for potential interactions with the patient's other medications. Many patients have impaired renal function, so medications that undergo renal excretion must be dosed appropriately after estimating creatinine clearance. Imipenem should be used with caution or not at all for patients who have seizure disorders.

The IDSA/ATS guidelines do not make specific recommendations about treatment of immunocompromised patients, provide no evidence to guide treatment for possible aspiration, and do not recommend adding anaerobic coverage unless a lung abscess or empyema is present.

The IDSA does not recommend corticosteroids for routine treatment of pneumonia due to conflicting evidence of benefit. The antiviral oseltamivir is recommended for influenza treatment in hospitalized patients and it is generally appropriate in the SNF setting as well, regardless of the duration of illness. Treatment for COVID-19 infection is indicated for most SNF patients as many SNF patients are elderly or have medical comorbidities. Vaccination against pneumococcus, influenza and SARS-CoV-2 is recommended for SNF patients.

References and Resources

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