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A Resource for Interprofessional Providers

Nursing Home-Acquired Pneumonia

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Pneumonia is a common infection among nursing home residents. Nursing home-acquired pneumonia is also a serious infection, with 30-day mortality rates estimated at between 10-30 percent.

Etiology

Nursing home-acquired pneumonia is categorized as a form of healthcare-acquired pneumonia (HCAP). While usually bacterial in origin, the infecting microorganism is not often identified in routine clinical practice.

Streptococcus pneumoniae is probably the most common cause. In more severe cases, such as those that require hospitalization, enteric gram-negative organisms and *S. aureus* may be more frequent pathogens than *S. pneumoniae*. Gram negatives and *S. aureus* can be associated with antimicrobial resistance, especially if a patient received antibiotics within the preceding 90 days, or if there is a high incidence of antibiotic resistance in the community or facility, or if the patient is on dialysis or immunosuppressed.

Diagnosis

The symptoms of pneumonia in nursing home patients are often subtle, but most patients have at least one respiratory finding, such as cough, increased respiratory rate (≥ 30 breaths per minute), or the presence of crackles on auscultation.

The 2005 American Thoracic Society / Infectious Diseases Society of America (ATS/IDSA) guideline recommends that diagnosis be based on a new or progressive infiltrate on chest radiography plus clinical findings consistent with pneumonia. These include new-onset fever $>100.4^{\circ}\text{F}$ ($>38^{\circ}\text{C}$), leukocytosis, purulent sputum, or hypoxemia (Table 1). Sputum Gram stain and culture should be considered if the patient is able to generate a useful

sample and the results can be obtained in a timely manner. Blood cultures are infrequently positive, but should be considered for patients requiring intensive care.

Treatment

Treatment of nursing home-acquired pneumonia is tailored to (a) the likely cause of the infection and (b) whether treatment will be given in the nursing home or in a hospital.

In the Nursing Home For patients who do not require hospitalization, there is little evidence to support the superiority of one antibiotic over another. Limited guidelines and expert opinion recommend two equally-acceptable options, both of which focus on *S. pneumoniae* as the likely cause. These options are shown in Table 2. Oral therapy is preferred over parenteral therapy, though cephalosporins can be given intramuscularly if needed.

Table 1. Guideline Recommendations for Diagnosis of Nursing Home-Acquired Pneumonia

- New infiltrate on chest x-ray
- PLUS any one or more of the following:
 - * New-onset fever $>100.4^{\circ}\text{F}$ ($>38^{\circ}\text{C}$)
 - * Elevated white blood cell count
 - * Purulent sputum
 - * Hypoxemia

In the Hospital For patients who have more severe illness and require hospitalization, methicillin-resistant *S. aureus* (MRSA) and *Pseudomonas aeruginosa* are more likely to be involved. The ATS/IDSA guidelines thus recommended

TIPS ABOUT DIAGNOSIS AND MANAGEMENT OF NURSING HOME ACQUIRED PNEUMONIA (NHAP)

- Be alert for subtle signs of pneumonia in nursing home patients – cough, tachypnea, or crackles on lung exam. Fever may not be present.
- Diagnose NHAP when a chest x-ray shows a new infiltrate, in combination with clinical signs.
- Treat mild cases of NHAP in the nursing home with oral antibiotics (see Table 1).
- Treat more severe cases of NHAP in the hospital with IV antibiotics (see Table 2).

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Continued from front page

treatment of hospitalized patients with antibiotics that cover these microbes and the recommended regimens are shown in Table 3. Some recent research suggests, however, that in-hospital treatment of nursing home-acquired pneumonia with the “in-nursing home” regimens described on the previous page results in similar outcomes as the more aggressive “in-hospital” antibiotics.

Regardless of the regimen used, antibiotics should be given intravenously and started as soon as possible. Antibiotics given within the last 90 days should not be used again because of possible resistance to those agents.

The recommendations in Table 2 are for empiric treatment of severe pneumonia cases. Therapy should be adjusted based on culture results, local microbiology and resistance patterns, and specific patient risk factors for specific bacterial causes and adverse effects from particular medications.

Special Considerations

Older adults in nursing homes often have multiple medical problems and take many medications, all of which may complicate antibiotic dosing. Many patients have impaired renal function, so medications that undergo renal excretion medications must be dosed appropriately after estimating creatinine clearance. Furthermore, in patients with overtly impaired renal function it is best to completely avoid some antibiotics all together - like aminoglycosides. Imipenem should be used with caution or not at all for patients who have seizure disorders, as this drug is associated with an increased rate of seizures. Drug interactions also pose a challenge for the provider, and each antibiotic should be assessed for an interaction with the patient’s other medications.

Table 2. Antibiotics for Treating Nursing Home-Acquired Pneumonia in the Nursing Home

Option 1: Anti-pneumococcal fluoroquinolone (eg, levofloxacin or moxifloxacin)

Option 2: Amoxicillin/clavulanate extended release or a 2nd or 3rd generation cephalosporin
PLUS
Azithromycin or doxycycline

Table 3. Antibiotics for Treating Nursing Home-Acquired Pneumonia in the Hospital

* Antipseudomonal cephalosporin or antipseudomonal carbapenem or extended-spectrum beta lactam/beta-lactamase inhibitor
PLUS
* Antipseudomonal fluoroquinolone or an aminoglycoside
PLUS
* Anti-MRSA agent (vancomycin or linezolid)

References and Resources

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