Bacterial Pneumonia in Long-Term Care

Agency for Healthcare Research and Quality

Diagnosis

Pneumonia is lung inflammation described as infiltrates on chest x ray

Signs and symptoms of pneumonia include:

- New or worsening shortness of breath or cough, often with sputum production[1]
- Fever (temperature >100°F or repeated temperatures above resident's baseline)[1]
- Decreased room air pulse oximetry (or increased oxygen requirements)[2]
- Pleuritic chest pain (pain with breathing) in the chest, upper abdomen, or back[3]

In adults, about 75% of pneumonia is caused by bacteria and 25% is caused by viruses[4]

- A positive test for a respiratory virus (e.g., influenza, COVID-19) in a resident with infiltrates on chest x ray usually indicates viral pneumonia[5,6]
- Fewer than 15% of nursing home residents have bacterial and viral pneumonia at the same time[7,8]

Evaluation for Suspected Pneumonia

- Pulse oximetry to evaluate for decreased oxygenation[2,3]
- CBC to evaluate for increased white blood cell count or presence of bands[9]
- Chest x ray; a new infiltrate suggests pneumonia; helpful to compare to prior imaging[3,9]
- Sputum Gram stain and culture[3,9]
- Test for influenza (particularly during peak influenza season, October–March) and COVID-19 or can send a respiratory viral panel if available[3,9-14]
- *Streptococcus pneumoniae* urinary antigen, *Legionella* urinary antigen (if available)[3,9,15]

Treatment for Bacterial Pneumonia

- Supportive care: cough suppressants, fluids, supplemental oxygen, nebulizer treatments, chest physical therapy
- Residents with influenza should receive oseltamivir[16]
- Residents who are generally in reasonable health and who have not been hospitalized or exposed to broad-spectrum antibiotics in the previous 90 days, consider:[13,17]
  - Amoxicillin-clavulanic acid or a second or third generation oral cephalosporin for 5–7 days PLUS doxycycline (for 5–7 days) or azithromycin (for 3 days)
  - If severe penicillin allergy*: moxifloxacin or levofloxacin for 5–7 days
- Residents with risk factors for resistant Gram-negative bacteria (hospitalized or broad-spectrum antibiotics in the previous 90 days, history of *Pseudomonas*, immunocompromised, bronchiectasis, or tracheostomy), consider:[13,17]
  - Cefepime or piperacillin-tazobactam for 7 days PLUS doxycycline (for 7 days) or azithromycin (for 3 days)
  - If severe penicillin allergy: levofloxacin
- If severe illness, consider adding vancomycin OR linezolid to either of the above regimens (for coverage of methicillin-resistant *Staphylococcus aureus*)[13,17]
- Longer treatment courses than those recommended do not improve outcomes[17,18]
- Modify therapy if microbiology results indicate a narrower-spuctrum agent can be used[9,13,17]
- Consider hospital transfer if no clinical improvement within 24 hours of starting antibiotics or clinical instability (e.g., unable to maintain O2 saturation, hypotension, tachycardia)[3]

*Recommend determining allergy risk and prescribing beta-lactam antibiotics if low risk. Fluoroquinolones may cause several serious side effects such as *Clostridioides difficile* infections, prolonged QTc intervals, tendinopathy and tendon rupture, aortic dissections, seizures, or peripheral neuropathy.

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