TH2- Updates in Management of Common Infections in PA/LTC Facilities

Thursday, March 22
8:00 AM-11:30 AM

Session Description

This session will highlight diagnostic challenges faced by providers when managing common infections (pneumonia, urinary tract infections and Clostridium difficile infections) in PA/LTC facilities, along with providing treatment updates. In addition, speakers will discuss strategies for prevention and early recognition of these infections. The audience will have the opportunity to seek answers for practical questions that they come across in their daily practice while managing common infections. This session will combine short presentations with interactive role-play session, small group case-based discussions, and an interactive panel discussion towards the end of the workshop.

Learning Objectives

- Describe various clinical presentations of pneumonia, UTI and CDI in PA/LTC setting.
- Discuss the diagnostic challenges for pneumonia, UTI and CDI and the limitations of the available tests.
- Demonstrate practical steps that can be taken for prevention and early recognition of the common infections in the PA/LTC facilities.
- Review the treatment updates for pneumonia, UTI and CDI.

Presenter(s): Muhammad S. Ashraf, MBBS, Dheeraj Mahajan, MD, CMD, Ghinwa Dumyati, MD, Sharon Bradley, RN, CIC, Laurie Archbold-Pannone, MD, MPH

Presenter(s) Disclosures: Muhammad S. Ashraf, MBBS: Has a financial disclosure: Grant/Research Support: Merck & Co., Inc.; All other speakers have reported they have no relevant financial relationships to disclose.
Pneumonia in Post Acute and Long Term Care

Ghinwa Dumyati, MD
Professor of Medicine
Infectious Diseases Division
University of Rochester Medical Center

Speaker Disclosures
Dr. Dumyati has no financial relationship(s).

Learning Objectives
By the end of the session, participants will be able to:
• Evaluate nursing home residents for pneumonia and understand the limitations of a mobile chest X-ray
• List the potential pathogens causing pneumonia in the nursing home residents and the treatment choices
• Discuss prevention strategies for nursing home pneumonia

Nursing Home Pneumonia
• Represents 13–48% of all infections
• Incidence: 1 per 1000 residents days
• Incidence is 10X higher compared to pneumonia in elderly patients living at home
• Leading cause of mortality
• Primary reason for resident transfer to the hospital
• Nursing home (NH) residents account for 10–18% of all people hospitalized for pneumonia

Risk for Pneumonia in Nursing Home
• Multiple underlying comorbidities (cardiovascular, respiratory and neurologic)
• Poor functional status
• Feeding tube
• Difficulty swallowing
• Receiving sedative agents

Increase risk of aspiration

Appropriate Diagnosis

El-Solh A. Current Medical Research and Opinion, 2010; 26: 2707–2714
**Acute Respiratory Tract Infections**

- Syndromes caused primarily by viruses
- Syndromes caused primarily by bacteria

- Upper respiratory tract infections
- Lower respiratory tract infections

90% due to viruses

~70% due to bacteria

**Work Up Considerations**

- Change in condition
  - Change in functional status
  - Fever
  - Respiratory symptoms

- Evaluation
  - History (history of COPD) and Physical (lung sounds)
  - Pulse oximetry ≤ 94%
  - Respiratory rate ≥ 25

- Communication
  - Advanced directives
  - Decision to transfer to hospital

- Diagnostic studies
  - CBC (≥ 14,000 cells/mm³) or a left shift
  - CXR

**Mobile Chest-X-ray Limitations**

- Inability of frail older persons to maintain a stationary, upright sitting position
- Relatively poor quality of portable radiography techniques
- A lack of availability of previous films for comparison
- Radiologists disagree frequently on the presence or absence of infiltrates (K = 0.54), pleural effusions (K = 0.8), hilar lymphadenopathy (K = 0.54), mediastinal lymphadenopathy (K = 0.49)

**Pneumonia Signs and Symptoms in Nursing Home Residents**

- Signs and Symptoms:
  - Cough 75%
  - Fever 62%
  - Rales 55%
  - No symptoms 7.5%
  - Pulse oximetry ≤ 93% (80% sensitive, 91% specific for pneumonia)
  - WBC ≥ 14,000 cell/mm³ or left shift is suggestive of a bacterial infection

**Mobile Chest-X-ray Limitations**

- Radiologists disagree frequently on the presence or absence of infiltrates (K = 0.54), pleural effusions (K = 0.8), hilar lymphadenopathy (K = 0.54), mediastinal lymphadenopathy (K = 0.49)

**CXR might drive antibiotic treatment**

- CXR Finding
- Treatment for pneumonia

**Nursing Home Pneumonia**

- Bacterial Pneumonia
- Pneumonia due to MDRO
- Aspiration pneumonia

*MDRO: multidrug resistant organisms*
Treatment decisions need to include clinical findings and should not be made based on radiographic findings alone.


### Other tests?

<table>
<thead>
<tr>
<th>Test</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory viral panel</td>
<td>May limit antibiotic use, respiratory swab</td>
<td>Delay in results, cost, influenza virus antigen less sensitive than PCR</td>
</tr>
<tr>
<td>Sputum culture</td>
<td>May yield pathogen</td>
<td>Colonization, poor specimen, may prompt excessive Rx (e.g., MRSA)</td>
</tr>
<tr>
<td>Urinary antigen testing (S. pneumonia, L. pneumophila)</td>
<td>May identify pathogen</td>
<td>Delay in results, urine sample needed, only Legionella serotype 1</td>
</tr>
<tr>
<td>Procalcitonin</td>
<td>May limit antibiotic use</td>
<td>Blood test, delay in results, no studies in nursing homes</td>
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</tbody>
</table>


### Therapy

Loeb minimum criteria for starting antibiotics

- **Temp > 102°F**
  - AND **RR > 25** or productive cough
- **Fever > 2.4°F** over baseline AND new cough plus:
  - 1) P > 100 or 2) Delirium or 3) Rigors or 4) RR > 25
- New productive cough AND RR > 25 or delirium
- COPD AND cough with purulent sputum


### Consider when antibiotics NOT needed

1. Chemical pneumonitis due to aspiration
   - Symptoms and abnormal CXR usually resolve within 24 hours
   - Antibiotics indicated if CXR changes fail to resolve in 48 hours
2. Viral pneumonia/bronchitis
3. End stage dementia

### Antibiotics Do Not Prolong Life in Advanced Dementia

J.T. van der Steen et al. / JAMDA 13 (2012) 156–161
Directing Therapy—Spectrum and Duration

Nursing Home Pneumonia ≠ Healthcare Associated Pneumonia

- In 2005: nursing home (NH) pneumonia was included in healthcare associated pneumonia- Removed in 2016
- The guidelines did not adequately identify patients with risk of multidrug resistant organisms (MDRO) and promoted the unnecessary use of broad spectrum antibiotics
- Recent studies suggest that NH pneumonia is more like community acquired pneumonia (CAP)
- Underlying patients characteristics are more important risk for MDRO than exposure to a specific healthcare system


Etiology- Pathogens More Consistent with CAP

<table>
<thead>
<tr>
<th>Organisms</th>
<th>Range of Prevalence</th>
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<tbody>
<tr>
<td>Streptococcus pneumoniae</td>
<td>9-55%</td>
</tr>
<tr>
<td>Staphylococcus aureus</td>
<td>0-33%</td>
</tr>
<tr>
<td>Haemophilus influenza</td>
<td>2-22%</td>
</tr>
<tr>
<td>Legionella</td>
<td>0-6%</td>
</tr>
<tr>
<td>Enteric Gram negative</td>
<td>4-14%</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>0-6%</td>
</tr>
<tr>
<td>Atypical pathogens (mycoplasma pneumonia, Chlamydia species)</td>
<td>0-19%</td>
</tr>
</tbody>
</table>


What to Treat with?

- Treat as a Community Acquired Pneumonia
- A broader regimen for MDRO reserved for specific populations:
  1. Patients with severe illness (e.g., mechanical ventilation, ICU admission, deterioration)
  2. Lack of improvement after 72 hours
  3. High risk of MDRO


Potential Algorithm to Identify Residents at Risk for MDRO Pneumonia


DEVELOPING CITY-WIDE PNEUMONIA TREATMENT GUIDELINES

Kabli AC et al. Clinical Infectious Diseases 2016;63:1-51
Recommended Antibiotics for Treatment of Bacterial Pneumonia in Nursing Home Residents

Mild-moderate pneumonia symptoms

<table>
<thead>
<tr>
<th>1st line</th>
<th>Uncomplicated bacterial pneumonia</th>
<th>Cefpodoxime (PO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>alternative</td>
<td>Uncomplicated bacterial pneumonia- aspiration risk</td>
<td>Amoxicillin/avulinate (PO)</td>
</tr>
<tr>
<td>2nd line</td>
<td>Bacterial pneumonia, contraindication to first line therapy</td>
<td>Levofloxacin or moxifloxacin (PO)</td>
</tr>
</tbody>
</table>

Uncomplicated bacterial pneumonia-aspiration risk

Amoxicillin/avulinate (PO)

Doxycycline (PO)

Severe pneumonia symptoms or failure to respond to initial therapy

<table>
<thead>
<tr>
<th>1st line</th>
<th>Severe bacterial pneumonia (no risk for pseudomonas)</th>
<th>Ceftriaxone (IM) and doxycycline (PO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd line</td>
<td>Used as first line, if high likelihood of pseudomonas aeruginosa*</td>
<td>Levofloxacin (PO)</td>
</tr>
</tbody>
</table>

*Recent intravenous antibiotics (90 days), previous respiratory infection with pseudomonas aeruginosa, known bronchiectasis, very severe underlying COPD (FEV1 <35% predicted)

Infectious Diseases Society of America Pneumonia Treatment Guidelines

<table>
<thead>
<tr>
<th>Pneumonia</th>
<th>Inpatient Treatment</th>
<th>Duration*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community Acquired Pneumonia</td>
<td>β-lactam (e.g. ceftriaxone, ampicillin/sulbactam) AND azithromycin OR Respiratory fluoroquinolone</td>
<td>5 days</td>
</tr>
<tr>
<td>Hospital Acquired Pneumonia</td>
<td>Pip/tazo OR cefepime OR imipenem OR meropenem OR levofloxacin OR aztreonam (if PCN allergy) +/- vancomycin or linezolid (depends on likelihood of MRSA)</td>
<td>7 days</td>
</tr>
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Prevention of Pneumonia

- Influenza vaccination of residents and staff
- ACIP 2017-2018 recommendation: Inactivated influenza vaccine (IIV) formulation (standard-dose or high-dose, trivalent or quadrivalent, unadjuvanted or adjuvanted) or Recombinant influenza vaccine are acceptable options
- High-dose IIV3 (trivalent) exhibited superior efficacy over comparator standard-dose IIV3 in a large randomized trial, and may provide better protection than standard dose IIV3 for this age group
- Pneumococcal vaccination
- Oral hygiene

Recommended Intervals For Sequential PCV13 and PPSV23

Conclusion

- Pneumonia is the leading cause of death in nursing home residents
- It is important to differentiate between bacterial and non bacterial etiologies to reduce to overuse of antibiotics
- Empiric treatment of pneumonia should be based on clinical assessment for severity and risk for MDRO
Acknowledgments

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Questions?