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 Archbald-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.
Updates in Management of Common Infections in PA/LTC Facilities
Pneumonia in Post Acute and Long Term Care

Pneumonia in Post Acute and Long Term Care

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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

Appropriate Diagnosis

Updates in Management of Common Infections in PA/LTC Facilities

Pneumonia in Post Acute and Long Term Care

Acute Respiratory Tract Infections

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

Nursing Home Pneumonia

- Bacterial/Aspiration Pneumonia
- Viral Pneumonia
- Pneumonia due to MDRO*

*MDRO: multidrug resistant organisms

Work Up Considerations

<table>
<thead>
<tr>
<th>Change in condition</th>
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<tbody>
<tr>
<td>Change in functional status</td>
</tr>
<tr>
<td>Respiratory symptoms</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Evaluation</th>
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<tbody>
<tr>
<td>History (history of COPD) and Physical (lung sounds)</td>
</tr>
<tr>
<td>Respiratory rate &gt; 25</td>
</tr>
<tr>
<td>Pulse oximetry &lt; 90%</td>
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<table>
<thead>
<tr>
<th>Communication</th>
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<tbody>
<tr>
<td>Advanced directives</td>
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<tr>
<td>Decision to transfer to hospital</td>
</tr>
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<table>
<thead>
<tr>
<th>Diagnostic studies</th>
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<tbody>
<tr>
<td>CBC (⩾ 14,000 cells/mm³) or left shift</td>
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<tr>
<td>CXR</td>
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</table>

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

- 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)

CXR might drive antibiotic treatment

- Pneumonia confirmed
- Pneumonia undetermined
- Unlikely pneumonia
“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</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Influenza virus antigen less sensitive</td>
</tr>
<tr>
<td></td>
<td></td>
<td>than PCR</td>
</tr>
<tr>
<td>Sputum culture</td>
<td>May yield pathogen</td>
<td>Colonization, poor specimens, may</td>
</tr>
<tr>
<td></td>
<td></td>
<td>prompt excessive Rx (e.g. MRSA)</td>
</tr>
<tr>
<td>Urinary antigen testing</td>
<td>May identify pathogen</td>
<td>Delay in results, urine sample</td>
</tr>
<tr>
<td>(S. pneumonia, L. pneumophila)</td>
<td></td>
<td>needed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Only Legionella serotype 1</td>
</tr>
<tr>
<td>Procalcitonin</td>
<td>May limit antibiotic use</td>
<td>Blood test, delay in results, no studies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in nursing homes</td>
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</table>

**Therapy**

**Loeb Minimum Criteria for Starting Antibiotics**

- Temp > 102° F AND RR > 25 or productive cough
- 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**

Updates in Management of Common Infections in PA/LTC Facilities
Pneumonia in Post Acute and Long Term Care

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>
</tr>
</thead>
<tbody>
<tr>
<td>Streptococcus pneumoniae</td>
<td>0-55%</td>
</tr>
<tr>
<td>Staphylococcus aureus</td>
<td>0-10%</td>
</tr>
<tr>
<td>Hemophilus influenza</td>
<td>2-22%</td>
</tr>
<tr>
<td>Legionella</td>
<td>0-0%</td>
</tr>
<tr>
<td>Enteric Gram negative</td>
<td>6-14%</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>0-0%</td>
</tr>
<tr>
<td>Atypical pathogens</td>
<td>0-10%</td>
</tr>
</tbody>
</table>

Atypical pathogens (mycoplasma pneumonia, Chlamydia species)

Casey C. et al. Am Fam Physician 2015;Oct 1;92(7):612-620

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

Casey C. et al. Am Fam Physician 2015;Oct 1;92(7):612-620

Potential Algorithm to Identify Residents at Risk for MDRO Pneumonia

Developing City-Wide Pneumonia Treatment Guidelines

Rochester, NY Nursing Home Collaborative:
http://www.rochesterpatientsafety.com/index.cfm/Page=For%20Nursing%20Homes
Updates in Management of Common Infections in PA/LTC Facilities

Pneumonia in Post Acute and Long Term Care

**Recommended Antibiotics for Treatment of Bacterial Pneumonia in Nursing Homes Residents**

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>1st line</th>
<th>2nd line</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild-moderate symptoms</td>
<td>Uncomplicated bacterial pneumonia</td>
<td></td>
</tr>
<tr>
<td>Cefpodoxime (PO)</td>
<td>Amoxicillin/clavulanate (PO)</td>
<td></td>
</tr>
<tr>
<td>Uncomplicated bacterial pneumonia</td>
<td>Amoxicillin/clavulanate (PO)</td>
<td></td>
</tr>
<tr>
<td>Uncomplicated bacterial pneumonia-aspiration risk</td>
<td>Amoxicillin/clavulanate (PO)</td>
<td>Doxycycline (PO)</td>
</tr>
<tr>
<td>2nd line</td>
<td>Bacterial pneumonia, contraindication to first line therapy</td>
<td>Levofloxacin or moxifloxacin (PO)</td>
</tr>
<tr>
<td>Severe pneumonia symptoms or failure to respond to initial therapy</td>
<td>Severe bacterial pneumonia (no risk for pseudomomas)</td>
<td>Ceftriaxone (IM) and doxycycline (PO)</td>
</tr>
<tr>
<td>1st line</td>
<td>Severe bacterial pneumonia (no risk for pseudomomas)</td>
<td>Ceftriaxone or doxycycline</td>
</tr>
<tr>
<td>2nd line</td>
<td>Used as 1st line if high likelihood of pseudomomas aeruginosa</td>
<td>Levofloxacin (PO)</td>
</tr>
</tbody>
</table>

**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**

**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>Ps/lazo OR carafine OR imipenem OR meropenem OR levofloxacin OR aztreonam (if PCN allergy)</td>
<td>7 days</td>
</tr>
</tbody>
</table>

*Clinical stability criteria: Temperature ≤ 37.8° C (100° F), pulse ≤ 100 beats/min, respiratory rate ≤ 24 breaths/min, systolic blood pressure ≥ 90 mm Hg, O2 ≥ 90%, ability to maintain oral intake; normal mental status

**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

Source: MMWR / August 25, 2017 / Vol. 66 / No. 2
Source: Infectious Diseases Society of America Pneumonia Treatment Guidelines
Source: Kalil AC et al. Clinical Infectious Diseases 2016;63:1-51
Updates in Management of Common Infections in PA/LTC Facilities
Pneumonia in Post Acute and Long Term Care

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  - Rina Pine, MD
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  - Brian Heppard, MD
  - Nimala Nicholas, MD
  - Alexander Karlic, MD

Questions?
Updates in Management of Common Infections in PA/LTC Facilities
Case Discussion for Pneumonia

Case Discussion for Pneumonia
Ghinwa Dumyati, MD1 and Laurie Archbald-Pannone, MD, MPH, AGSF, FACP2
1. University of Rochester Medical Center, Infectious Diseases Division
2. University of Virginia, Department of Medicine, Division of Geriatrics, Division of Infectious Diseases

Speaker Disclosures
Dr. Dumyati has no financial relationship(s).
Dr. Archbald-Pannone: TechLab, Inc. (Blacksburg, VA). Provides research funding and salary support for independent research study

On September 25, 2017
- C.S. is an 80 year old woman who was admitted to your nursing home a year ago because of increased care at home due to dementia
- Couple of days ago she didn't feel well and her appetite was poor. Yesterday, her family took her out and noted that she was coughing quite a bit and felt short of breath
- You are seeing her a day later. She is presently complaining of nonproductive cough and shortness of breath, no chills, poor appetite, her eyes are watery
- Nursing notes report runny nose and sore throat on the prior day, she also fell because of weakness
- She had one episode of emesis today

Past Medical History and Medications
- Dementia
- Type II diabetes mellitus with retinopathy and nephropathy
- Coronary artery disease, S/P CABG
- She has a history of frequent falls
- Chronic kidney disease
- Hypothyroidism
Medications: Metoprolol, furosemide, long acting insulin, thyroxine, donepezil, sertraline, aspirin, clopidogrel

On Exam
- General appearance: She in no acute distress, speaking in full sentences, coughing intermittently
- Temperature 99.4°F (has another recorded temp of 99.6°F), baseline temp 98.7°F
- Blood pressure 146/72, respiratory rate 20/min, heart rate 80/min
- Pulse oximetry on room air 87%, 94% on 2 liters
- Lungs: rhonchi at base different from prior exam a week ago
- Extremities 1+ edema. Rest of exam normal

Questions #1
- What is the differential diagnosis for the resident's symptoms?
- What other tests are needed to guide your management plan?
- Do you need to order a chest X-ray?
Updates in Management of Common Infections in PA/LTC Facilities
Case Discussion for Pneumonia

Laboratory Results

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC</td>
<td>3.9 THOU/uL</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>10.4 g/dL</td>
</tr>
<tr>
<td>MCV</td>
<td>96 (H)</td>
</tr>
<tr>
<td>Platelets</td>
<td>117 THOU/uL</td>
</tr>
<tr>
<td>Seg</td>
<td>70 %</td>
</tr>
<tr>
<td>Lymphocyte</td>
<td>17.7%</td>
</tr>
<tr>
<td>Monocyte</td>
<td>11.7%</td>
</tr>
<tr>
<td>Eosinophil</td>
<td>0.3%</td>
</tr>
<tr>
<td>Basophil</td>
<td>0.3%</td>
</tr>
<tr>
<td>Immature granulocytes</td>
<td>0.3%</td>
</tr>
<tr>
<td>Sodium</td>
<td>145 mmol/L</td>
</tr>
<tr>
<td>Potassium</td>
<td>3.9 mmol/L</td>
</tr>
<tr>
<td>Chloride</td>
<td>104 mmol/L</td>
</tr>
<tr>
<td>CO2</td>
<td>27 mmol/L</td>
</tr>
<tr>
<td>Anion Gap</td>
<td>14</td>
</tr>
<tr>
<td>BUN</td>
<td>44 (H)</td>
</tr>
<tr>
<td>Creatinine</td>
<td>2.38 (H)</td>
</tr>
</tbody>
</table>

Chest X-ray Official Report- A day later

“Streaky opacities/lung markings bilaterally likely represent infectious etiology such as bronchitis and or developing pneumonia”

Questions #2

• Do you agree with the decision to start antibiotic?
• Do you agree with the duration?
• Does this official chest-Xray report change your decision?

On 9/28/17

• She was evaluated by the nurse practitioner
• She was still feeling weak and her muscles were aching. She still has non productive cough. No fever
• On exam she had course rhonchi throughout
• Nurse practitioner note: “another patient on the unit has a cough and fever, will continue present antibiotic but check for influenza”
• Influenza A was positive for both residents!

Follow up

• A week after finishing her antibiotic, the nurse calls you because CS had 3 episodes of loose bowel movements in the last 8 hours.
• PMH confirmed, patient has never had C. difficile infection before
Ms. CS- Physical exam

- Vital signs
  - BP 135/61, HR 102, T 38.9C, RR 18, O2 94% RA
- Gen: A&O fully, mild distress
- CV: RRR
- Resp: CTAB, no wheezes
- ABD: S/ND, sl tender to palpation BLQ. No rebound, no guarding.
- Neuro: A&O fully

Question # 3 & 4

While awaiting the results of the stool testing, what is the next best step in the management of this patient?

a) Prescribe an anti-motility agent
b) Place patient on contact isolation
c) Send stool sample from asymptomatic roommate
d) Prescribe a pain medication for abdominal pain

If stool testing confirms *C. difficile* infection, what is the best treatment for this patient?