





Nurses Take Antibiotic Stewardship Action Initiative

Pneumonia 101 For Nurses








Slide Title and Commentary	Slide Number and Image
<p>Pneumonia 101 For Nurses</p> <p>SAY:</p> <p>Pneumonia 101 for Nurses. This presentation will focus on how to diagnose pneumonia and how nurses can participate in ensuring that patients receive antibiotics and are tested for pneumonia when is really needed.</p> <p>This material was supported in part by a U.S. Centers for Disease Control and Prevention (CDC) contract to Johns Hopkins University.</p> <p><u>Disclaimer:</u> The conclusions in this presentation are those of the JHU authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.</p>	<p>Slide 1</p>  <p><u>Pneumonia 101</u> <u>For Nurses</u></p> <p>Nurses Take Antibiotic Stewardship Action Initiative</p> <p>This material was supported in part by a U.S. Centers for Disease Control and Prevention (CDC) contract to Johns Hopkins University.</p> <p>The Department of Antimicrobial Stewardship, The Johns Hopkins Hospital:</p> <ul style="list-style-type: none"> • Valeria Fabre, MD • Sara E. Cosgrove, MD, MS • Elizabeth Zink, MS, RN, CCNS, CNRN <p>The Office of Antibiotic Stewardship, Centers for Disease Control and Prevention:</p> <ul style="list-style-type: none"> • Arjun Srinivasan, MD • Lauri Hicks, DO • Melinda Neuhausser, PharmD  <p><small>Disclaimer: The conclusions in this presentation are those of the JHU authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.</small></p> <p style="text-align: right;">1</p>
<p>Definitions</p> <p>SAY:</p> <p>Pneumonia is diagnosed when three criteria are met: the patient has a new lung infiltrate compatible with pneumonia, the patient has signs and symptoms that supports an infectious pulmonary process such as a fever, leukocytosis, cough, pleuritic chest pain, purulent secretions and the patient has a decline in oxygenation (at rest or with exertion).</p>	<p>Slide 2</p>  <p>Definitions</p> <p>Pneumonia is diagnosed when the following are present:</p> <ul style="list-style-type: none"> • New lung infiltrate • Clinical evidence that the infiltrate is of infectious origin (e.g., associated fever, leukocytosis, purulent secretions, pleuritic chest pain, cough) • Decline in oxygenation  <p style="text-align: right;">2</p>

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<p>Definitions</p> <p>SAY:</p> <p>Pneumonia can be classified into four types: Community-acquired, for those cases developed in the community; hospital-acquired, which develops at least 48 hours after admission; ventilator-associated pneumonia, which develops more than 48 hours after endotracheal intubation; and aspiration pneumonia, which occurs after micro- or macro-aspiration of oral or gastrointestinal microbial flora and can occur in both the community and hospital setting.</p> <p>Classifying pneumonia is helpful because it can inform selection of the optimal antibiotic treatment regimen.</p>	<p>Slide 3</p>  <p>Definitions</p> <ul style="list-style-type: none"> • Community-acquired pneumonia (develops in the community) • Hospital-acquired pneumonia (develops \geq 48 hours after admission) • Ventilator-associated pneumonia (develops > 48 hours after endotracheal intubation) • Aspiration pneumonia: pneumonia following micro- or macro-aspiration of oral or gastrointestinal flora <div style="border: 1px solid red; padding: 5px; display: inline-block;"> <p>Understanding what type of pneumonia the patient has helps with antibiotic choices</p> </div> 		
<p>PNA Mimics</p> <p>SAY:</p> <p>When there is a new oxygen requirement or abnormal finding on chest imaging, it is important to interpret these findings carefully before sending a respiratory culture and starting antibiotics. Keep in mind that there are many reasons why the lung parenchyma may look abnormal. Examples of non-infectious infiltrates include atelectasis, pulmonary edema, and fibrosis can appear similar to infiltrates, while pulmonary embolism, mucous plugging, atelectasis, pulmonary edema, pulmonary hemorrhage, pleural effusions, and aspiration pneumonitis.</p> <p>Let's review a case: a chest x-ray is read as "pulmonary edema, cannot rule out infection" in a patient with uncontrolled hypertension who presents with shortness of breath for 5 days. The patients does not have fever, cough or chest pain. In this case, pneumonia unlikely and antibiotics are not needed.</p> <p>There are many non-infectious reasons for acute onset oxygen decline that must be kept in mind when a patient presents with respiratory complaints. These include pulmonary embolism, mucous plugging, atelectasis, pulmonary edema, pleural effusions and aspiration pneumonitis.</p>	<p>Slide 4</p>  <p>PNA Mimics</p>  <table border="0"> <tr> <td data-bbox="1386 982 1627 1226"> <p>Infiltrates</p> <ul style="list-style-type: none"> • Atelectasis • Pulmonary edema • Pulmonary hemorrhage • Fibrosis • Tumor • Sarcoidosis </td> <td data-bbox="1659 982 1900 1226"> <p>Oxygen decline</p> <ul style="list-style-type: none"> • Pulmonary embolism • Mucous plugging • Atelectasis • Pulmonary edema • Pleural effusions • Aspiration pneumonitis </td> </tr> </table> 	<p>Infiltrates</p> <ul style="list-style-type: none"> • Atelectasis • Pulmonary edema • Pulmonary hemorrhage • Fibrosis • Tumor • Sarcoidosis 	<p>Oxygen decline</p> <ul style="list-style-type: none"> • Pulmonary embolism • Mucous plugging • Atelectasis • Pulmonary edema • Pleural effusions • Aspiration pneumonitis
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<p>The Color Of The Sputum Does Not Indicate Infection</p> <p>SAY:</p> <p>The diagnosis of pneumonia should not be made based on the color of sputum. Studies have shown a lack of correlation between yellow or green sputum and presence of infection.</p> <p>A study including 241 patients presenting with acute cough to outpatient clinics in Germany showed that the presence of discolored sputum did not predict infection.</p> <p>In another study, the association between discolored sputum and symptom resolution was evaluated among 2,419 adult patients with new or worsened cough or a clinical presentation compatible with a lower respiratory tract infection. Patients with discolored sputum were more likely to receive antibiotics; however, receipt of antibiotics was not associated with symptom resolution.</p>	<p>Slide 5</p> <p>The Color Of The Sputum Does Not Indicate Infection</p>  <ul style="list-style-type: none"> • 241 patients presenting with acute cough <ul style="list-style-type: none"> – “Proof of infection”: bacterial growth along with moderate number of leukocytes/LPF – Lack of correlation between sputum color and infection in healthy individuals – There was good correlation for patients with underlying chronic lung disease • 3,402 patients with acute or worsened cough <ul style="list-style-type: none"> – Sputum color was not associated with resolution of symptoms over time – Symptom resolution was not associated with antibiotics  <p>5</p>
<p>“If There Are Bacteria, There Has To Be An Infection...”</p> <p>SAY:</p> <p>The presence of bacteria growing in cultures from non-sterile body sites does not equal infection. Examples of non-sterile sites where bacteria might be found and may not be necessarily causing an infection include sputum and wounds.</p> <p>In order to determine if bacteria are causing infection, the clinical picture needs to be taken into account.</p> <p>For example, let’s review a case. A 65 yo man with chronic tracheostomy is admitted for pneumonia. Sputum culture grows MSSA and he is treated with 7 days of oxacillin. At the end of therapy, the patient is markedly improved--off the ventilator, afebrile, and respiratory secretions back to baseline. Before discharge another sputum sample is sent which shows few MSSA and light PMNs. The primary team is considering extending treatment. Is this appropriate?</p> <p>The patient does not require more antibiotics. If a patient with a tracheostomy is found to have bacteria on a respiratory specimen but his respiratory status is at baseline and the patient lacks signs or symptoms of pulmonary infection, antibiotic treatment for the bacteria found is not necessary neither appropriate.</p>	<p>Slide 6</p> <p>“If There Are Bacteria, There Has To Be An Infection...”</p>  <ul style="list-style-type: none"> • The presence of bacteria growing in cultures from a non-sterile site does not equal infection <ul style="list-style-type: none"> – Examples of non-sterile sites where bacteria may be found and the patient may not necessarily have an infection include the respiratory tract and wounds – Case: <ul style="list-style-type: none"> • 65 yo man with chronic tracheostomy admitted for pneumonia • Sputum culture grows MSSA treated with 7 days of oxacillin • Patient is markedly improved – off the ventilator, afebrile, respiratory secretions back to baseline • Before discharge another sputum sample is sent which shows few MSSA and light PMNs. The primary team is considering extending treatment. Is this appropriate?  <p>6</p>

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<p>Another situation to be aware is that bacteria may be detected for some time after antibiotics are initiated. So for example, if a patient is treated for pneumonia with a recommended antibiotic and appropriate duration, sending a repeat sputum to document “eradication” of bacteria would not be appropriate and extending treatment if bacteria were still found when a patient has improved clinically and as expected is unnecessary.</p>	
<p>Tracheobronchitis</p> <p>SAY:</p> <p>Tracheobronchitis is defined as fever with no other recognizable cause and new or increased sputum production, positive endotracheal tube aspirate culture (>10⁶ CFU/ml) yielding a new bacteria and no radiographic evidence of pneumonia.</p> <p>It is reasonable to NOT treat ventilator-associated tracheobronchitis with antibiotics. Data are inconsistent about potential benefits. Treatment of tracheobronchitis can be considered in patients with copious purulent respiratory secretions despite aggressive suctioning OR those patients with copious purulent secretions that are affecting the ability to extubate. If there is a desire to treat, treatment is shorter than pneumonia (3-5 days).</p>	<p>Slide 7</p>  <p>Tracheobronchitis</p> <ul style="list-style-type: none"> • Defined as fever with no other recognizable cause and new or increased sputum production, positive endotracheal tube aspirate culture (>10⁶ CFU/ml) and no radiographic evidence of pneumonia • It is reasonable to NOT treat ventilator-associated tracheobronchitis with antibiotics • Treatment of tracheobronchitis can be considered in patients with copious purulent respiratory secretions despite aggressive suctioning OR those patients with copious purulent secretions that are affecting the ability to extubate <ul style="list-style-type: none"> – Treatment is shorter than pneumonia (3-5 days) – Oral agents should be considered  <p>7</p>
<p>Aiming for Safer Antibiotic Use</p> <p>SAY:</p> <p>Careful thoughts should always go into the decision of whether an antibiotic needs to be started or continued. Most people see antibiotics as life-saving medications—and they are— but the risks associated with their use is sometimes forgotten. About 30% of antibiotic use in the hospital is inadequate. Every time a patient takes an antibiotic, the chance of bacteria developing resistance increases. The more resistant bacteria become, the harder they are to treat. more difficult it is to treat them and the more likely the patient will do worse.</p>	<p>Slide 8</p>  <p>Aiming For Safer Antibiotic Use</p> <ul style="list-style-type: none"> • Every time a patient takes an antibiotic, it is an opportunity for bacteria to become more resistant <ul style="list-style-type: none"> – This is a disadvantage to the patient as resistant infections are more difficult to treat • 1 in 5 patients who receive an antibiotic will experience an adverse event • 1 in 3 antibiotics used in the hospital are inappropriate in some way (not needed, given for too long, too broad-spectrum) • The goal is for the patient to receive antibiotics <u>only</u> when needed  <p>8</p>

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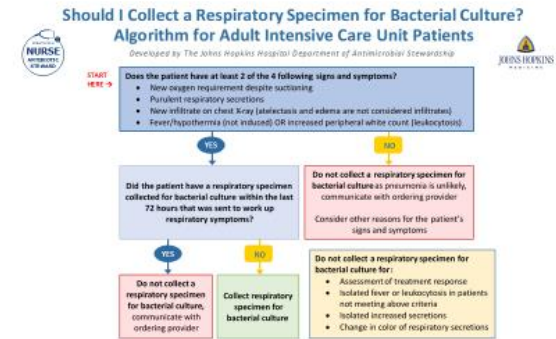
<p>Once a pneumonia diagnosis is made, appropriate therapy can be considered. Administering antibiotics is to be done with care. When a patient receives these drugs, the patient's flora are likely to be altered and become more resistant, which can hinder successful treatment of a future infection. One in five patients who receive an antibiotic will experience an adverse event. One in three 1/3 of antibiotics used in the hospital are inappropriate in some respect. , and 1/5 of patients who receive an antibiotic will experience an adverse event. However, diligent attention to improving antibiotic prescribing practices can help limit the spread of resistance as well as adverse events.</p>	
<p>How Can Nurses Help Reduce Unnecessary Antibiotics Driven By Non-Infectious Respiratory Processes?</p> <p>SAY:</p> <p>While many nurses are not responsible for prescribing antibiotics themselves, nurses can still play a role in antibiotic stewardship. In particular, they can help reduce unnecessary antibiotics given for non-infectious respiratory processes. How? By making sure a patient has an appropriate indication for a respiratory culture. Remember, do (not send sputum for culture if there is no concern for infection and do not send sputum cultures for test of cure.).</p>	<p>Slide 9</p> <p> How Can Nurses Help Reduce Unnecessary Antibiotics Driven By Non-Infectious Respiratory Processes?</p> <ul style="list-style-type: none">• Familiarize yourself with the definition of pneumonia• When a patient reports or develops respiratory symptoms, consider other etiologies before obtaining a respiratory culture• Do not send respiratory specimens for culture when there is no concern for infection• Do not send a sputum culture for test-of-cure <p></p>
<p>Should I Collect a Respiratory Specimen for Bacterial Culture? Algorithm for Adult Intensive Care Unit Patients</p> <p>SAY:</p> <p>To ensure patients are tested appropriately, nurses can use this algorithm to assist them and the primary team in assessing the need for a respiratory bacterial culture.</p>	<p>Slide 10</p>

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The algorithm starts with reviewing if patient has the signs and symptoms of pneumonia. If the patients had 2 of the 4 signs and symptoms listed in the first box, follow the pathway on the left. If not, look to the right. When a patient meets criteria, make sure a specimen has not already been sent to work up the respiratory symptoms and is pending in the laboratory.



Kell et al., Management of Adults With Hospital-acquired and Ventilator-associated Pneumonia: 2016 Clinical Practice Guidelines by the Infectious Diseases Society of America and the American Thoracic Society. 10

References

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References

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