Pneumonia in Hospitalized Patients

Update in Hospital Medicine

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Disclosures

- Grant funding
 - Centers for Disease Control and Prevention
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 - Massachusetts Department of Public Health
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 - UpToDate for chapters on pneumonia

Outline

- How accurate are clinical signs for pneumonia?
- Is pneumonia in hospitalized patients viral or bacterial?
- What kind of imaging should we get?
- Is there a role for procalcitonin?
- o Do we need to get cultures?
- Do we need to start antibiotics right away?
- o What should we treat with?
- o Do we need to include atypical coverage?
- o How long should we treat for?

AMERICAN THORACIC SOCIETY DOCUMENTS

Diagnosis and Treatment of Adults with Community-acquired Pneumonia

An Official Clinical Practice Guideline of the American Thoracic Society and Infectious Diseases Society of America

Oshua P. Metlay*, Grant W. Waterer*, Ann C. Long, Antonio Anzueto, Jan Brozek, Kristina Crothers, Laura A. Cooley, Nathan C. Dean, Michael J. Fine, Scott A. Flanders, Marie R. Griffin, Mark L. Metersky, Daniel M. Musher, Marcos I. Restrepo, and Cynthia G. Whitney; on behalf of the American Thoracic Society and Infectious Diseases Society of America

This official clinical practice guideline was approved by the American Thoracic Society May 2019 and the Infectious Diseases Society of America August 2019

Background: This document provides evidence-based clinical practice guidelines on the management of adult patients with community-acquired pneumonia.

management decisions. Although some recommendations remain unchanged from the 2007 guideline, the availability of results from new therapeutic trials and epidemiological investigations led to

Published in 2019

Case Study			
0	A 72-year old gentleman with a history of coronary disease, atrial fibrillation, and obstructive lung disease is admitted to hospital with shortness of breath x 2 days. He notes poor appetite, feeling weak, and intermittent non-productive cough but denies fever.		
0	Went to his grandchild's birthday party the week before (pizza!) but none were sick and he wore a mask at all times		
0	On exam, he is lethargic but easily arousable. Temperature 100.1, HR 120 irregular, BP 98/64, RR 28, SaO2 90% RA. JVP difficult to see. Crackles in the bases. Mild bilateral lower extremity edema.		
0	Labs are notable for WBC count of 10.2, hct 32, plt 240, Na 130, creatinine 1.4, liver function tests mildly elevated.		
0	Portable chest x-ray with edema +/- LLL infiltrate		
0	SARS-CoV-2 anterior nares rapid PCR negative		





Would you start antibiotics?

Why is Pneumonia So Difficult to Diagnose?

- Many medical conditions in hospitalized patients present with the same clinical signs as pneumonia
 - Radiographic opacities
 - Fever
 - Abnormal white blood cell count
 - Impaired oxygenation
 - Increased pulmonary secretions









Rhinovirus	8.6%	
Influenza	5.8%	
Strep. pneumoniae	5.1%	
Metapneumovirus	3.9%	
RSV	3.0%	
Parainfluenza	3.0%	
Coronavirus	2.3%	
Mycoplasma pneumoniae	1.9%	
Staph. aureus	1.6%	
Adenovirus	1.4%	
Legionella pneumophila	1.4%	
Enterobacteriaceae	1.4%	
Haemophilus influenzae	0.5%	
Chlamydia pneumoniae	0.4%	
Other	2.3%	





















































Check for updates

AMERICAN THORACIC SOCIETY DOCUMENTS

Published May 2021

Nucleic Acid-based Testing for Noninfluenza Viral Pathogens in Adults with Suspected Community-acquired Pneumonia

An Official American Thoracic Society Clinical Practice Guideline

Outpatients: we suggest <u>not</u> performing routine NAAT testing for respiratory viral pathogens other than influenza.

Inpatients: we suggest performing NAAT testing for respiratory viruses other than influenza in patients with severe CAP or immunocompromised state

ATS/IDSA Guidelines

Obtain sputum gram stain & culture in inpatients if:

Any of the following:

• the patient has severe pneumonia

- you believe empiric coverage for MRSA or Pseudomonas is necessary
- the patient has a prior history of MRSA or Pseudomonas infection
- patient was been hospitalized and received IV antibiotics within the preceding 90 days

Test for influenza if influenza is circulating in the community. Test for other respiratory viruses if severe pneumonia or immunocompromised.

My Opinion

Obtain sputum gram stain & culture + viral studies in <u>all</u> inpatients

My reasons:

- Risk factors for resistant organisms are ill defined
- Positive cultures can help you tailor treatment
- Negative cultures can facilitate stopping antibiotics early
- Culture data is critical to generate hospital antibiograms to inform future empiric treatment choices
- Many viruses cause pneumonia & they circulate year-round (Covid!)
- Viral diagnosis has infection control implications



	Standard Regimen	MRSA coverage?	Pseudomonas coverage?
Mild disease	B-lactam + macrolide or Fluoroquinolone	If prior history of respiratory MRSA then cover for MRSA If risk factors alone, get cultures & nasal PCR. Only cover MRSA if cultures or nasal PCR positive	If prior history of respiratory Pseudomonas then cover for Pseudomonas If risk factors alone, get cultures. Only cover for Pseudomonas if cultures positive
Severe disease	B-lactam + (macrolide or fluroquinolone)	If prior history of respiratory MRSA or risk factors for MRSA then get cultures and cover MRSA upfront	If prior history of respiratory Pseudomonas or risk factors for Pseudomonas get cultures and cover for Pseudomonas upfront

Nasal MRSA Culture/PCR		
 Can a nasal swab screen MRSA prepresence or absence of MRSA pneu Meta-analysis of 22 studies, 5163 p 	edict the umonia? atients	
Sensitivity Positive predictive value Negative predictive value	85% 57% 98%	
	Clinical Infectious Disease 2018;67:1-	





















JAMA 2003;290:2588-2598

CARING FOR THE CRITICALLY ILL PATIENT

Comparison of 8 vs 15 Days of Antibiotic Therapy for Ventilator-Associated Pneumonia in Adults A Randomized Trial

Jean Chastre, MD	Context The optimal duration of antimicrobial treatment for ventilator-associated
lichel Wolff, MD	pneumonia (VAP) is unknown. Shortening the length of treatment may help to con-
Jean-Yves Fagon, MD	tain the emergence of multiresistant bacteria in the intensive care unit (ICU).
Sylvie Chevret, MD	Objective To determine whether 8 days is as effective as 15 days of antibiotic treat- ment of patients with microbiologically proven VAP.





















ATS/IDSA Guidelines	My Opinion
Treat all patients for a minimum of 5 days	If patient is immunocompetent, hemodynamically stable, and clearly improving then <5 days is fine.
	 My reasons: Diagnosis of pneumonia is often questionable. Even when the diagnosis is correct, a third or more are caused by viruses 2 RCTs showing 3 days as good as 8 days for both mild and severe CAP





Summary

- Diagnosing pneumonia is challenging. We're often wrong. CT may help.
- Many (?most) pneumonias are caused by **viruses.** Test for them.
- Tailor the urgency of treatment to severity of illness and certainty of infection. If you're on the fence and the patient is stable get more data before starting antibiotics.
- Know your antibiogram. Vancomycin not necessary for most patients.
 If you start it, stop if MRSA not found. Atypical coverage most important for patients with severe disease or compromised immune systems
- Short course regimens (3-5 days) usually adequate. Serial procalcitonin measures may enable shorter courses. Don't reset the clock at discharge!

