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# 113

## COMMUNITY-ACQUIRED PNEUMONIA

Fever with a Cough..... Level II

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### LEARNING OBJECTIVES

After completing this case study, the reader should be able to:

- Recognize the typical signs, symptoms, physical examination, and laboratory/radiographic findings in a patient with community-acquired pneumonia (CAP).
- Describe the most common causative pathogens of CAP, including their frequency of occurrence and susceptibility to commonly used antimicrobials.
- Discuss the risk stratification strategies that can be employed to determine whether a patient with CAP should be treated as an inpatient or outpatient.
- Provide recommendations for initial empiric antibiotic therapy for an inpatient or outpatient with CAP based on clinical presentation, age, presence of comorbidities, and presence of allergies.
- Define the goals of antimicrobial therapy for a patient with CAP, including monitoring parameters that should be used to assess the response to therapy as well as the occurrence of adverse effects.
- Describe the clinical parameters that should be considered when changing a patient from IV to oral antimicrobial therapy in the treatment of CAP.

### PATIENT PRESENTATION

#### ■ Chief Complaint

"I have been short of breath and have been coughing up brown mucus for the past 3 days."

#### ■ HPI

James Thompson is a 55-year-old man with a 3-day history of worsening shortness of breath, subjective fevers, chills, right-sided chest pain, and a productive cough. The patient states that his initial symptom of shortness of breath began approximately 1 week ago after delivering mail on an extremely cold winter day. After several days of not feeling well, he went to an immediate care clinic and received a prescription for levofloxacin 750 mg po for 5 days, which he never filled due to financial reasons. He has been taking acetaminophen and an over-the-counter cough and cold preparation, but feels that his symptoms are getting "much worse." The patient

began experiencing pleuritic chest pain and a productive cough over the past 3 days, and feels that he has been feverish with chills, although he did not take his temperature. Upon presentation to the ED, he is febrile and appears to be visibly short of breath.

#### ■ PMH

HTN × 15 years  
COPD × 10 years

#### ■ SH

Lives with wife and four children.  
Employed as a mail carrier for the U.S. Postal Service  
Smokes 2 ppd for the past 30 years  
Denies alcohol use or IV drug use

#### ■ Meds

Patient states that he has only been sporadically taking his medications due to financial issues.  
Lisinopril 10 mg po once daily  
Hydrochlorothiazide 12.5 mg po once daily  
Ipratropium/albuterol MDI two inhalations four times daily  
Albuterol MDI two inhalations PRN shortness of breath  
Acetaminophen 650 mg po Q 6 h PRN pain  
Guaifenesin/dextromethorphan (100 mg/10 mg/5 mL) 2 teaspoonfuls Q 4 h PRN cough

#### ■ All

NKDA

#### ■ ROS

Patient is a good historian. Patient has been experiencing shortness of breath, a productive cough, subjective fevers, chills, and pleuritic chest pain that is "right in the middle of my chest." He denies any nausea, vomiting, constipation, or problems urinating.

#### ■ Physical Examination

##### Gen

Patient is a well-developed, well-nourished, African-American man in moderate respiratory distress appearing somewhat anxious and uncomfortable.

##### VS

BP 156/90, P 127, RR 31, T 39.1°C; Wt 88 kg, Ht 6'1"

##### Skin

Warm to the touch; poor skin turgor

##### HEENT

PERRLA; EOMI; moist mucous membranes

##### Neck/Lymph Nodes

No JVD; full range of motion; no neck stiffness; no masses or thyromegaly; no cervical lymphadenopathy

##### Lungs/Thorax

Tachypneic, labored breathing; coarse rhonchi diffusely throughout right lung fields; decreased breath sounds in right middle and lower lung fields

##### CV

Audible S<sub>1</sub> and S<sub>2</sub>; tachycardic with regular rhythm; no MRG

##### Abd

NTND; (+) bowel sounds

**Genit/Rect**

Deferred

**Extremities**

No CCE; 5/5 grip strength; 2+ pulses bilaterally

**Neuro**A & O  $\times$  3; CN II–XII intact**Labs on Admission**

Na 140 mEq/L	Hgb 12.1 g/dL	WBC $17.2 \times 10^3/\text{mm}^3$
K 4.3 mEq/L	Hct 35%	Neutros 67%
Cl 102 mEq/L	RBC $3.8 \times 10^6/\text{mm}^3$	Bands 5%
CO <sub>2</sub> 22 mEq/L	Plt $220 \times 10^3/\text{mm}^3$	Lymphs 16%
BUN 31 mg/dL	MCV 91 $\mu\text{m}^3$	Monos 12%
SCr 1.4 mg/dL	MCHC 35 g/dL	
Glu 101 mg/dL		

**ABG**pH 7.410; pCO<sub>2</sub> 29; pO<sub>2</sub> 65 with 85% O<sub>2</sub> saturation on room air**Chest X-Ray**

Right middle and lower lobe airspace disease, likely pneumonia. Left lung is clear. Heart size is normal.

**Chest CT Scan without Contrast**

No axillary, mediastinal, or hilar lymphadenopathy. The heart size is normal. There is consolidation of the right lower lobe and lateral segment of the middle lobe, with air bronchograms. No significant pleural effusions. The left lung is clear.

**Sputum Gram Stain**

&gt;25 WBC/hpf, &lt;10 epithelial cells/hpf, many Gram (+) cocci in pairs

**Sputum Culture**

Pending

**Blood Cultures  $\times$  Two Sets**

Pending

**Assessment**

Probable multilobar community-acquired pneumonia involving the RML and RLL  
Hypoxemia

**QUESTIONS****Problem Identification**

- Create a list of the patient's drug therapy problems.
- What clinical, laboratory, and radiographic findings are consistent with the diagnosis of CAP in this patient?
- What are the common causative bacteria of CAP?
- What clinical, laboratory, and physical examination findings should be considered when deciding on the site of care for a patient with CAP (inpatient or outpatient)?

**Desired Outcome**

- What are the goals of pharmacotherapy in the treatment of CAP?

**Therapeutic Alternatives**

- What feasible pharmacotherapeutic alternatives are available for treatment of CAP?

**Optimal Plan**

- What drug, dose, route of therapy, dosing schedule, and duration of treatment should be used in this patient?

**CLINICAL COURSE**

While in the ED, the patient was placed on 4L NC of O<sub>2</sub>, and his oxygen saturation improved to 98%. The patient was initiated on ceftriaxone 1 g IV daily and azithromycin 500 mg IV daily and admitted to the hospital. Over the next 48 hours, the patient's clinical status improved with resolving fever, tachypnea, tachycardia, and shortness of breath. On hospital day 2, the blood cultures were reported positive with growth of *Streptococcus pneumoniae*, resistant to penicillin (MIC  $\geq 2$ ) and erythromycin (MIC  $\geq 1$ ), but susceptible to ceftriaxone (MIC  $\leq 0.06$ ), levofloxacin (MIC  $\leq 0.5$ ), and vancomycin (MIC  $\leq 1$ ). The sputum culture demonstrated only the presence of normal respiratory flora.

- Given this new information, what changes in the antimicrobial therapy would you recommend?

**CLINICAL COURSE**

Gradually over the course of the next 7 days, the patient's clinical symptoms resolved, and blood cultures performed on hospital day 7 were negative. On hospital day 10, the patient was discharged home on oral antibiotics to complete a 14-day course of treatment.

- What oral antibiotic would be suitable to complete the course of therapy for CAP?

**Outcome Evaluation**

- What clinical and laboratory parameters should be monitored to ensure the desired therapeutic outcome and to detect or prevent adverse effects?
- When is it appropriate to convert a patient from IV to oral therapy for the treatment of CAP?

**Patient Education**

- What information should be provided to the patient about his oral outpatient antibiotic therapy to enhance compliance, ensure successful therapy, and minimize adverse effects?

**SELF-STUDY ASSIGNMENTS**

- Review the most recent practice guidelines for the treatment of community-acquired pneumonia from the Infectious Diseases Society of America (IDSA)/American Thoracic Society, and evaluate changes from the last published guidelines.
- Review national, regional, and local patterns of *S. pneumoniae* susceptibility and compare the data to what is seen at your institution or clinic setting.
- Describe the role of short-course antibiotic therapy in the management of CAP.

**CLINICAL PEARL**

Influenza and pneumococcal vaccines for appropriate patient types are important components in reducing the morbidity and mortality associated with CAP.

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# 114

## OTITIS MEDIA

Tug-of-War . . . . .Level I

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## LEARNING OBJECTIVES

After completing this case study, the reader should be able to:

- Identify the signs and symptoms of acute otitis media (AOM).
- Identify risk factors associated with an increased incidence of AOM.
- Identify the pathogens most commonly causing AOM.
- Recommend an effective and economical treatment regimen including specific agent(s), route of administration, and dose(s) of antibiotics and analgesic medications.
- Recognize the role of delaying antibiotic therapy for AOM.
- Educate parents about recommended drug therapy using appropriate non-technical terminology.

## PATIENT PRESENTATION

### ■ Chief Complaint

“My ear hurts.”

### ■ HPI

Jacob Rodriguez is a 26-month-old boy who is brought to his pediatrician by his mother on a Monday morning in late January. Mom describes a 1-day history of tugging at his right ear and crying, and a 2-day history of decreased appetite, decreased playfulness, and difficulty sleeping. Mom states that his temperature last night was normal by electronic axillary thermometer (37.0°C). Jacob has not been given any analgesics, as his mom states she wanted to wait to hear what the pediatrician had to say. When Jacob is asked if anything hurts, he points to his right ear and says “boo-boo.”

### ■ PMH

Former 38-week, 3.5-kg healthy infant at birth, breast-fed for 3 months.

Immunizations are up-to-date, including 7-valent pneumococcal vaccination (Prevnar).

First and only episode of AOM at age 11 months treated successfully with amoxicillin and no adverse effects.

Jacob was seen approximately 3 months ago for wound treatment after he fell and cut his cheek on the fireplace. The wound has healed completely with no scar.

### ■ FH

Parents both in good health. One sibling, 4 years old, in good health.

### ■ SH

Jacob lives at home with his parents and sister. His father is employed, and his mother takes care of both children. Both parents are smokers. There is a pet dog in the home. Jacob uses a pacifier to fall asleep, but he does not use one during the day.

### ■ Meds

None

### ■ All

NKDA

### ■ Physical Examination

#### Gen

WDWN Hispanic male, now crying

#### VS

BP 110/60, HR 126, RR 32, T 37.8°C; Wt 11.6 kg, Ht 28"

#### HEENT

Both TMs erythematous (with R > L); right TM non-bulging and mobile with copious cerumen and questionable purulent fluid behind TM; both TMs landmarks appear normal including the pars flaccida, the malleus, and the light reflex below the umbo. However, the left TM landmarks are more clear than the right landmarks. Throat is erythematous; nares patent.

#### Neck

Supple

#### Chest

Clear, no crackles, wheezes, or rhonchi

#### CV

RRR

#### Abd

Soft, nontender