Community Acquired Pneumonia

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Objectives

• Be familiar with incidence, pathogenesis, and clinical factors associated with Community Acquired Pneumonia (CAP)
• Determine site of care for patient diagnosed with CAP
CAP: Epidemiology

- 7th leading cause of death in the United States
- ~4 million adults are diagnosed with CAP annually
  - ~600,000 of these individuals are hospitalized
- $8.4 – $10 billion spent annually on treatment

Pathogenesis

• Exposure of lungs to particulate matter and microbes by micro-aspiration
• Defect in host defenses which leads to pneumonia
• Various organisms have developed mechanisms to overcome pulmonary host defenses
• Various diseases may lead to impairment of host defenses

CAP: Diagnosis

• Clinical features
  – Cough
  – Fever
  – Sputum production
  – Pleuritic chest pain

• Infiltrate by chest radiograph

• +/- microbiological data

CAP: Initial Assessment

• Patient specific factors
  – Previous antibiotic therapies (choose abx from different class)
  – Concomitant disease states
  – Travel history

• Physical exam
  – Vital signs (HR, RR, BP, temperature, mental status)
  – Chest auscultation and percussion
CAP: Site of Care

- Patient assessment
  - Physical examination
  - Vital signs (BP, HR, RR, temperature, mental status)
  - Need for parenteral antibiotics
  - Concomitant medical conditions
  - Laboratory tests
- Prognostic Scales
  - Pneumonia Severity Index (PSI)
  - Severity of Illness: CURB-65
- Clinical judgment
- Patient ability to take oral medications

CAP: Severity of Illness
Pneumonia Severity Index (PSI)

Step 1 of the PSI Prediction Rule

Step 2 of the PSI Prediction Rule

## PSI: Site of Care Determination

<table>
<thead>
<tr>
<th>PSI Class (points)</th>
<th>Percent Predicted Mortality</th>
<th>Recommended Site of Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I</td>
<td>0.1%</td>
<td>Outpatient</td>
</tr>
<tr>
<td>Class II (&lt;70)</td>
<td>0.6%</td>
<td>Outpatient</td>
</tr>
<tr>
<td>Class III (71-90)</td>
<td>0.9%</td>
<td>Outpatient, Observation Unit, or Short Hospitalization</td>
</tr>
<tr>
<td>Class IV (91-130)</td>
<td>9.3%</td>
<td>Inpatient</td>
</tr>
<tr>
<td>Class V (&gt;130)</td>
<td>27%</td>
<td>Inpatient</td>
</tr>
</tbody>
</table>

CAP: Severity of Illness
CURB-65

- CURB-65 (one point given for each of the below criteria)
  - Confusion (based on a mental test or new disorientation to person, place, or time)
  - Uremia (> 7 mmol/L or 20 mg/dL)
  - Respiratory rate (> 30 breaths/minute)
  - Low Blood pressure (SBP < 90 mmHg or DBP < 60 mmHg)
  - Age ≥ 65 years

CURE-65

30-day Mortality Rate (%)

Score 0: 0.7  
Score 1: 2.1  
Score 2: 9.2  
Score 3: 14.5  
Score 4: 40  
Score 5: 14  

CURB-65 Site of Care Determination

- **Score 0-1**
  - Low mortality
  - Outpatient treatment

- **Score 2**
  - Intermediate mortality
  - Consider supervised treatment or hospitalization

- **Score ≥ 3**
  - High mortality
  - Hospitalize
  - Consider ICU

Site of Care Summary: PSI versus CURB-65

<table>
<thead>
<tr>
<th>Class or Score</th>
<th>Recommended Site of Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSI I-II</td>
<td>Outpatient</td>
</tr>
<tr>
<td>PSI III</td>
<td>Outpatient, Observation Unit, or Short Hospitalization</td>
</tr>
<tr>
<td>PSI IV-V</td>
<td>Inpatient</td>
</tr>
<tr>
<td>CURB-65 0-1</td>
<td>Outpatient</td>
</tr>
<tr>
<td>CURB-65 2</td>
<td>Supervised Treatment or Hospitalization</td>
</tr>
<tr>
<td>CURB-65 ≥3</td>
<td>Inpatient</td>
</tr>
</tbody>
</table>

Defining Severe CAP

• Why do we need to define severe CAP?
  – Optimize ICU resources
  – Delayed ICU transfer is associated with increased mortality
  – Likely pathogens differ

ICU Admission for Severe CAP

• **One** of the following major criteria:
  – Septic shock requiring vasopressor support
  – Respiratory failure requiring mechanical ventilation

• **OR three** of the following minor criteria:
  – Respiratory rate ≥30 breaths/min
  – \( \text{PaO}_2/\text{FiO}_2 \) ratio ≤250
  – Multilobar infiltrates
  – Confusion/disorientation (to person, place, or time)
  – Uremia (BUN ≥20 mg/dL)
  – Leukopenia (wbc <4000 cells/mm\(^3\))
  – Thrombocytopenia (platelet count <100,000 cells/mm\(^3\))
  – Hypothermia (core temperature <36°C)
  – Hypotension requiring aggressive fluid resuscitation

JT is a 72 yo WF who presents to ED w/ 5-day h/o cough with purulent sputum production, worsening SOB, and decreased oral intake.

PMH: COPD; ALL: NKDA

Vitals: RR 22, HR 90, BP 124/84, T 100.4° F

Labs: BUN 16mg/dL, SCr 1.2

CXR: left lower lobe infiltrate

JT is diagnosed with community-acquired pneumonia.

QUESTION:
Where should JT receive care for his recently diagnosed CAP?

A. As an outpatient
B. Outpatient w/ in-home health care
C. Inpatient, general medicine floor
D. Inpatient, admit to the ICU
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More to come...

• We’ll pick up in lecture to cover
  – Common CAP pathogens
  – Empiric CAP therapy
  – Duration of therapy