Hospitalized Patients with Acute Pneumonia

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KEYWORDS

• Community-acquired pneumonia • Hospital-acquired pneumonia
• Emerging infectious diseases • Viral pneumonia • Infection control
• Antibiotic stewardship

HOSPITAL MEDICINE CLINICS CHECKLIST

1. Pneumonia is one of the leading causes of hospital admission, morbidity, and mortality among elderly patients.
2. Choosing the empirical antimicrobial regimen depends on risk factors for multidrug resistance and presenting severity of illness.
3. Risk factors for drug resistance include prior hospitalization, prolonged intensive care unit (ICU) stay, recent surgery, and prior antibacterial therapy.
4. Many scoring systems, including the Infectious Diseases Society of America/American Thoracic Society criteria, pneumonia severity index, and CURB-65 (confusion, blood urea nitrogen >30, respiratory rate $\geq$30, systolic blood pressure <90 mm Hg or diastolic blood pressure $\leq$60 mm Hg, and age $\geq$65 years), can be used to appropriately determine which patients are best suited for a ward or ICU admission.
5. Diagnostic studies, particularly a sputum culture, are recommended for acutely ill patients in the ICU.
6. Therapy should include coverage for the major organisms of acute pneumonia, including *Streptococcus pneumoniae, Haemophilus influenzae, and Moraxella catarrhalis*. This therapy would include a third-generation cephalosporin, such as ceftriaxone, or a fluoroquinolone, such as levofloxacin. If patients are placed in the ICU, vancomycin should be included for *Staphylococcus aureus*.

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Disclosures: None.
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7. Atypical coverage for *Mycoplasma* and *Legionella* should be added with azithromycin if a third-generation cephalosporin is used.
8. For unusual or atypical cases, the public health department should be contacted to determine if an additional or emerging organism is present.

Which patients with pneumonia get hospitalized (which groups are most vulnerable)?

Pneumonia is one of the leading causes of mortality and hospitalization among US adults. Studies have shown that hospitalizations for pneumonia have been on the rise, and that trend is particularly true among elderly adults (aged ≥65 years). This fact is particularly relevant because as the population ages and life expectancy increases, the elderly represent an increasing portion of the population. The elderly are thought to be particularly susceptible to pneumonia requiring hospitalization because of the higher prevalence of comorbid diseases, such as chronic cardiac and pulmonary disease or diabetes mellitus, in that population.[1,2] Surrogate markers of multiple comorbidities (multi-morbidity) are also risk factors for pneumonia and include poor performance status, poor oral hygiene, high number of invasive indwelling medical devices, and polypharmacy.[3] **Box 1** outlines the major risk factors for hospital admission. A tool that included factors such as age, smoking status, and pulmonary function was validated in a study and shown to predict the long-term risk of

Box 1
Risk factors for hospitalization and mortality in patients with acute pneumonia

Risk factors for hospitalization

Aged older than 65 years

Greater than 2 comorbidities (eg, diabetes, heart failure, COPD)

Poor oral hygiene

Alcohol or drug abuse

Poor performance status

Underlying structural lung disease

Invasive medical devices

Altered mental status

Renal failure

Risk factors for ICU admission and increased mortality

Mechanical ventilation, invasive and noninvasive

Vasopressor use

Hypercapnia

Hypoxemia

Altered mental status

High predication score (eg, CURB-65, PSI score)

Abbreviations: COPD, chronic obstructive lung disease; CURB-65, confusion, urea, respiration, and blood pressure; PSI, pneumonia severity score.