

## 1.12 HOSPITAL-ACQUIRED AND HEALTHCARE-ASSOCIATED PNEUMONIA

Hospital-acquired pneumonia (HAP) is an infection of the lung parenchyma that occurs during the course of hospitalization. HAP is a significant source of morbidity, mortality, and increased resource expenditures, including prolonged hospital length of stay by an average of 7 to 9 days.<sup>1-3</sup> HAP accounts for approximately 15% of all hospital-acquired infections, and the associated mortality rate ranges from 20% to 50%.<sup>1-4</sup> The primary risk factor for the development of HAP is mechanical ventilation, and HAP occurs in 9% to 27% of all intubated patients.<sup>1,3</sup> Hospitalists manage patients with HAP either as an attending physician or as a consultant to patients admitted to other services. Healthcare-associated pneumonia (HCAP) was added as a category of pneumonia in the 2005 American Thoracic Society/Infectious Diseases Society of America guidelines to identify patients at increased risk for multidrug-resistant pathogens coming from community settings. HCAP is defined as pneumonia acquired in healthcare environments outside of the traditional hospital setting and is distinct from community-acquired pneumonia (CAP), HAP, or ventilator-acquired pneumonia. HCAP more closely resembles HAP with respect to pathogens and prognosis. Quality indicators have been created around the key processes of care for patients with pneumonia, and these indicators are used to evaluate performance of states, healthcare organizations, physician groups, and individual physicians. Hospitalists apply evidence-based practice guidelines to the management of patients hospitalized with pneumonia and lead initiatives to improve quality of care and reduce practice variability.

### KNOWLEDGE

*Hospitalists should be able to:*

- Define HAP and HCAP and differentiate them from CAP.
- List common organisms associated with HAP and HCAP.
- Describe local and national resistance patterns for HAP and HCAP.
- Identify important historical elements, medical record data, and physical examination findings consistent with HAP and HCAP.
- Differentiate the infectious causes of HAP and HCAP from those of CAP.
- Describe the tests required to evaluate HAP and HCAP.
- Identify risk factors for developing HAP and HCAP.
- Describe the role of mechanical ventilation as a risk factor for the development of HAP.
- Explain the prophylactic measures commonly used to lower the risk of HAP.
- Describe steps that can be used to limit the emergence of antibiotic resistance.
- Recognize indications for specialty consultation, which may include infectious disease and/or pulmonary services.
- Describe the role of mechanical ventilation as a potential treatment option.

- Describe infection control practices to prevent the spread of resistant organisms within the hospital.
- Describe potential complications of HAP and HCAP.
- Explain goals for hospital discharge including evidence-based measures of clinical stability for safe care transition.
- Explain implications of HAP and HCAP on discharge planning.

### SKILLS

*Hospitalists should be able to:*

- Elicit a thorough and relevant medical history to identify symptoms consistent with HAP and HCAP.
- Perform a targeted physical examination to elicit signs consistent with HAP and HCAP.
- Assess patients with suspected HAP in a timely manner and manage or comanage the patient with the primary requesting service.
- Order and interpret laboratory, microbiologic, and radiologic studies to confirm the diagnosis of HAP and HCAP and determine the etiologic agent.
- Initiate an empiric antibiotic regimen on the basis of patient history, underlying comorbid conditions, likely organisms, and local resistance patterns.
- Tailor antibiotic regimens on the basis of microbiologic culture and sensitivity data as soon as available.
- Manage complications of HAP and HCAP, which may include respiratory failure, pleural effusions, and empyema.
- Coordinate care for patients requiring mechanical ventilation.
- Identify patients who require thoracentesis, perform or coordinate the procedure, and interpret the results.
- Communicate with patients and families to explain the tests, procedures, and their indications, and to obtain informed consent.
- Communicate with patients and families to explain the etiology, management plan, and potential outcomes of HAP and HCAP.
- Facilitate discharge planning early during hospitalization.
- Document the treatment plan and provide clear discharge instructions for postdischarge clinicians.

### ATTITUDES

*Hospitalists should be able to:*

- Employ a multidisciplinary approach, which may include nursing, respiratory therapy, nutrition, and pharmacy services, to the care of patients with HAP and HCAP through all care transitions.
- Follow evidence-based recommendations, protocols, and risk stratification tools for the treatment of HAP.
- Work collaboratively with primary care physicians and emergency physicians in making admission decisions.

**SYSTEM ORGANIZATION AND IMPROVEMENT**

To improve efficiency and quality within their organizations, hospitalists should:

- Collaborate with local infection control practitioners to reduce the spread of resistant organisms within the institution.
- Lead, coordinate, and/or participate in multidisciplinary initiatives, which may include collaboration with critical care specialists and pulmonologists, to reduce the incidence of HAP in ventilated patients.
- Lead, coordinate, and/or participate in quality improvement initiatives to reduce ventilator days, rates of HAP, and variance in antibiotic use.
- Implement systems to ensure hospital-wide adherence to national standards for empiric antibiotic use and docu-

ment those measures as specified by recognized organizations.

- Lead efforts to educate staff on the importance of smoking cessation counseling and other preventive measures.

**References**

1. Chastre J, Fagon JY. Ventilator-associated pneumonia. *Am J Respir Crit Care Med.* 2002;165(7):867-903.
2. Fagon JY, Chastre J, Hance AJ, Montravers P, Novara A, Gibert C. Nosocomial pneumonia in ventilated patients: a cohort study evaluating attributable mortality and hospital stay. *Am J Med.* 1993;94(3):281-288.
3. Rello J, Ollendorf DA, Oster G, Vera-Llonch M, Bellm L, Redman R, et al; VAP Outcomes Scientific Advisory Group. Epidemiology and outcomes of ventilator-associated pneumonia in a large US database. *Chest.* 2002;122(6):2115-2121.
4. American Thoracic Society; Infectious Diseases Society of America. Guidelines for the management of adults with hospital-acquired, ventilator-associated, and healthcare-associated pneumonia. *Am J Respir Crit Care Med.* 2005;171(4):388-416.