

Pneumonia in Adults: the Practical Emergency Department Perspective

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KEYWORDS

- Pneumonia • Community-acquired • Classification • Treatment
- Adult • Pneumococcus

INTRODUCTION AND PERSPECTIVE

Pneumonia is an inflammation of the lung most commonly caused by infection with bacteria, viruses, and other organisms. It is both a common and a potentially serious disease. It is estimated that there were more than 500,000 hospital admissions in the United States in 2009 from pneumonia. Whereas pneumonia managed as an outpatient is a less severe disease, pneumonia requiring hospitalization is associated with approximately 15% mortality. Pneumonia is often a complication of a preexisting condition or infection such as influenza. The 2009 national vital statistics identified pneumonia and influenza as the eighth leading cause of death.¹ Pneumonia consistently accounts for most of these deaths. Close to 90% of the deaths attributed to pneumonia occur in the population older than 65 years. In this cohort, pneumonia and influenza combine as the seventh leading cause of death.^{2,3}

The Center for Disease Control's Advisory Committee on Immunization Practices recommends annual influenza vaccination for everyone older than 6 months.⁴ (The emergence of serious drug-resistant pneumococci also accentuates the urgent need for pneumococcal immunization. Together, pneumonia and influenza represented a cost to the US economy in 2005 of \$40.2 billion. In 2010, the economic costs of all lung diseases were projected to be approximately \$173.4 billion.⁵)

The challenge for emergency department (ED) care is to recognize the diagnosis, initiate early and appropriate empiric antibiotic therapy, risk stratify patients with respect to severity of illness, and recognize indications for admission. This challenge

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must be balanced with an emphasis on cost-effective management, recognizing the changing spectrum of pathogenesis and a cognizance toward variable and less common presentations.

PATHOGENESIS

Infectious transmission in pneumonia occurs most commonly either by microaspiration or by direct droplet inhalation. However, the development of clinical pneumonia requires either a defect in host defense mechanisms or inoculation with virulent organisms. Several pneumonic pathogens are spread by droplets. This mode of transmission bypasses the upper tract defenses and deposits directly in the lower respiratory tract. **Fig. 1** shows the 2 most common modes of transmission and the infectious organisms most commonly associated with each.

Host defenses can be impaired in many ways. **Fig. 2** shows some common conditions that are associated with an increased risk of the development of pneumonia and the manner in which these conditions impair host defenses.

Pneumonia can also be transmitted through less common mechanisms. These mechanisms may include: hematogenous spread; invasion from infection in contiguous structures (pleura or subdiaphragmatic structures); direct inoculation (as a result of surgery or bronchoscopy); and reactivation, most commonly in immunocompromised hosts. The most common organisms that are implicated in reactivation, even after many years, include *Pneumocystis jiroveci*, *Mycobacterium tuberculosis*, and cytomegalovirus.

CAUSE AND CLASSIFICATION

The challenge in the ED is not in making the diagnosis of pneumonia but rather in identifying the cause of the infection such that the appropriate antibiotic treatment can be instituted in a timely manner. This strategy is of particular importance in those patients with higher risk of mortality (ie, hospitalized inpatients). Because microbiological testing results are not available at the time of the ED assessment, the initial therapy with antibiotics is empiric.

To facilitate the decision-making process with regard to the institution of empiric antibiotics, it is helpful to classify pneumonia. The traditional classification was based on the terminology of typical or atypical pneumonia. The traditional clinical

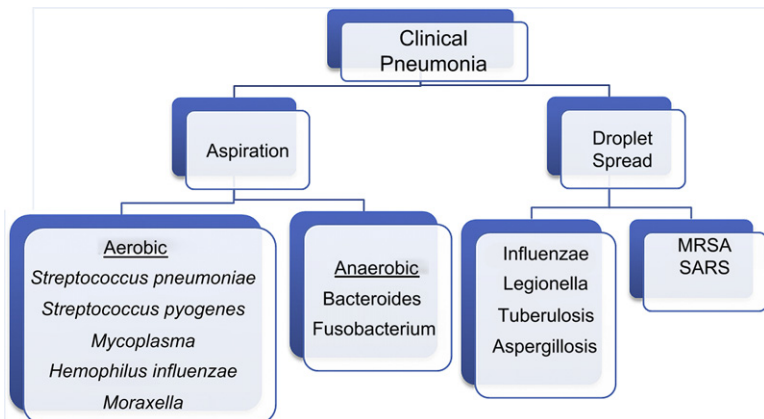


Fig. 1. Modes of transmission of pneumonia.

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