Preface
Antoni Torres

Hospital-Acquired Pneumonia: Etiologic Considerations 679
Amalia Alcón, Neus Fàbregas, and Antoni Torres

The development of pneumonia requires the pathogen to reach the
alveoli and the host defenses to be overwhelmed, either by micro-
organism virulence or by inoculum size. Different microorganisms
can be found depending on the onset time of pneumonia and on
the local pattern variation encountered between different institu-
tions and countries. A very important, unresolved issue is the defi-
definition of early and late-onset pneumonia. It still remains uncertain
from the literature whether the given threshold refers to the
number of days in hospital or to the number of days following intu-
tubation. Noninvasive ventilation is demonstrating that the term
“ventilator-associated pneumonia” is perhaps inaccurate and
should be referred to as “intubation-associated pneumonia.”

Risk Factors for Pneumonia in the Intubated Patient 697
Olga Diaz, Emili Diaz, and Jordi Rello

Most epidemiologic studies have reported an association between
antibiotic use and development of ventilator-associated pneumo-
nia. The information gathered here helps to explain why risk fac-
tors in the development of ventilator-associated pneumonia vary
from series to series. It also explains why different investigators
have found opposite effects when evaluating the antibiotics. When
analyzing the role of antibiotic exposure over time (the dynamic
concept) one might find answers to different incidence rates and
etiology of ventilator-associated pneumonia between studies
performed to date.

Diagnosis of Hospital-Acquired Pneumonia:
Postmortem Studies 707
Saad Nseir and Charles-Hugo Marquette

Postmortem studies provide important information on hospital-
acquired pneumonia in mechanically ventilated patients. Ventila-
tor-associated pneumonia is a diffuse polymicrobial and dynamic
process. Although early animal studies established a relationship
between histologic pneumonia and bacterial loads, more recent
studies highlight histobacteriologic discrepancy. The complex relationship between histology and bacteriology in ventilator-associated pneumonia may explain the limited value of invasive or noninvasive sampling techniques based on quantitative cultures.

**Hospital-Acquired Pneumonia: Diagnostic Strategies:**
**Lessons from Clinical Trials**  
Jean-Yves Fagon

Appropriate antimicrobial treatment of patients with ventilator-associated pneumonia (VAP) significantly improves outcome. Use of empiric broad-spectrum antibiotics in patients without bacterial lung infection is potentially harmful, because it facilitates colonization and superinfection with multiresistant organisms. Using bronchoscopic techniques to obtain protected specimen brush or bronchoalveolar lavage specimens for quantitative cultures from the affected area in the lung permits physicians to devise a strategy accurate for identifying patients with VAP, selecting rapidly appropriate initial antimicrobial therapy, adjusting therapy, and withholding antibiotics from patients without VAP. When fiberoptic bronchoscopy is not available, clinical strategy with the use of short-course antibiotics or quantitative cultures of specimens obtained with simplified nonbronchoscopic diagnostic procedures are possible alternatives.

**Antimicrobial Treatment of Hospital-Acquired Pneumonia**  
Jean Chastre

Rapid identification of infected patients and accurate selection of antimicrobial agents for initial treatment of hospital-acquired pneumonia represent important clinical goals, because it seems that better treatment of this infection might have a major impact on hospital-associated mortality and morbidity. Persistently high mortalities for pneumonia in the critical care unit argue, however, for a continued reassessment of the current modalities of therapy and definition of better protocols. More active and less toxic antibacterial agents are still needed. It should be emphasized that in the event that one or several specific etiologic agents are identified by a reliable technique, the choice of antimicrobial drugs is much easier, because the optimal treatment may be selected in light of the susceptibility pattern of the causative pathogens without resorting to broad-spectrum drugs or risking inappropriate treatment. Great efforts should be placed to obtain reliable pulmonary specimens for direct microscopic examination and cultures in each patient clinically suspected of having developed nosocomial pneumonia before new antibiotics are administered.
Recent Developments in Antibiotic Treatment
Andrés de Roux and Hartmut Lode

In view of the growing microbial resistance rates worldwide, the evaluation of new antimicrobial drugs becomes an emergent issue. Because the rate of multiresistant Gram-positive bacteria has increased dramatically during the past two decades, research on treatment options has focused on methicillin-resistant Staphylococcus aureus, penicillin-resistant Streptococcus pneumoniae, and vancomycin-resistant enterococci. This article reviews recent developments in antibiotic treatment options of hospital-acquired pneumonia. Studies regarding the effectiveness of linezolid and quinupristin-dalfopristin are presented. The roles of older and newer fluoroquinolones are evaluated. Also discussed is an interesting paper studying the duration of antibiotic treatment in hospital-acquired pneumonia. Finally, some new antimicrobial agents with interesting potential are mentioned.

Treatment Failures in Patients with Ventilator-Associated Pneumonia
Malina Ioanas, Santiago Ewig, and Antoni Torres

This article provides an overview of the main topics of treatment failure in patients with ventilator-associated pneumonia, including definition, pneumonia-related and extrapulmonary causes behind treatment failures, and patterns of treatment failures. The challenge of treatment failures in ventilator-associated pneumonia can only be faced when a well-defined concept of treatment failures, including a cost-effective approach to patients suffering from this condition, is defined and applied.

Prevention of Hospital-Acquired Pneumonia: European Perspective
Marc J.M. Bonten

Prevention of ventilator-associated pneumonia (VAP) has been a subject of intensive study in European ICUs since the 1980s. Several antibiotic-containing preventive strategies seem to be very effective in different patient populations. Selection of antibiotic resistance remains the major disadvantage of these strategies, however, limiting applicability in settings with high levels of antibiotic resistance. There is little evidence that systemic prophylaxis is effective for the prevention of VAP, and initial studies were associated with resistance problems. Of the non-antibiotic-containing preventive strategies, subglottic aspiration was effective in several studies. Other strategies were effective in single studies, and more data are needed on the generalizability, feasibility, and cost-effectiveness of these interventions.
Pulmonary infections represent the main cause of complications and one of the most important causes of mortality in immunocompromised patients. Clinical management of these infections is a complex challenge because virtually any microorganism may affect any immunocompromised patient at any time in the evolution. The high associated mortality requires a rapid and sometimes invasive diagnostic approach to try to obtain an etiologic diagnosis allowing the early introduction of specific treatment. This article describes the myriad of potential pathogens that may cause nosocomial pneumonia in non-HIV immunocompromised patients; recent developments in diagnostic tests, including noninvasive and bronchoscopic techniques; and new therapeutic approaches. The importance of an adequate assessment of risk factors with special emphasis on the potential prognostic implications of an early diagnosis is underlined.