European Respiratory Monograph: Community-Acquired Pneumonia


Enormous progress in our understanding and treatment of community-acquired pneumonia (CAP) has not reduced mortality in hospitalized patients, the incidence of CAP has been increasing, and, despite higher intensive care unit (ICU) admission rates in the United States than in Europe, inpatient mortality appears to be similar. The Socratic method is where the latest monograph from the European Respiratory Society goes with a challenging array of chapters posing provocative questions, explored with evidence-based studies drawn mainly from a wealth of European studies. The CAP paradox of increasing incidence and mortality despite improving assessment tools, antibiotics, and ICU care begs introspection. Given the likely explanation of more aged and immunocompromised hosts, do future hopes reside within the antibiotic pipeline, or with real-time diagnostics, genotypes, and vaccine research?

Introductory chapters explore definitions and epidemiology. Although American guidelines have split CAP into additional categories of nursing home–acquired pneumonia (NHAP) and healthcare-associated pneumonia (HCAP), the hope of NHAP and HCAP as indicators of risk for multidrug resistance has not improved on prediction rules that include comorbidities, recent hospitalization, functional status, dialysis care, and recent antibiotic use. Placing all HCAP patients on broad-spectrum antibiotics risks side effects, adds expense, and may ultimately fulfill the prophecy of multidrug resistance. Here the lumpers may have it over splitters. Unfortunately, there is no chapter on cost, outcomes, or antibiotic stewardship. European guidelines admit fewer patients, use narrow-spectrum antibiotics, and are more cost effective. American small-area analysis (www.Dartmouthatlas.org) shows no better outcomes for CAP treated in Huntsville, TN, vs Boston, MA. Pneumonia 30-day hospital readmission rates are 15.9% in Huntsville and 16.0% in Boston, with much greater expense, a discussion missed [1].

Two chapters discuss pathogenesis and microbiology using traditional and molecular techniques. Urine antigen testing for Legionella pneumophila and Streptococcus pneumoniae adds speed and specificity, but culture remains important for antibiotic sensitivity and epidemiology. The need for sputum culture in nonhospitalized patients and interpretation of culture in hospitalized patients is controversial. Enter polymerase chain reaction–based platforms, with real-time results, improved sensitivity and specificity, but expanded spectrum of pathogens, often revealing multiple pathogens in the same patient. What are the consequences of multiple pathogens, and is it helpful to treat all discoveries? The promise of deep-sequencing 16S ribosomal RNA and amplifying antibiotic resistance genes is enticing but expensive—certainly important for tuberculosis, cystic fibrosis, or immunocompromised pneumonia, but less compelling for CAP. Matrix-assisted laser desorption/ionization–time-of-flight mass spectrometry is not discussed, but could accelerate species identification and detect antibiotic resistance.

Important chapters regarding atypical pneumonia discuss Mycoplasma, Chlamydia, Legionella, and viral pathogens. History and epidemiology are put forward with flair, lest we forget that alone with S. pneumoniae these are the most common CAP pathogens. Controversy intervenes regarding the use of macrolides for all patients with CAP. Scoring systems are not perfect but may predict atypical pneumonia. The problem arises with sole use of macrolides for presumed atypical pneumonia, given increasing S. pneumoniae resistance to macrolides. Cardiovascular risks associated with macrolide QT prolongation and increased mortality have shifted the balance. Quinolones also suffer from QT prolongation and are more likely than macrolides to fail treatment for S. pneumoniae with minimum inhibitory concentrations >2. Consider doxycycline, with efficacy against Legionella and an anti-inflammatory effect.

Phenotypes (HCAP, NHAP, chronic obstructive pulmonary disease, aspiration, young and elderly) are discussed and juxtaposed to assessment tools. NHAP remains a difficult entity, driven more by impaired functional status and advanced directives than by prefatory resistance. Assessment tools were developed to predict mortality and have increased the proportion of CAP patients managed at home. However, risk of death is not always an indicator of ICU care or the need for ventilation and vasopressor support. New scoring systems for ICU care are
reviewed but suffer from limited validation and lack consensus. Biomarkers (ie, procalcitonin) are not strong prognosticators, but might be combined with scoring tools and may help differentiate pneumonia from pulmonary infiltrates that do not require antibiotics. These chapters suggest future directions.

Advances in critical care are reviewed in chapters on acute respiratory failure, septic shock, and nonresolving pneumonia. Response to early initiation of noninvasive ventilation (continuous positive airway pressure) is common in CAP, but delay in intubation is associated with increased mortality. CAP is the leading cause of septic shock, accounting for 45% in hospitalized patients. Early recognition and initiation of bundled treatment includes fluid resuscitation with 30 mL/kg to target a mean arterial blood pressure of 65 mm Hg, central venous pressure between 8 and 12 mm Hg, and central venous oxygen saturation of 70% within 6 hours of diagnosis. Recognizing clinical stability presages early transition to oral antibiotics and shortens hospital stay. Etiologies and management of clinical failure are discussed, with implication for antibiotic resistance and duration. Nonresolving pneumonia is considered along with timing of repeat chest radiography, computed tomography, and bronchoscopy.

The final 5 chapters discuss nonantibiotic therapies. Chest physiotherapy is useful in weaning protocols, neuromuscular dysfunction, and occasional bronchiectasis, but is not effective in CAP. Steroids similarly do not alter mortality and may increase cardiovascular risk, and inhaled corticosteroids increase susceptibility to CAP. High-quality studies do not confirm benefit from immunoglobulin therapy. Angiotensin-converting enzyme inhibitors may improve cough reflex and swallowing in patients prone to aspiration and have been associated with decreased 30-day mortality. Surprisingly, no recommendation can be made for use of β2 agonists. Atherosclerosis is an inflammatory disease, and cardiovascular complications are increased during and for some time following resolution of CAP. Statins may assuage cardiovascular mortality, but nonsteroidal anti-inflammatory drugs may increase cardiovascular risk and bronchospasm. Finally, pneumococcal and influenza vaccination are reviewed, with consideration for efficacy in the elderly. Pneumococcal serotypes can be reduced in the elderly population by immunizing children, but new serotypes may pose a moving target. If you are surprised by CAP evolution and hanker to weigh in on these tidbits, Community-Acquired Pneumonia is more of a page turner than you might imagine.

Notes

Acknowledgments. T. H. T. is an employee of the Veterans Administration.

Disclaimer. The views expressed herein do not necessarily represent the views of the Department of Veterans Affairs or the US government.

Potential conflicts of interest. Author certifies no potential conflicts of interest.

The author has submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

Thomas H. Taylor
Geisel School of Medicine at Dartmouth, Hanover, NH

Reference