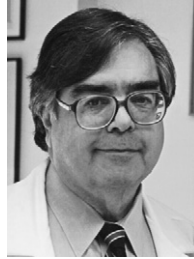


Preface



Burke A. Cunha, MD, MACP
Guest Editor

This issue of *Critical Care Clinics* is an overview of the key problems in antimicrobial therapy in critical care medicine. Infectious diseases continue to be an important aspect of critical care medicine. Aside from being common problems in the critical care setting, infectious diseases are often fulminant or fatal in critical care. Although infectious disease is of critical importance in critical care there is only one book, *Infectious Diseases in Critical Care Medicine* [1], now in its second edition, specifically dedicated to this subject. Physicians practicing critical care are, in the main, not trained in infectious diseases. Appropriately, they rely on infectious disease consultants and other consultants outside of their specialty. Infectious diseases are varied, complex, changing, and present some of the most difficult differential diagnostic and therapeutic problems in medicine.

In this issue of *Critical Care Clinics*, topics with particular significance to critical care are reviewed. Selection of optimal empiric antimicrobial therapy of community-acquired and nosocomial pathogens requires an in-depth knowledge of antimicrobial therapy. Multidrug-resistant (MDR) pathogens also are becoming increasingly recognized as colonizers in the critical care setting and less commonly as opportunistic pathogens in critical care medicine. Appropriate empiric antimicrobial therapy should take into account the significance of the isolate in the clinical context. In general, colonizing organisms should not be “chased” or “covered” with antimicrobial therapy. Because colonization is more difficult to eliminate than infection, much of

the overuse of antimicrobial therapy in the critical care setting can be ascribed to the unnecessary treatment of colonizing organisms. Treating colonizing organisms may have several untoward results. If one is unaware of the resistance potential of various antibiotics, then coverage of colonizers often results in changes in the patient's flora, fungal superinfections, or worsening resistance patterns with colonizing organisms, or worse yet, inducing resistance with other organisms. In addition to the collateral damage that empiric therapy may cause among colonizing organisms, fostering multidrug resistance may also occur in flora from other body sites.

The needless use of antibiotics increases the potential for adverse reactions. Multiple uses of antibiotics simultaneously (ie, polypharmacy) increases the potential for drug side effects and drug-drug reactions along with increased antibiotic costs. All too often it is incorrectly assumed that multiple antibiotics, in an attempt to cover every diagnostic possibility, present antibiotic resistance. Intensive care often is equated with intense antibiotic therapy.

The prevention of antibiotic resistance primarily depends on using antibiotics with a low resistance potential (eg, meropenem) over those with a high resistance potential (eg, ceftazidime). With few exceptions, optimal empiric monotherapy is the preferred infectious disease approach to infections in critical care medicine. If the initial antibiotic selected has a sufficient spectrum against predictable pathogens based on clinical syndromes the possibility of missing a pathogen is exceedingly low. All other things being equal, using optimal empiric monotherapy as early as possible in the infectious process optimizes outcomes. Antibiotic therapy should only be modified if there is sufficient reason (ie, based on representative microbiologic data or change in the clinical syndrome). Antibiotic changes are often made based on indirect or inaccurate culture data changing patterns of colonizing organisms that have been changed as a result of suboptimal empiric therapy.

Because antimicrobial therapy is such an essential part of infectious disease management in critical care setting, this issue of *Critical Care Medicine* primarily focuses on the key aspects of antimicrobial therapy in critical care. The contributors to this issue have been selected for their experience and clinical judgment. The authors are world-class experts in their respective fields. Among the problem organisms in critical care medicine are *Acinetobacter baumannii*, methicillin-resistant *Staphylococcus aureus* (MRSA), *Pseudomonas aeruginosa*, and *Clostridium difficile*. Dr. Duane R. Hospenthal has provided an excellent overview of *A baumannii* colonization and infections. Dr. John Segreti provides a fine review of MRSA in the critical care setting. Dr. Helen Giamarellou, an authority on the therapy for *P aeruginosa*, reviews the various therapeutic approaches to this opportunistic pathogen. *C difficile* has become a worldwide problem, and Dr. Daniel M. Musher, a highly respected world authority on the subject,

provides his perspective on the various therapies for *C difficile* diarrhea and colitis.

A few special general topics are included because of their clinical importance in critical care. Dr. Emilio Bouza is an international authority on central intravenous line infections and acute bacterial endocarditis. His excellent article is of great benefit to physicians treating these two common intravascular infectious diseases in clinical care. I have contributed an article on sepsis and septic shock focused on a differential diagnostic approach and empiric antimicrobial therapy for this clinical problem encountered daily by clinicians.

Although there is a wide variety of antibiotics available to clinicians to treat infections in the clinical care setting the optimal use of some of the newer agents continues to be defined. Accordingly, overviews of selected antibiotics relevant to critical care medicine have been included in this issue. The lead article in this section is written by Drs. Richard Quintiliani, Sr and Richard Quintiliani, Jr, who discuss the pharmacokinetic and pharmacodynamic aspects of antimicrobial therapy for critical care clinicians. Aside from antimicrobial activity and pharmacokinetic considerations, pharmacodynamic considerations are an important aspect of antibiotic dosing. Dr. Jeffrey Alder, PhD discusses the uses of daptomycin in the critical care setting for the treatment of serious systemic MRSA infections. Dr. George A. Pankey discusses the emerging role of tigecycline in critical care medicine. Tigecycline is one of the few antibiotics available active against all major MDR gram-positive and gram-negative pathogens (excluding *P aeruginosa*). Dr. Matthew E. Falagas is internationally known for his work on the antimicrobial therapy of multidrug-resistant gram-negative bacilli (GNBs). His article on colistin and polymyxin B reviews their use to treat multidrug-resistant GNBs in the critical care setting. I have contributed an article on vancomycin, which currently is being reevaluated as an anti-MRSA antibiotic in view of increasing resistance, delayed therapeutic response, and therapeutic failures. Lastly, Dr. Richard B. Brown ably reviews the side effects and drug interactions of antibiotics commonly used in the critical care setting. More than ever, clinicians must be conscious of the effects of the drugs they prescribe, particularly in patients receiving multiple antibiotics. Clinicians must be aware of not only the individual side effects from each agent but also the potential drug interactions among the antibiotics and the non-antibiotic medications that the patient is receiving.

This issue of *Critical Care Clinics* focuses on antimicrobial therapy in critical care medicine and should serve as a ready reference to clinicians of all disciplines treating infectious diseases in the critical care setting. The contributors of these articles are respected authorities on their subjects and bring to the readers of *Critical Care Clinics* their expertise and perspective in their respective topics. Critical care clinicians should find this issue

clinically relevant and useful and will undoubtedly refer frequently to the articles in this issue.

Burke A. Cunha, MD, MACP
Infectious Disease Division
Winthrop-University Hospital
259 First Street
Mineola, NY 11501, USA

Further readings

- Amabile-Cuevas CF, editor. Antibiotic resistance from molecular basics to therapeutic options. Austin, TX: R.G. Landes Company; 1996.
- Baddour L, Gorbach SL, editors. Therapy of infectious diseases. Philadelphia: Saunders; 2003.
- Bryskier A, editor. Antimicrobial agents. Washington, DC: ASM Press; 2005.
- Chadwick DJ, Goode J, editors. Antibiotic resistance: Origins, evolution, selection and spread. New York, NY: John Wiley & Sons; 1997.
- Conte JE Jr, editor. Manual of antibiotics and infectious diseases. 9th Edition. Philadelphia: Lippincott Williams & Wilkins; 2002.
- Cunha BA, editor. Antibiotic Essentials. 7th edition. Physicians Press: Royal Oak, MI; 2008.
- Evans WE, Schentag JJ, Jusko WJ, editors. Applied pharmacokinetics. 2nd edition. Spokane, WA: Applied Therapeutics; 1986.
- Finch RG, Greenwood D, Norrby SR, et al, editors. Antibiotic and chemotherapy. 8th edition. Edinburgh, Scotland: Churchill Livingstone; 2003.
- Greenwood D, Davey P, Finch R, et al, editors. Antimicrobial chemotherapy. 5th edition. Oxford, UK: Oxford University Press; 2007.
- Hedaya MA, editor. Basic pharmacokinetics. Boca Raton, FL: CRC Press; 2007.
- Kucers A, Crowe S, Grayson ML, et al, editors. The use of antibiotics. 5th edition. Oxford, England: Butterworth Heinemann; 1997.
- Lewis K, Salyers AA, Taber HW, et al, editors. Bacterial resistance to antimicrobials. New York, NY: Marcel Dekker, Inc.; 2002.
- Lorian V, editor. Antibiotics in laboratory medicine. 5th edition. Philadelphia: Lippincott Williams & Wilkins; 2005.
- Piscitelli ST, Rodvold KAS, editors. Drug interactions in infectious diseases. Totowa, NJ: Humana Press; 2001.
- Reese RE, Betts RF, Gumustop B, editors. Handbook of antibiotics. Philadelphia: Lippincott Williams & Wilkins; 2000.
- Ristuccia AM, Cunha BA, editors. Antimicrobial therapy. New York, NY: Raven Press; 1984.
- Scholar EM, Pratt WB, editors. The antimicrobial drugs. 2nd edition. New York, NY: Oxford University Press; 2000.
- Yu V, Edwards G, McKinnon PS, et al, editors. Antimicrobial therapy and vaccines, Volume III: Antimicrobial agents. 2nd edition. Pittsburgh: Esun Technologies; 2005.
- Wax RG, Lewis K, Salyers AA, et al, editors. Bacterial resistance to antimicrobials. 2nd edition. Boca Raton, FL: CRC Press; 2008.

Reference

- [1] Cunha BA, editor. Infectious diseases in critical care medicine. 2nd edition. New York, NY: Informa Healthcare; 2007.