APPROACH TO MULTIDRUG RESISTANT BACTERIAL INFECTIONS

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Several bacterial pathogens have evolved into multidrug resistant (MDR) forms both in developed and developing countries at an expanding rate. The World Health Organization has identified antimicrobial resistance as one of the three most important problems facing human health. It was estimated that 4·95 million deaths were associated with bacterial AMR globally in 2019.[1] Three infectious syndromes dominated the global burdens attributable to AMR: lower respiratory and thorax infections, bloodstream infections, and intra-abdominal infections. Some of the most important MDR pathogens that currently cause infection in hospital and in the community are the so-called "ESKAPE" pathogens (Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumanii, Pseudomonas aeruginosa, and Enterobacter species), emphasizing their capacity to "escape" the effects of routine antibiotics. Most of the MDR studies were heterogeneous in terms of study design, patient population, site of infection, choice of antibiotic treatment, duration of follow-up period, and the outcome definitions, making it difficult to compare the different treatments and combinations of antibiotics used. Current recommendations in Europe and USA are based on systematic reviews that suggest different methods to prevent and control MDR infections, but provide little data on new and alternative antibiotic treatment options and therefore provide little firm guidance on specific treatment choices and algorithms. Attempts are ongoing to overcome antibacterial resistance by using new agents and combinations of new plus old agents. For example, both old (clavulanic acid, tazobactam) and new (avibactam, vaborbactam, relebactam) BLIs are being used in treatment algorithm for critically ill patients in the ICU according to MDR pathogen. There were still controversies regarding microbiological success for single agent compared with combinations of multiple agents. Many bacteria have the ability to produce biofilms, comprising organized congregations of bacteria adhering to each other making complex condition where antibiotic failed to wipe out bacteria despite of retaining in vitro susceptibility. It is also not always possible to conduct randomized controlled studies involving the required number of patients in a timely manner. So a requirement with the increasing choice of highly effective antimicrobial drugs, with dosages based on pharmacokinetic analysis of drug disposition, selection of the appropriate drug based on clinical microbiological data and pharmacodynamic indices. Rational antimicrobial therapy is more applicable today than in the history of antimicrobial therapy. Exploring newer modalities such as phage therapy and lytic antibiotics as well as obtaining a deeper understanding of the pathways involved in MDR mechanisms in order to engineer targeted drugs. Besides, rapid and comprehensive diagnostics are the key factor for the future management of antimicrobial resistance.

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