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Perspective

Role of Bactericidal Medicines in Treatment of Bacterial Infections in Immunocompromised Patients

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1. Description

An effective approach for separating antibiotics that kill bacteria—referred to as "bactericidal"—from antibiotics that restrict bacterial growth, or "bacteriostatic," is the distinction between bactericidal and bacteriostatic medications. Major medical and infectious disease textbooks, clinical recommendations, and ads for novel antibiotics all use this classification. The intuitively obvious difference between the two categories of antibiotics leads one to believe that bactericidal medications have a more potent antibacterial effect and can actually kill germs. Contrarily, bacteriostatic antibiotics are regarded to be less effective without a strong immune response since it is assumed that they need phagocytic cells to effectively eliminate microorganisms.

Throughout the dawn of time, people have employed natural remedies to improve their health, and many of the medications used today were first made with the help of natural resources. For the treatment and management of infectious pathogens, numerous antimicrobial substances were previously found in both synthetic and natural items. Only a small number of them, nevertheless, were available on the market for the world's poor. The availability and price of numerous currently recommended antibiotics have been further hampered by the rise of multi-drug-resistant bacteria globally. It consequently lessens the efficacy of the treatment plans and raises morbidity, mortality, and medical expense rates. At least 2 million Americans suffer from dangerous infections caused by germs that are resistant to one or more of the antibiotics used to treat diseases, according to a CDC analysis. Antibiotic resistance is anticipated to have a higher overall financial cost than direct medical care. Because of financial constraints, adequate surveillance systems, laboratory tests, and access to appropriate antimicrobials are absent in low-income nations, further complicating the problem. The number of deaths would increase to 10 million and would cost the globe up to if successful efforts to intervene in the search for new treatments had not been made. To this end, finding a novel antibiotic derived from natural sources is eventually a crucial component of modern medicine to combat the socio-economic and health effects brought on by drug-resistant microorganisms.

According to this theoretical paradigm, bactericidal medicines should be used to treat bacterial infections in critically ill and immunocompromised patients. In addition, some specific illnesses, such endocarditis, are also believed to call for bactericidal medicines. The heart valves are viewed as isolated, immunosuppressed areas that are difficult for phagocytic cells to penetrate. A phagocyte-independent killing by bactericidal medicines is therefore typically advised in such situations. Woefully, there are no clinical studies to back up the idea that bacteriostatic drugs are superior to bactericidal antibiotics. Given the significant impact on recommendations for the care of seriously ill patients, this is extremely surprising.

The inability to evaluate a drug class' effect in a manner that is clinically significant could be the cause. The fundamental issue is that three main factors—the host, the pathogen, and the drug—have an impact on clinical outcomes during bacterial infection and its treatment, including death and cure rates. It is challenging to evaluate a drug class effect because it can only be

secondary to these three important factors. Our analytical premise was that if the three primary factors—host, medications, and pathogens—were as varied as feasible, the drug class effect of "bactericidal *vs* bacteriostatic" might be demonstrated. The results may be boiled down to the distinction between bactericidal and bacteriostatic antibiotics if the common denominator is restricted to the difference between bacteriostatic and bactericidal medicines in various clinical studies. A meta-level that is outside the scope of a single randomised trial is introduced by this method. In order to treat patients with severe bacterial infections, we therefore conducted a meta-analysis incorporating a wide range of prospective clinical trials using bacteriostatic *versus* bactericidal antibiotic medicines.