Clinical and Economic Impact of Antimicrobial Resistance

Yehuda Carmeli

Tel Aviv Sourasky Medical Center, Israel

Antimicrobial resistance has been a challenging clinicians and investigators since antibiotics have been introduced into clinical practice. The development of multiple new antibiotic agents in the 70's and early 80's, has led to reduced interest in resistance, however, soon after resistance to these new agents emerged, and over the last decade multi-drug resistance and extreme-drug resistance has become an increasing problem in many parts of the world.

Infections with antibiotic resistant bacteria are associated with severe clinical outcomes. Patients with infections caused by antibiotic resistant pathogens have higher mortality, morbidity, length of hospital stay and higher expenditure than similar patients with infections caused by susceptible organisms. As a rule of thumb, resistant organisms are associated with two fold higher rates of adverse outcomes as compared to susceptible strains. This is primarily related to delay in effective therapy occurring much more often with resistant organisms. However, these adverse outcomes are also related to the affected population; patients with resistant organisms are often more vulnerable patients that those with susceptible strains. In certain cases resistant organisms are also more virulent.

The impact of resistance goes beyond that, as infection with resistant organisms do not only replace susceptible strains, but often cause extra infections, i.e., patients that would have not been infected by a susceptible strain is infected by a resistant strain. The proportion of this population is difficult to estimate, however, from the societal point of view, this causes much higher burden than replacement of susceptible organisms.

Antibiotic resistance has also an indirect effect of great importance. When proportion of resistance reaches certain level (usually 20%), clinicians feel it is inappropriate to use the agent as empiric therapy, and the agent is lost. In the era when effective agents are scarce, such a loss can result in severe health and economic burden.