Global Impact of Antimicrobial Resistance

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Abstract
This seminar focuses on global developments in terms of bacterial resistance against antimicrobial substances. From the beginning of the development of antimicrobial agents using the principle of “selective toxicity” – after initial discoveries made by researchers such as Paul Ehrlich, Alexander Fleming and Gerhard Domagk – there has been a constant increase of microbial resistance to these substances. Globally, there are two major factors promoting antimicrobial resistance development, (1) inappropriate use, leading to the emergence of resistance, and (2) lack of infection control, leading to the spread of resistant organisms. Among the practices of inappropriate use is massive, widespread use of antibiotics in livestock and agriculture, comprising about 70% of global use. Over the decades since antibiotics were widely introduced, there has been a relentless increase of resistance of all major groups of microorganisms against all major groups of antibiotics. There are only minor instances where resistance development was temporarily halted through intensified infection control efforts. Globally, antimicrobial resistance development is clearly linked with lesser or more antibiotic use in various countries or settings; this can be seen in country-by-country comparisons. A major recent threat is carbapenem resistance, which is associated with resistance to almost all antibiotic classes available. Antibiotic resistance has also clearly been shown to be associated with increased mortality when treatment in critically ill patients was needed. All this is associated with a significant decrease in new antimicrobial substances being developed. A potential future scenario is the “End of the Antibiotic Era” whereby in a few decades formerly trivial infections may no longer be treatable.

Selected Publications