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Antibiotic Stewardship - Where do we Stand in India?

Neelam Taneja and Ramanpreet Kaur*

Department of Medical Microbiology, Postgraduate Institute of Medical Education and Research, Chandigarh, India

Short Communication

Antimicrobial stewardship refers to "coordinated interventions designed to improve and measure the appropriate use of antimicrobials by promoting the selection of the optimal antimicrobial drug regimen, dose, duration of therapy, and route of administration [1]." Hence, antimicrobial stewardship basically aims at helping each patient receive the appropriate treatment without adverse effects of antibiotic use. These programs are beneficial in reducing treatment failures, decreasing health-care associated infections and also reducing antibiotic resistance, while proving economically beneficial to the hospital. Indian hospitals are facing an enormous challenge of managing multi-drug resistant organisms. The major threat is posed by gram negative bacteria which have not only become resistant to third generation cephalosporins, aminogycosides and fluroquinolones but also to carbapenems .This situation has forced the clinicians to use colistin, tigecycline , fosfomycin in various combinations [2]. It is not just that multi/pan drug resistant organisms are accumulating, but our antibiotic armamentarium is not keeping pace with this accumulating menace. .And the matter of concern is that the global sale of these carbapenems (40%) and colistin (13%) is increasing steadily with a particular steep rise in India, Pakistan and Egypt. The five rapidly growing countries known as the BRICS (Brazil, Russia, India, China and South Africa) had the greatest upsurge in antibiotic use from 2000 through 2010; (68 percent, 19 percent, 66 percent, 37 percent, and 21 percent respectively) [3]. In-appropriate use of antibiotics in clinical practice is largely responsible for selecting out these resistances. Stewardship programs are actually a boon to our health care society if implemented and monitored properly. Antibiotic stewardship programs (ASPs) have clear cut benefits in reducing the rate of inappropriate use of antibiotics but this is also not without limitations [4]. ASPs intend to decrease or restrict the use of certain antimicrobials which are supposed to impact the resistance more and allow dispensing of other drugs not presently associated with resistance. But, in this way we might be decreasing the pressure on one antibiotic by not using it but on the other hand we are giving opportunity to bacteria to acquire resistance to the currently available drugs. This phenomenon is referred as "squeezing the balloon". For example, in an ICU study, a heavy use of piperacillin-tazobactam was used with a high rate of piperacillin resistant Pseudomonas infections [5]. In an attempt to decrease this resistance, piperacillin-tazobactam was replaced with imepenem. After sometime, though the rate of piperacillin resistant Pseudomonas infections surely decreased, but it led to an increase in imepenem resistance. Similarly, decreased cephalosporin and fluroquinolones use has proven to be beneficial in decreasing the rate of *C. difficult* infections [6] but this comes with the cost of resistance to other antibiotics like carbapenems or beta lactam-betalactam inhibitor (BL-BLI) combinations. The most practical limitations in implementation of these programs are staff and funding constraints. Well dedicated and trained staff is the necessity of these programs that can devote sufficient amount of time in understanding the problem pathogens of the particular area and determine the priority areas and further implementing the plan of action along with rigorous monitoring. Another factor to be considered here is that ASPs in itself cannot lead to a drastic change unless they are integrated with other approaches like infection control measures and using some alternatives to antibiotics wherever possible may be in the form of vaccines (immunization).India needs trained pharmacologists and microbiologists to address the need for Antibiotic Stewardship and Infection Control in various institutions and hospitals throughout India. The focus should be to bring together different disciplines and faculty in working towards a common cause, assessing the ground level realities in antibiotic use and hospital infections as well as developing strategic interventions through a collaborative approach to improve infection. Also there is a dire need to deal with the issue of "over the counter" availability of drugs especially in developing countries. There should be the rule of "prescription-only medicines" as according various international guidelines. This is because non-prescription use of antibiotics has a major contribution in escalating the danger of antibiotic resistance [7]. This non prescription use of drugs varies from 19% to 90% in various countries outside U.S. and Europe, which is a matter of serious concern. Considering that India

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Correspondence:
Neelam Taneja, Department of Medical Microbiology, Postgraduate Institute of Medical Education and Research, India, Fax: 01722744401; Tel: 01722755160; E-mail: drneelampgi@yahoo.com

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has huge expertise in computer applications, creation of a centralized antibiotic manufacture and supply record will go a long way to curb this menace.

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