NEED FOR NATIONAL/REGIONAL GUIDELINES AND POLICIES IN INDIA TO COMBAT ANTIBIOTIC RESISTANCE

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Over the last 60 years, bacteria and, in particular those pathogenic for humans, have evolved towards antimicrobial drug resistance. This evolution has two key steps: emergence and dissemination of resistance.

Antimicrobial resistance is an issue of great significance for public health at the global level. Considered as wonder drugs, antibiotics are often prescribed inappropriately and inadequately and have thus become one of the highly abused agents.[1] Bacterial pathogens causing acute infections are increasingly exhibiting resistance to the commonly used antibiotics and have become a great threat to public health. The increasing antibiotic resistance problems, largely due to widespread and irrational use of antimicrobial agents in hospitals and the community, is a cause of great concern, especially in developing countries.

Unless antibiotic resistance problems are detected, as they emerge and actions are taken to contain them, the world could be faced with pan-resistant bacterial strains with no known or new antibiotic(s) left or available to combat them. There is, therefore, a definite and felt need for national policies or guidelines to address this issue critically.[2]

Need for Antibiotic Prescription Guidelines and Policies

Antibiotic resistance is indirectly increasing not only the healthcare costs, but also the severity and death rates from certain infections that could have been avoided with prudent antibiotic use. The spread of resistance has repeatedly been shown to be associated with antibiotic therapy, which once again stresses the need for rational use of these drugs.[1-2]

Reliable statistics on antibiotic resistance and policies that are mandatory to control spread of resistant pathogens are available from the developed nations. These data generated by large surveillance studies in countries such as the USA, Europe, Australia, etc. and the inferences drawn from these analyses are pertinent only to those regions.

However, such surveillance data are sparse from India due to the lack of large scale, meta-analytic studies. A serious issue that has to be addressed and resolved is the differences and shortcomings that exist among microbiology laboratories across the country performing antibiotic susceptibility tests without any strict adherence to the standard or recommended procedures. With the type of resistance patterns prevailing, there is an absolute and urgent need for nationwide-specific and standard-operating guidelines for the performance of antibiotic high-end susceptibility tests that should be strictly implemented in all laboratories across the country.

There is also a need to review the antibiotic prescription practices of the clinicians. Most often high-end antibiotics are prescribed for infections caused by viruses that are obviously unresponsive to antibiotic therapy. Unfortunately, majority of the prescriptions are irrational as they are biased by the information gathered from the representatives of the pharmaceutical companies, especially for the newer antibiotics. There needs to be checks and control on the prescriptions of any newly introduced broad-spectrum antibiotic or one that targets highly resistant bacteria, both in hospitals and in the private clinics.

Another important issue that has to be critically addressed in India is the indiscriminate dispensing of the antibiotics off the pharmacy counters without any licensed prescriptions.

It should also be realized that the prevalence of drug resistance in developing nations is rather unique, as the poor environmental sanitation, nutritional deficiencies in the host and certain endemic infections further enhance the risk of dissemination of resistant strains both in the community and in healthcare areas.

Campaigns to Prevent Antimicrobial Resistance

Monitoring of antimicrobial resistance is the single most important recommendation of many professional societies and national agencies that critically address the growing problem of antibiotic resistance.

The CDC, in collaboration with an interagency task force, has issued a document entitled “A Public Health Action Plan to Combat Antimicrobial Resistance,” which designates monitoring of trends and variations in rates of antibiotic resistance as a top priority. The campaign centers on four main strategies: prevent infection, diagnose and treat infection, use antimicrobials wisely, and prevent transmission.
Similarly, the Healthcare Infection Control Practices Advisory Committee (HICPAC) has recently published a guideline for management of multidrug-resistant organisms. One of the recommendations for prevention and control of multidrug-resistant organisms is for institutions to have a multidisciplinary process in place to review local antibiograms and antimicrobial drug use to enhance appropriate antimicrobial use.

**CLSI Guidelines for Hospital Antibiograms**[3-5]

Hospital antibiograms can be a useful means for guiding empiric therapy and tracking the emergence of bacterial resistance among nosocomial isolates. However, variability in the manner in which antibiograms are constructed and reported introduces confounder that impedes intra- and interhospital comparisons.

To address these variations, consensus guidelines have been developed by the Clinical and Laboratory Standards Institute (CLSI) in constructing hospital antibiograms using standardized methods (M39). These antibiograms are commonly used to help guide empiric antimicrobial treatment and are an important component of detecting and monitoring trends in antimicrobial resistance. It would be ideal to elucidate these guidelines through multicentric studies in India, so as to generate nationwide or more appropriately region-specific antibiograms. The several components of the M39 document have to be critically reviewed and analyzed pertaining to the type of healthcare setting.

**Role of Microbiology Laboratory in Developing Hospital Antibiograms**[6,7]

The clinical microbiology laboratory is a key component in the function of antimicrobial stewardship programs. Timely and accurate reporting of microbiology susceptibility test results allows selection of more appropriate and focused therapy and may help reduce broad-spectrum antimicrobial use.

The hospital antibiogram is a periodic summary of antimicrobial susceptibilities of local bacterial isolates submitted to the hospital’s clinical microbiology laboratory. Antibiograms are often used by clinicians to assess local susceptibility rates, as an aid in selecting empiric antibiotic therapy, and in monitoring resistance trends over time within an institution. These data are often considered when deciding if a particular antimicrobial will be included in the anti-infective section of a drug formulary. Antibiograms are also used to compare susceptibility rates across institutions and track resistance trends.

Ideally, resistance data should be analyzed based on the type of patient, i.e., outpatient or hospitalized. Exclusion of clinical isolates from outpatient clinics will give a better sense of the true state of resistance within the hospital. In addition, the preparation of antibiograms specific to certain patient care areas, especially intensive care units, may allow identification of local problems and focused antimicrobial stewardship and infection control efforts.

Antibiograms may be distributed as printed cards, as part of institutional handbooks on antimicrobial therapy, or on the institutional intranet.

**Impact of In Vitro Antibiotic Susceptibility Tests on Antibiotic Prescriptions**[12]

Although it would be preferable for treatment to be culture-driven, empirical therapy is often necessary and should be designed to cover the pathogens most frequently encountered in each particular unit. Because pathogens vary from unit to unit, from hospital to hospital and, temporally within units themselves, routine surveillance of antibiotic susceptibility should be performed frequently and repetitively and cover both gram positive and gram negative pathogens. However, such a broad-spectrum empiric therapy should not be misused as it may lead to the development of resistance, which may not be reversed by changing the antibiotics once the sensitivity is known.

The major factor that converts antimicrobial therapy from “empiric” to “rational” is in vitro antibiotic susceptibility testing and reporting. However, if these tests are either not conducted or conducted poorly, they are not useful clinically and may create a false sense that therapy is rationally guided. Furthermore, it is very important and mandatory that the interpretative criteria (breakpoints) and the results are reported as susceptible, intermediate or resistant, as per recommendations.

**Responsibilities and Role of Clinicians in Combating Antibiotic Resistance**[9]

It is imperative that all the clinicians understand the principles and the standard methods of antibiotic susceptibility tests. They should also insist on the laboratory to follow these recommended procedures to generate antibiotic susceptibility test reports that are quality assured. Antimicrobial susceptibility data generated based on consistent, reproducible and comparable data between different laboratories will produce better outcomes and help in developing region-wise antibiograms.

**Summary**

Sharing of expertise, cooperation, and collaboration between the clinicians using antibiotic therapy and the clinical microbiologists at the regional levels may be the simplest and the most useful public health measure to optimize the use of antibiotics and manage infectious diseases.
Although several documentations of antibiotic resistance and the spread of resistant strains within hospitals and the community have been published and continue to be reported from India, there is a definite need for nationwide statistics to be generated and made available to the clinicians and infectious disease specialists. Based on these figures and resistance patterns of the prevailing common pathogens, country- and region-specific guidelines and policies on antibiotic prescription and usage may be formulated.

A master antibiogram for a region would allow a tertiary care institution to consider resistance patterns in hospitals referring patients and to select appropriate antimicrobial therapy or change drugs in non-responding patients. Antimicrobial resistance data generated by this approach will have better day-to-day application.

The concept of “empiric antimicrobial therapy” would then be changed to that of “presumptive antimicrobial therapy” based on common pathogens, known susceptibility patterns and host factors in any given region. The data will also be useful in monitoring resistance trends in a region over time and assessing the effects of interventions to reduce antimicrobial resistance.

Use of restricted antibiotic guidelines will be a step towards the upgradation in the antibiotic policies of many multispeciality and tertiary healthcare centers, which will help reduce antibiotic resistance in the long run. It is necessary to define an antimicrobial stewardship program as an ongoing effort by a healthcare institution to optimize antimicrobial use among hospitalized patients to improve patient outcomes, ensure cost-effective therapy, and reduce adverse sequela of antimicrobial use.

REFERENCES

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