



Implementation of Antimicrobial Stewardship Program in Hospitals: An Urgent Need

Pramod Kumar Manjhi^{1*}, Sadaram Samba Shiva²

¹Professor (Assistant) and Head, Department of Pharmacology, Patna-801507 (Bihar) India; ²Junior Pharmacovigilance, Associate All India Institute of Medical Sciences, Patna – 801507 (Bihar) India.
^{*}E-mail: drpramodkumar@aiimspatna.org

INTRODUCTION

Stewardship means “the careful and responsible management of something entrusted to one’s care”. Antimicrobial stewardship program (ASP) has been defined as “the optimal selection of drug, dosage, and duration of antimicrobial treatment that results in the best clinical outcome for treatment or prevention of infections, with minimal toxicity to the patient and minimal impact on subsequent resistance.”⁽¹⁾ ASP guides the safe and cost-effective use of antimicrobial agents in an evidence-based approach to the correct selection of antimicrobial agents, dosages, routes of administration and duration of therapy.⁽²⁾ Antimicrobial Stewardship (AMS) is an organized team effort between Physicians, Pharmacologists, Microbiologists, Infection control teams, Clinical pharmacists, and Nurses to strategize the rational use of antibiotics and prevent the emergence of resistance to global health problems.⁽³⁾ Optimization of antibiotics is critical in effectively treating infections, protecting patients from unnecessary antibiotic use, and combatting antibiotic resistance.⁽⁴⁾ Extensive use of antibiotics encourages genetic mutations and multidrug resistance in microbes, resulting in decreased efficacy and cost-effective treatment.⁽⁵⁾

GOALS OF ASP

There are three primary goals of an ASP, viz.: 1) to work with healthcare professionals (HCPs) so that their patients receive the most appropriate Anti-Microbial Agents (AMAs) at the correct dose and for the correct duration. 2) to prevent overuse, misuse, and abuse of AMAs, and 3) the most important goal of ASPs is to minimize the development of antimicrobial resistance.

Health care professional’s role in ASP

Clinicians play a key role in ASP as they are the only prescribers, and contribute to preventing antimicrobial resistance to a major extent. Antibiotic prescribing based upon the organism detected through a culture sensitivity report is the safe and effective approach in the management of a par-

ticular condition or disease. In the majority of the critical care settings, due to minimal time antibiotics are prescribed before the culture sensitivity test has been done, so to avoid infection severity and prognosis. In this case, the prescribed antibiotic will prevent the growth of the organism making the sent culture report negative. ASP helps clinicians in improving clinical outcomes and antibiotic prescribing in minimizing harm and resistance. Continuous follow-up and monitoring with culture reports are done before prescribing the new antibiotic to the same patient. In the case of multidrug-resistant, the culture-sensitive antibiotic with the best outcomes and minimal side effects are specifically preferred according to the patient’s condition. Clinical pharmacists play a major role in tackling antimicrobial resistance. Once the Clinician prescribes the antibiotic, the clinical pharmacist follows up and monitors the patient from the start date till the stop and checks for the antibiotic dosage, frequency and duration of treatment/days. Clinical pharmacist collects the justification form from the prescriber once it is filled. Justification form includes therapy (prophylaxis/empirical /definitivetherapy), site/focus of infection, suspected or confirmed cause of infection and reasons for prescribing the antibiotic. Monitoring and reporting the laboratory values on daily basis with respect to the prescribed antibiotic should be done. The same should be done for every antibiotic prescribed or added further to the same patient. All this information should be thoroughly verified by the clinical pharmacologist. Further the justification form along with the patient details (includes name, age, sex, diagnosis, complaints, past history) will be verified by the Microbiology team for any interventions or alerts.

Microbiologist play a pivotal role by communicating with the clinicians in selection of culture sensitive antibiotic. Microbiologist receives the AMS form with justification submitted by clinical pharmacist after its verification from clinical pharmacologist. Microbiologist verifies patient demographics, prescriber name, complaints, diagnosis, history of any recent use of antibiotic, prescribed antibiotic with its dose frequency and start date, laboratory values, culture sensitivity report for the suspected organism, whether sent

before or after or not sent, justification form filled by the prescriber and clinical pharmacologist intervention. After the verification, microbiologist mentions whether the prescribed antibiotic is rational, irrational or inappropriate and suggest the interventions to the prescriber with daily follow-up by the clinical pharmacist.

Nurses contribute in ASP by coordinating with the prescribers and microbiology department for upto date lab reports. Nurses collect the samples (blood, urine, swab, secretions, etc.,) and send them to the microbiology team for culture sensitivity. They regularly follow-up with the lab and inform the culture sensitivity report to the prescriber once the reports are processed.

BENEFITS

Optimized use of antimicrobials in an evidence-based prescribing pattern will improve patient outcomes with reduced adverse effects, and antimicrobial resistance. Therapeutic drug monitoring and a cost-effective prescribing policy will reduce the economic burden on the patient. Antibiotic selection by culture sensitivity avoids irrelevant prescribing.

CHALLENGES

Conflict among clinicians in following definite antibiotic prescribing and lack of universal antibiotic policy with coordination. Pharmacologists' presence is a major asset in the enforcement of regulations. Clinical pharmacist attention in ASP and communication is devoid in the majority of the clinical settings. Prescribing without culture sensitivity is the major challenge towards antimicrobial resistance due to the lack of culture and sensitivity reports and minimal time.

Coordination gaps within the departments of the hospital in following ASP.⁽⁶⁾

CONCLUSION

The antimicrobial stewardship program is the mainstay in minimizing antimicrobial resistance and reducing the unwanted harm to patients improving clinical outcomes. ASP in hospitals will reduce multidrug resistance and mortality rates. Implementation of ASP is necessary for every hospital and an urgent need in global healthcare.

REFERENCES

1. Gerding DN. The search for good antimicrobial stewardship. *Jt Comm J Qual Improv.* 2001 Aug;27(8):403-4. doi: 10.1016/s1070-3241(01)27034-5. PMID: 11480201.
2. Alsaeed A, Blondeau JM. Antibiotic resistance in hospitals. *Future Microbiol.* 2015;10(3):303-7. doi: 10.2217/fmb.15.10. PMID: 25812451.
3. Dyar OJ, Huttner B, Schouten J, Pulcini C; ESGAP (ESCMID Study Group for Antimicrobial stewardship). What is antimicrobial stewardship? *Clin Microbiol Infect.* 2017 Nov;23(11):793-798. doi: 10.1016/j.cmi.2017.08.026. Epub 2017 Sep 4. PMID: 28882725.
4. Baroudi R, Flaugh M, Grace E, Zakria D. The Importance of an Antimicrobial Stewardship Program. *Fed Pract.* 2015 Sep;32(9):20-24. PMID: 30766084; PMCID: PMC6364820.
5. Tanwar, Jyoti; Das, Shrayanee; Fatima, Zeeshan; Hameed, Saif (2014). "Multidrug resistance: an emerging crisis". *Interdisciplinary Perspectives on Infectious Diseases.* 2014: 541340. doi: 10.1155/2014/541340. PMC 4124702. PMID 25140175.
6. Challenges in Implementing Antimicrobial Stewardship Programmes at Secondary Level Hospitals in India: An Exploratory Study Philip Mathew, *Front Public Health.* 2020; 8: 493904. 2020 Sep 18. doi: 10.3389/fpubh.2020.493904