EDITORIAL

Approach to the Control of Antimicrobial Resistance: Are We Missing the Plot?

JV Peter

Keywords: Antibiotic stewardship, Antimicrobial resistance, Cost.
Indian Journal of Critical Care Medicine (2020): 10.5005/jp-journals-10071-23626

The topic of antimicrobial resistance (AMR) has been the subject of much discussion for several decades. The Centers for Disease Control and Prevention (CDC) has put forth three broad steps to deal with antibiotic resistance.[1] This includes (a) detect, respond, and contain resistant pathogens; (b) prevent spread of resistant infections; and (c) encourage innovation for new strategies, drugs, and diagnostics.[1] Although globally AMR is on the increase,[2] a context-specific approach may be required given the geographic variations in the extent and type of AMR.[3] Thus, the approach to AMR in a particular region would require (a) the assessment of the magnitude of AMR in that region, (b) an understanding of the factors that contribute to AMR, (c) outlining strategies to combat AMR, (d) implementation of strategies, and (e) the evaluation of the success of such strategies. Over two decades ago, an editorial suggested that it was time for action to control AMR.[4] The authors put forth the argument that "although we still need a better understanding of the factors involved in the emergence and spread of antibiotic resistance, action cannot wait until all the answers are available".[4]

The Institution of Antimicrobial Stewardship Programmes (AMSP) across the globe has been an effort to address the issue of AMR. In India, the Indian Council of Medical Research (ICMR) in 2013 launched the Antimicrobial Resistance Surveillance and Research Network (AMRSN) with the purpose of rationalizing AMSP in India.[5] In a subsequent survey of 20 healthcare institutions in India, which was published in 2015, it was observed that AMR data were being analyzed in 80% of the institutions sampled.[6] The publication of a policy document on antimicrobial stewardship practices in India[7] and a review of the implementation of antimicrobial stewardship activities in India in 2020[8] suggest that the country has moved beyond the initial stages of just understanding the magnitude of AMR or the factors that contribute to AMR to a broader stewardship role. In this context, it is thus unfortunate that there is still some preoccupation on descriptive studies on antimicrobial utilization and cost of therapy without an attempt to study changes in antimicrobial utilization over time or look at interventions that may bring about a change in antimicrobial utilization.

A study of the daily drug dose (DDD) or the days of therapy (DOT) is by itself of limited value in the current scenario given that there are several studies[9,10] and a systematic review[11] that have addressed this topic both nationally[9] and globally.[10] What is more relevant and useful is the study of drug utilization over time, comparison of utilization before and after an intervention, or the role of regulation on antimicrobial use. Such studies enable centers to audit not only trends over time but also to track the change in AMR over a period of time based on interventions through a robust AMSP.[12,13] This would provide meaningful data that others centers could use to strategize AMSP in their own centers with a view to combat AMR.

The study published in the current issue of the Indian Journal of Critical Care Medicine[14] is a descriptive study that outlines the frequency of use of antimicrobial agents in an intensive care unit (ICU) in Eastern India and describes the DDD and DOT of commonly used antimicrobial agents. The authors demonstrated an association between severity of illness and the use of restricted antibiotics and provided the cost of therapy per patient.[14] For the reasons outlined above, this study does not contribute in a significant manner to the knowledge on AMR or antimicrobial stewardship in the country. The study also has limitations in terms of missing data where it appears that not all patients were included and the proportion of patients missed was not stated in the study. The high proportion of patients with a documented infection (over 82%) with no description of what the "neurologicals" or "others" were is concerning and introduces an element of selection bias. The association between the use of restricted antibiotics and severity of illness, measured by APACHE-II and SOFA, is not surprising. It would have been useful to know the antibiotics that were determined by the investigators to be restricted, although a reference is made to the WHO list, referenced as published in 1993. A median (interquartile range) ICU length of stay of 3 (2–6) days in a cohort with a median APACHE-II score of 18 (12–22), signifying moderate to severe severity of illness does not appear synchronous.

The way forward for India would be to tackle AMR on a war footing, keeping in mind that in India many centers work in a resource-constrained environment.[15] The effort should focus not only on resistant gram-negative infections but also gram-positive infections and tuberculosis. This would require an urgent multipronged approach by all stakeholders involved in the care of patients across the country, failing which we will struggle to control AMR.

Department of Critical Care, Medical Intensive Care Unit, Christian Medical College Hospital, Vellore, Tamil Nadu, India

Corresponding Author: JV Peter, Department of Critical Care, Medical Intensive Care Unit, Christian Medical College Hospital, Vellore, Tamil Nadu, India, Phone: + 91 416 228 2693, e-mail: peterjohnvictor@yahoo.com.au

How to cite this article: Peter JV. Approach to the Control of Antimicrobial Resistance: Are We Missing the Plot? Indian J Crit Care Med 2020;24(10):899–900.

Source of support: Nil

Conflict of interest: None

References

1. What CDC is doing: antibiotic resistance solutions initiative. https://www.cdc.gov/drugresistance/solutions-initiative/index.html accessed September 2020.
2. Roca I, Akova M, Baquero F, Carlet J, Cavaleri M, Coenen S, et al. The global threat of antimicrobial resistance: science for intervention. New Microbe and New Infect 2015;6:22–29. DOI: 10.1016/j.nmni.2015.02.007.
3. Birgand G, Castro-Sánchez E, Hansen S, Gastmeier P, Lucet JC, Ferlie E, et al. Comparison of governance approaches for the control of antimicrobial resistance: analysis of three European countries. Antimicrob Resist Infect Control 2018;7(1):28. DOI: 10.1186/s13756-018-0321-5.
4. Huovinen P, Cars O. Control of antimicrobial resistance: time for action. BMJ 1998;317(7159):613–614. DOI: 10.1136/bmj.317.7159.613.
5. Ghafur A, Mathai D, Muruganathan A, Jayalal J, Kant R, Chaudhary D, et al. The Chennai declaration: a road map to tackle the challenge of antimicrobial resistance. Ind J Cancer 2013;50(1):71–73. DOI: 10.4103/0019-509X.104065.
6. Walia K, Ohri VC, Mathai D. Antimicrobial stewardship programme of ICMR. antimicrobial stewardship programme (AMSP) practices in India. Indian J Med Res 2015;142(2):130–138. DOI: 10.4103/0971-5916.164228.
7. Walia K, Ohri VC, Madhumathi J, Ramasubramanian V. Policy document on antimicrobial stewardship practices in India. Indian J Med Res 2019;149(2):180–184. DOI: 10.4103/ijmr.IJMR_147_18.
8. Sahni A, Bahl A, Martolia R, Jain SK, Singh SK. Implementation of antimicrobial stewardship activities in India. Indian J Med Spec 2020;11(1):5–9. DOI: 10.4103/INJMS.INJMS_118_19.
9. Anand N, Nayak IMN, Advaitha MV, Thaikattil NJ, Kantanavar KA, Anand S. Antimicrobial agents' utilization and cost pattern in an intensive care unit of a teaching hospital in South India. Indian J Crit Care Med 2016;20(5):274–279. DOI: 10.4103/0972-5229.182200.
10. Caldeira L, Burattini MN. Analysis of antimicrobials' consumption profile in a university hospital of Western Parana. Brazil Brazilian J Pharmaceutical Sci 2009;45(2):295–302. DOI: 10.1590/S1984-82502009000200015.
11. Bitterman R, Hussein K, Leibovici L, Carmeli Y, Paul M. Systematic review of antibiotic consumption in acute care hospitals. Clin Microbiol Infect 2016;22(6):561.e7–561.e19. DOI: 10.1016/j.cmi.2016.01.026.
12. Balkhy HH, El-Saed A, El-Metwally A, Arabi YM, Aljohany SM, Zaibag MA. Antimicrobial consumption in five adult intensive care units: a 33-month surveillance study. Antimicrob Resist Infect Control 2018;7(1):156. DOI: 10.1186/s13756-018-0451-9.
13. Rupali P, Palanikumar P, Shanthamurthy D, Peter JV, Kandasamy S, Zacchaeus NGP, et al. Impact of an antimicrobial stewardship intervention in India. Evaluation of post-prescription review and feedback as a method of promoting optimal antimicrobial use in the intensive care units of a tertiary care hospital. Infect Control Hosp Epidemiol 2019;40(05):512–519. DOI: 10.1017/ice.2019.29.
14. Patra SK, Mishra SB, Rath A, Samal S, Iqbal SN. Study of antimicrobial utilization and cost of therapy in medicine intensive care unit of a tertiary care hospital in Eastern India. Indian J Crit Care Med 2020;24(10):938–942.
15. Kakkar AK, Shafiq N, Singh G, Ray P, Gautam V, Agarwal R, et al. Antimicrobial stewardship programs in resource constrained environments: understanding and addressing the need of the systems. Front Public Health 2020;8:140. DOI: 10.3389/fpubh.2020.00140.