EDITORIAL

Multidrug Resistance: The Growing Menace in PICU

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Antibiotic resistance in bacteria is obtained through various mechanisms, either genetic or acquired. Antibiotic resistance is a problem that plagues every ICU irrespective of the types of cases in it. These "superbugs" with antimicrobial resistance have emerged as one of the leading public health threats of the 21st century. The Review on Antimicrobial Resistance, commissioned by the UK Government, argued that AMR could cause an overall mortality of 10 million people per year by 2050. The spread of MDR organisms is an urgent issue requiring a global, coordinated action plan to address.[1–5]

Most antibiotic resistance is hospital-acquired, but few types of resistance are even passed on to community-acquired organisms—this is quite alarming. The ICU is the epicenter of this crisis of antimicrobial resistance in hospitalized patients, and the number of these bacteria is increasing with each passing day.

Newborn babies, infants, and children are substantially affected by antimicrobial resistance. Globally, infectious diseases remain a major cause of morbidity and mortality in children, and an estimated 2,14,000 newborn babies died from drug-resistant bacterial infections in 2015. The evidences supporting pediatric MDR infections compared to adults are very few.[6,7]

In the current issue of the journal, Patel et al. describe the incidence of MDR organisms in pediatric patients admitted to neurointensive care.[8] They report 17.3/1000 patient days as the overall incidence of MDR infections in pediatric patients admitted to neurointensive care. MDR *Klebsiella pneumonia* was the commonest pathogen (38.7%) isolated in this study followed by MDR *Pseudomonas aeruginosa* (22.5%) and MDR *Escherichia coli* (12.9%). The factors they associate include the length of stay in the neurosurgical ICU, ventilation >5 days duration with cardiac and respiratory comorbidities, and invasive emergency surgery with poor nutrition status. They also cite that the relatively underdeveloped immune system may be a factor for the same.

This incidence is concerning as children acquiring MDR infection will have prolonged stays and this itself will set a vicious cycle. The use of invasive medical devices and surgical interventions increases the risk of HAI. Advocating an antibiotic regulation policy will help in decreasing the incidence of MDR bugs. Implementing an Antibiotic Stewardship Program (ASP) to a large extent helps in regulating the use of high-end antibiotics in the ICU. The implementation of this program is not very easy especially when multiple caregivers are looking after a sick child. The process of de-escalation plays a key role in helping the use of these antibiotics for fewer days and thus preventing the development of MDR organisms. Narrowing the spectrum after the culture report especially is one of the ways that helps in de-escalation. Biomarkers may largely aid in better implementation of ASP.[9]

In low- and middle-income countries, implementation of ASP is an uphill task. The common practice for the management of infections in low-resource settings involves symptom-based and endemicity-guided diagnosis, and the subsequent prescription of broad-spectrum antimicrobials for unconfirmed infections. Lack of access to essential diagnostics, shortage of skilled laboratory personnel, and high cost and long turn-around times exacerbate diagnostic insufficiency in these countries. Thus, ineffective diagnostic stewardship leads to antimicrobial misuse.[10–13]

Hand hygiene, screening and identifying patients who are at risk, implementation of ICU bundles, and surface cleaning are the main prongs of prevention of ICU infections. Implementation of these is a major uphill task and doctors are mostly the main culprits who fail to implement these. A united front against this current pandemic is necessary and we need to curtail our antibiotic usage as early as possible.

To conclude, the present study sheds light on the incidence of drug resistance in a very select type of pediatric neurosurgical ICU. The incidence is alarming and all measures should be taken to contain and eliminate these infections to prevent morbidity and mortality in children.

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