

ORIGINAL RESEARCH

Assessment of antimicrobials use in Pediatric intensive care unit

Dr. Nandit P Banawalikar

Assistant Professor, Department of Pharmacology, Venkateshwara Institute of Medical Sciences, Gajraula, Uttar Pradesh, India

Corresponding Author

Dr. Nandit P Banawalikar

Assistant Professor, Department of Pharmacology, Venkateshwara Institute of Medical Sciences, Gajraula, Uttar Pradesh, India

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ABSTRACT

Background: Infections account for a significant number of hospital admissions, especially in children, and are a major source of morbidity and mortality in India. The present study was conducted to assess antimicrobials use in Pediatric intensive care unit. **Materials & Methods:** 120 children admitted to Pediatric intensive care unit of both genders were selected. Baseline demographic and clinical features, duration of hospital stay, antimicrobials received was recorded. ADR data were captured on the ADR monitoring form of Pharmacovigilance Programme of India. **Results:** Out of 120 patients, males were 72 and females were 48. Total antimicrobial prescribed were 280. The mean antimicrobial per patient was 2.3. The mean duration of antimicrobial treatment was 6.5 days. The mean duration of hospital stay was 8.2 days. ADR was reported in 4 cases. Antimicrobials used were Cephalosporin in 45%, Beta Lactams/Vancomycin in 28%, Amikacin in 12%, Metronidazole in 6%, Fluroquinolone in 4%, Macrolides in 3.5%, and Aciclovir in 1.5% cases. The difference was significant ($P < 0.05$). **Conclusion:** The most common antimicrobials used were Cephalosporin, Beta Lactams/Vancomycin, Amikacin and Metronidazole.

Keywords: Infections, children, antimicrobials

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INTRODUCTION

Infections account for a significant number of hospital admissions, especially in children, and are a major source of morbidity and mortality in India.¹ Thus, an essential class of medications in both the community and hospitals are antibiotics and other antimicrobials. A large body of research has shown that the indiscriminate use of antimicrobials is associated with both frank resistance and changed susceptibility patterns in pathogenic organisms.² The rational use of antimicrobials is beset with enormous challenges, ranging from widespread ignorance to inadequate personal hygiene and environmental sanitation to a lack of surveillance mechanisms to track antimicrobial use and resistance.³ The majority of empirical use of antibiotics is caused by a lack of support in microbiology laboratories, the absence or ineffective use of antibiotic use policies in most healthcare settings, and the use of antibiotics for nonhuman purposes.⁴ As new antimicrobials are developed and the spectrum of infections shifts over time, prescription patterns and practices for antibiotics also change. Antimicrobials may make up 50% of the entire cost of medications marketed in India, while

survey results on the prevalence of antimicrobial use have been inconsistent.⁵

The prevalence of antibiotic resistance rises along with the drug's broad use. In both inpatient and outpatient settings, there is evidence linking the usage of antimicrobial drugs to resistance.⁶ The incidence of adverse drug reactions (ADRs) is an additional concern associated with the use of antibiotics. ADRs may have comparatively more severe effects in children than in adults, which could result in considerable morbidity in young patients.⁷ The present study was conducted to assess antimicrobials use in Pediatric intensive care unit.

MATERIALS & METHODS

The present study consisted of 120 children admitted to Pediatric intensive care unit of both genders. Parents gave their written consent to participate in the study. Data such as name, age, gender etc. was recorded. Baseline demographic and clinical features, duration of hospital stay, antimicrobials received was recorded. Parents of the children were interviewed regarding their residential, literacy, and socio-economic status. ADR data were captured on the ADR monitoring

form of Pharmacovigilance Programme of India statistical analysis. P value < 0.05 was considered (PvPI). Data thus obtained were subjected to significant.

RESULTS

Table I Distribution of patients

Total- 120		
Gender	Male	Female
Number	72	48

Table I shows that out of 120 patients, males were 72 and females were 48.

Table II Assessment of parameters

Parameters	Mean	SD
Total antimicrobial prescribed	280	-
Mean antimicrobial per patient	2.3	1.5
Duration of antimicrobial treatment (days)	6.5	2.8
Duration of hospital stay (days)	8.2	3.6
ADR	4	-

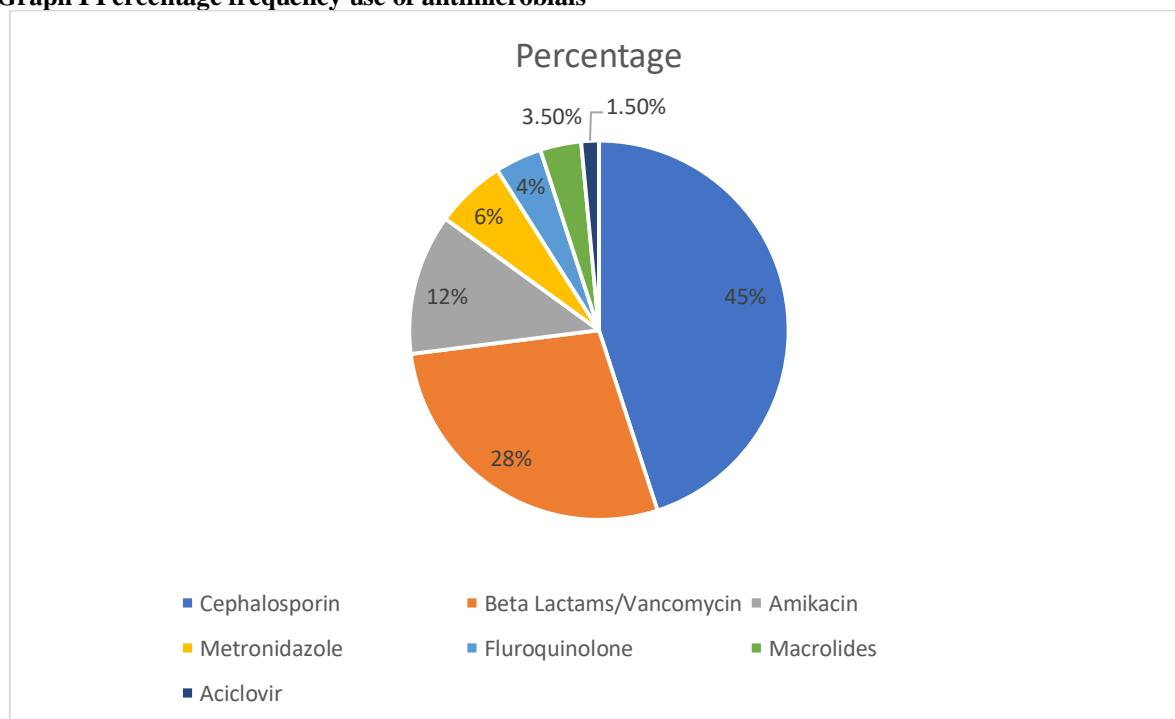
Table II show that total antimicrobial prescribed were 280. The mean antimicrobial per patient was 2.3. The mean duration of antimicrobial treatment was 6.5 days. ADR was reported in 4 cases. The mean duration of hospital stay was 8.2 days.

Table III Percentage frequency use of antimicrobials

Antimicrobials	Percentage	P value
Cephalosporin	45%	0.01
Beta Lactams/Vancomycin	28%	
Amikacin	12%	
Metronidazole	6%	
Fluroquinolone	4%	
Macrolides	3.5%	
Aciclovir	1.5%	

Table III, graph I shows that antimicrobials used were Cephalosporin in 45%, Beta Lactams/Vancomycin in 28%, Amikacin in 12%, Metronidazole in 6%, Fluroquinolone in 4%, Macrolides in 3.5%, and Aciclovir in 1.5% cases. The difference was significant (P< 0.05).

Graph I Percentage frequency use of antimicrobials



DISCUSSION

Antimicrobial use in children requires careful consideration due to several factors, including age-related differences in pharmacokinetics, the potential for adverse effects, and the development of antimicrobial resistance.⁸Antimicrobials should only be prescribed for bacterial infections or certain fungal infections where they are likely to be effective. They are not effective against viral infections, such as the common cold or most cases of acute bronchitis.⁹The selection of antimicrobial therapy should be based on factors such as the type of infection, the likely pathogens involved, local resistance patterns, and the child's age, weight, and medical history. Pediatric-specific dosing guidelines should be followed to ensure appropriate dosing and minimize the risk of adverse effects.¹⁰Dosages of antimicrobial agents in children are typically based on the child's weight or body surface area to achieve therapeutic levels while minimizing the risk of toxicity. Liquid formulations are often used for younger children to facilitate accurate dosing.¹¹The present study was conducted to assess antimicrobials use in Pediatric intensive care unit.

We found that out of 120 patients, males were 72 and females were 48. Baidya et al¹² over the 1- year study period, 332 admissions were screened. The prevalence of antimicrobial use was 79.82%. The majority of the 265 children who received antimicrobials were males (61.10%) and hailed from rural and low socioeconomic background. Median age was 36 months. Six children died, 43 were transferred out, and the rest discharged. In most instances, either 2 (40%) or a single antibiotic (39.6%) was used. Ceftriaxone, co-amoxiclav, amikacin, vancomycin, and ampicillin were predominantly used. Antivirals, antimalarials, and antiprotozoals were used occasionally. Average number of antimicrobials per patient was 2.0 ± 1.27 ; the majority (84.1%) were by parenteral route and initial choice was usually empirical. Prescriptions were usually in generic name. The antimicrobial treatment ranged between 1 and 34 days, with a median of 7 days. Six ADRs were noted of which half were skin rash and the rest loose stools. We found that total antimicrobial prescribed were 280. The mean antimicrobial per patient was 2.3. The mean duration of antimicrobial treatment was 6.5 days. The mean duration of hospital stay was 8.2 days. ADR was reported in 4 cases.

We found that antimicrobials used were Cephalosporin in 45%, Beta Lactams/Vancomycin in 28%, Amikacin in 12%, Metronidazole in 6%, Fluroquinolone in 4%, Macrolides in 3.5%, and Aciclovir in 1.5% cases. Bamelet al¹³ observed the antibiotic prescription in the tertiary care hospital. There were 50 patients were enrolled. The maximum antibiotics were prescribed from cephalosporin class (42; 40.38%) which included ceftriaxone, cefixime, cefotaxim, cefpodoxime. The majority of cephalosporins were

prescribed in miscellaneous cases followed by respiratory tract infections, gastrointestinal tract, Central nervous tract infections and nil in CVS cases, secondly higher number of antibiotics prescribed was metronidazole and from Aminopenicillin class which includes amoxiclav and ampicillin and another beta lactamase which includes ureidopenicilin and carbepenem. The majority of aminopenicillin were prescribed in miscellaneous group infections followed by respiratory tract infections.

The limitation of the study is the small sample size.

CONCLUSION

Authors found that most common antimicrobials used were Cephalosporin, Beta Lactams/Vancomycin, Amikacin and Metronidazole.

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