

## Original article

# Study of pattern of antimicrobial drugs used in in-patients admitted to paediatric intensive care unit with respiratory tract infections

<sup>1</sup>Dr Arpitha.D, <sup>2</sup>Dr Muruges J.V , <sup>3</sup>Dr Durugappa.H

<sup>1</sup>Postgraduate in Pharmacology, Vijay Nagar Institute of Medical sciences, Ballari-583104,karnataka.

<sup>2</sup>Associate Professor, Department of Pharmacology,VIMS, Ballari

<sup>3</sup>Professor and Head of Department of Paediatrics,. VIMS, Ballari

Corresponding author: Dr ARPITHA.D, Postgraduate in Pharmacology, Vijay Nagar Institute of Medical sciences, Ballari-583104,karnataka.

Email: girishdas.15910@gmail.com



## Abstract:

**Introduction:** The medical science which deals with the physical, mental and social health of children from birth to young adulthood is called pediatrics.<sup>1</sup> Infancy and childhood is stages of rapid growth and development. In total world pediatric population is 20-25%.

**Methodology:** Cross sectional study was conducted in department of Pediatrics, VIMS Ballari, study includes analysis of antimicrobials used in PICU patients diagnosed with respiratory tract infections.The study was conducted after obtaining approval and clearance from the institutional ethics committee of VIMS Ballari, Karnataka.

Written informed consent was obtained from the patients (informants) before their recruitment in the study.

Patients suffering from respiratory tract infections treated with antimicrobials were included in this study. Diagnosis was made by the consultant paediatrician from department of paediatrics, VIMS Ballari, based on the clinical presentation of RTI and especially patients admitted in PICU.

**Results:** First line antibiotics used in PICU where it shows 55.5% of patients were prescribed with ceftriaxone and 32.5% patients are treated with Amoxicillin + Clavulanic acid combination. Other drugs used are Piperacillin, Tazobactam, Cefotaxime, Vancomycin. It shows second line antibiotic used in PICU are Amikacin 75% and Vancomycin 6.5%. Other drugs used were Piperacillin+Tazobactam, Augmentin, Ciprofloxacin. Third line of antibiotic used among the PICU patients were 71.5% no usage of antibiotics and 12.5% Piperacillin and Tazobactam combination , 8% of Vancomycin were used in PICU. Other antibiotic are Amikacin, Ceftriaxone, Meropenem. Metronidazole, Azithromycin.

**Conclusion:** First line antibiotics used were ceftriaxone, Augmentin, 2<sup>nd</sup> line antibiotics were amikacin, vancomycin, 3<sup>rd</sup> line antibiotics were piperacillin tazobactam, vancomycin. All patients received parenteral therapy intravenous and intramuscular according to the need Antibiotic bundle care was met according to the quality care indicators of ICU from ISCCM.

### **Introduction:**

The medical science which deals with the physical, mental and social health of children from birth to young adulthood is called pediatrics.<sup>1</sup> Infancy and childhood is stages of rapid growth and development. In total world pediatric population is 20-25%.<sup>2,3</sup> Children of age group 1-10 years are prone to Respiratory tract infection(RTI) within 4 weeks if the mucosal lining of the nasal passage and paranasal sinuses are inflamed, which leads to infection of the respiratory tract. Etiological factors which lead to RTI are allergens, environmental irritants, infection by viruses, bacteria or fungi.<sup>4,5</sup> International classification of diseases (ICD) defines acute respiratory infections, as an infection that include both upper and lower respiratory system infection include epiglottitis and severe infections like pneumonia.<sup>6</sup> Common RTI in the pediatric age group are influenza, pneumonia and common pathogens are M. catarrhalis, H. influenza, P. aeruginosa, K. pneumoniae, S. pneumoniae. Also staphylococcus aureus.<sup>7,8</sup>

### **Methodology**

Cross sectional study was conducted in department of Pediatrics, VIMS Ballari, study includes analysis of antimicrobials used in PICU patients diagnosed with respiratory tract infections. The study was conducted after obtaining approval and clearance from the institutional ethics committee of VIMS Ballari, Karnataka.

Written informed consent was obtained from the patients (informants) before their recruitment in the study.

Patients suffering from respiratory tract infections treated with antimicrobials were included in this study. Diagnosis was made by the consultant paediatrician from department of paediatrics, VIMS Ballari, based on the clinical presentation of RTI and especially patients admitted in PICU.

### **INCLUSION CRITERIA**

- ✓ Patients aged between 1-12 years
- ✓ All admitted with respiratory tract infections in PICU

### **EXCLUSION CRITERIA**

- ✓ Informants who refused to give consent
- ✓ Patients who discharged or expired within 24 hours of admission
- ✓ Patients transferred out from PICU within 24 hours of admission

### **Results:**

Distribution of age group of pediatric patients admitted in PICU during the study period. It shows that majority of patients are under 5 age group that is 2-5 year (40%) and 5- 10 year of age group (16%) more than 10 year of age group of children showed 10.5% of children hospitalised in PICU. Mean standard deviation showed  $4.09 \pm 3.58$ .

Table no. 1:

<b>Number of antibiotics used among the patients</b>		
<b>No. of Abs used</b>	<b>Frequency</b>	<b>Percent</b>
One AB (MONOTHERAPY)	27	13.5
Two AB (DUALTHERAPY)	118	59
Three AB (TRIPLETHERAPY)	54	27
Four AB (FOUR DRUG THERAPY)	1	0.5
Total	200	100

Number of antibiotics used among the patients where it shows 59% of patients were prescribed with DUALTHERAPY and 27% of patients were prescribed with TRIPLETHERAPY, 13.5% of children were prescribed with MONOTHERAPY. Here we can see significant pattern of DUALTHERAPY.

Table no. 2:

<b>First line of antibiotic used among the patients</b>		
<b>First line of antibiotic used</b>	<b>Frequency</b>	<b>Percent</b>
Ceftriaxone	111	55.5
Augmentin	65	32.5
Pipzo	14	7
Cefotaxime iv	6	3
Vancomycin	2	1
Metronidazole	1	0.5
Amikacin	1	0.5
Total	200	100

First line antibiotics used in PICU where it shows 55.5% of patients were prescribed with ceftriaxone and 32.5% patients are treated with Amoxicillin + Clavulanic acid combination. Other drugs used are Piperacillin, Tazobactam, Cefotaxime, Vancomycin.

Table no. 3:

<b>Second line of antibiotic used among the patients</b>		
<b>Second line of antibiotic used</b>	<b>Frequency</b>	<b>Percent</b>
Amikacin iv	150	75
Vancomycin iv	13	6.5
Pipzo	4	2
Augmentin	4	2
Ciprofloxacin	1	0.5
Doxycycline po	1	0.5
No usage	27	13.5
Total	200	100

It shows second line antibiotic used in PICU are Amikacin 75% and Vancomycin 6.5%. Other drugs used were Piperacillin+Tazobactam, Augmentin, Ciprofloxacin.

Table no. 4:

<b>Third line of antibiotic used among the patients</b>		
<b>Third line of antibiotic used</b>	<b>Frequency</b>	<b>Percent</b>
Pipzo	25	12.5
Vancomycin iv	16	8.0
Amikacin	6	3.0
Ceftriaxone	4	2.0
Meropenem	2	1.0
Metronidazole	2	1.0
Azithromycin po	1	0.5
Doxycycline	1	0.5
No usage	143	71.5
Total	200	100

shows Third line of antibiotic used among the PICU patients were 71.5% no usage of antibiotics and 12.5% Piperacillin and Tazobactam combination , 8% of Vancomycin were used in PICU. Other antibiotic are Amikacin, Ceftriaxone, Meropenem. Metronidazole, Azithromycin.

Table no.5:

<b>Common Antibiotics used among the patients</b>		
<b>Common AB used</b>	<b>Frequency</b>	<b>Percent</b>
<b>First line of AB</b>		
Ceftriaxone	111	55.5
Augumentin	65	32.5
<b>Second line of AB</b>		
Amikacin	150	75.0
Vancomycin	13	6.5
<b>Third line of AB</b>		
Pipzo	25	12.5
Vancomycin	16	8.0

#### **Discussion:**

The goal of the study is to assess and analyse pattern of antimicrobial drugs used in pediatric patients in PICU with RTI and to identify the factors to decide the selection of antibiotics. Here main aim is to determine percentage of patients who received antimicrobial agents in RTI, also this study reveals extent of use and temporal trends of antimicrobial usage in PICU. In our set up, PICU of VIMS, Ballari demography of patients shows most of the age group under 5 are hospitalised in PICU which is 40%. Whereas male children admitted were 42%. J. Pandiamunian et al, done a prospective hospital based cross sectional study in the PICU of tertiary care hospital located in puducherry showed 61% of male children and 39% were female children age group ranging from 1-12 years. Mean age of patients admitted in PICU was found to be 18.93 months.<sup>9</sup> In another study done in south India done by Shivleela et. al, retrospective study pediatric in patient showed mainly 54% of males and 46% of females whereas age group again under 5 age group were most hospitalised.<sup>10</sup>

#### **Conclusion:**

First line antibiotics used were ceftriaxone, Augmentin, 2<sup>nd</sup> line antibiotics were amikacin, vancomycin, 3<sup>rd</sup> line antibiotics were piperacillin tazobactam, vancomycin. All patients received parenteral therapy intravenous and intramuscular according to the need Antibiotic bundle care was met according to the quality care indicators of ICU from ISCCM.

#### **REFERNCES:**

1. Definition of a paediatric according to American academy of paediatrics (AAP). [www.pedjobs.org/pdf/AAP](http://www.pedjobs.org/pdf/AAP).
2. Palikhe N. Prescribing Pattern of Antibiotics in Pediatric Hospital of Kathmandu Valley. *Journal of Nepal Health Research Council*.2004;2(2):31-6.
3. Shankar PR, Upadhyay DK, Subish P, Dubey AK, Mishra P. Prescribing patterns among pediatric inpatients in a

- teaching hospital in western Nepal. Singapore Med J 2006; 47(4):261-265.
4. Revai K, Dobbs LA, Nair S, Patel JA, Grady JJ, Chonmaitree T. Incidence of acute otitis media and sinusitis complicating upper respiratory tract infection: the effect of age. Pediatrics 2007; 119: e1408–12.
  5. Resi D, Milandri M, Moro ML, et al. Antibiotic prescriptions in children. J Antimicrob Chemother 2003; 52: 282-86
  6. Lopez, A F Cubells, L Garcia, J Fernandez, J and The Spanish Society for Pediatric Emergencies (2003) Procalcitonin in pediatric emergency departments for early diagnosis of invasive infectious infants: results of a multicenter study and utility of rapid qualitative test for this marker Pediatric Infectious Diseases Journal 22 895 -903
  7. Gonzalez BE, Rueda AM, Shelburne SA 3rd, Musher DM, Hamill RJ, Hulten KG. Community-associated strains of methicillin-resistant *Staphylococcus aureus* as the cause of healthcare-associated infection. Infect Control Hosp Epidemiol. 2006;27:1051-6.
  8. Huang SS, Lee SC, Lee N, See LC, Tsai MH, Shieh WB. Comparison of in vitro activities of levofloxacin, ciprofloxacin, ceftazidime, cefepime, imipenem, and piperacillin/tazobactam against aerobic bacterial pathogens from patients with nosocomial infections. J Microbiol Immunol Infect. 2007;40:134-40.
  9. Marcdante K.J, Kliegman R.M. Nelson Essentials of Pediatrics 7th ed. Elsevier Saunders 2015;(16)110:358p
  10. The Lancet series on Pneumonia and Diarrhoea <http://www.thelancet.com/series/childhoodpneumonia-and-diarrhoea> accessed on 20/10/2019

---

Date of Submission: 11 December 2020

Date of Peer Review: 02 January 2020

Date of Acceptance: 18 February 2020

Date of Publishing: 30 March 2020

Author Declaration: Source of support: Nil , Conflict of interest: Nil

Ethics Committee Approval obtained for this study? Yes

Was informed consent obtained from the subjects involved in the study? Yes

For any images presented appropriate consent has been obtained from the subjects: NA

Plagiarism Checked: Urkund Software

Author work published under a Creative Commons Attribution 4.0 International License



Creative Commons Attribution  
4.0 International license

CC BY 4.0

DOI: 10.36848/IJBAMR/2020/12185.51235