

Original article

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

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Abstract:

Introduction: WHO observes World Antibiotic Awareness Week every year from November dated 18 – 24. The theme for 2019 is the future of antibiotics depends on all of us. Another move from WHO headquarters in the year 2019 is trying to launch an educational app on antimicrobial resistance, looking forward help from other partners to launch.

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: It showing other associated conditions among the patients those are mainly Febrile convulsions for about 7.5% and pulmonary TB about 1.5% This shows always RTI cause is multifactorial. Table no. 14 also shows other associated conditions where there is involvement of severe anaemia 4% , respiratory distress 3%.

Conclusion: These patients were involved with other associated conditions namely, Febrile convulsions, severe anaemia, respiratory distress. Prescription pattern in PICU showed 2 antibiotics were preferred by the paediatrician to treat RTI. Diagnostic criteria were all met by the physician for empirical therapy.

Introduction:

WHO observes World Antibiotic Awareness Week every year from November dated 18 – 24. The theme for 2019 is the future of antibiotics depends on all of us. Another move from WHO headquarters in the year 2019 is trying to launch an educational app on antimicrobial resistance, looking forward help from other partners to launch. Along

with that WHO has developed a campaign on injection safety called “get the point- make smart injection choices”, to give the knowledge for the prescriber and health care professionals to improve clean care for all.¹

A therapeutic agent produced synthetically or by an organism which selectively destroys microorganisms such as bacteria, fungi or protozoa is called as antimicrobial agent.² Antibiotics are substances produced by microorganisms which selectively suppress the growth of or kill other microorganisms at very low concentration. Here definition excludes other natural substances which also inhibit microorganisms but are produced by higher forms, for example, antibodies or even those produced by microbes but are needed in high concentrations (ethanol), lactic acid, H₂O₂.³

In the case of community-acquired pneumonia most commonly used antibiotics are Amoxicillin, Amoxicillin-clavulanic acid, Ampicillin, Cefotaxime, Ceftriaxone, Ciprofloxacin, Cotrimoxazole usually in routine.⁴ In Paediatric Intensive Care Units (PICU) usually, children with acute illness or critical illness are admitted, who require special care and monitoring. In any PICU a pediatric intensivist is concerned about antimicrobial use in the unit. Most commonly prescribed Antibiotics in PICU some of the studies showed that aminopenicillin, aminoglycosides used in first 3 days of hospitalization in other studies they were cefazolin, vancomycin, cefotaxime, piperacillin-tazobactam combination, Ceftriaxone.⁵

When Mortality rates among patients suffered from pneumonia to other diseases in PICU it is death rate of pneumonia which is leading, also survival rate is less along with the length of stay of patients which is more.⁶ Reasons for deaths: In pneumonia mainly in PICU is because of secondary infections caused due to gram-negative infections with pseudomonas, Klebsiella, E coli, Acinetobacter along gram-positive cocci like Staphylococcus aureus. Relatively extreme age is a risk factor for infection in PICU because of the immature immunological system. Prolonged intubation and mechanical ventilation is also other cause.⁷

Methodology

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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:

Table no. 1:

Associated conditions among the patients		
Condition	Frequency	Percent
Infections		
Malaria	1	0.5
Meningitis	2	1.0
Pul TB	3	1.5
HIV positive	1	0.5
Sepsis	5	2.5
Malformations		
CHD	2	1.0
VSD	1	0.5
Anorectal MF	1	0.5
CNS		
MR with Seizures diso	2	1.0
Febrile convulsions	15	7.5
Tonic clonic seizure	1	0.5
Seizures	1	0.5

Table is showing other associated conditions among the patients those are mainly Febrile convulsions for about 7.5% and pulmonary TB about 1.5% This shows always RTI cause is multifactorial. Table no. 14 also shows other associated conditions where there is involvement of severe anaemia 4% , respiratory distress 3%.

Table no. 2:

Associated conditions among the patients		
Condition	Frequency	Percent
Deficiency		
PEM	6	3.0
Severe anaemia	8	4.0
Sickle cell anaemia	1	0.5
Febrile thrombocytopenia	2	1.0
GIT		
Acute GE with dehydration	2	1.0
Parenteral diarrhoea	2	1.0
Others		
Respiratory distress	6	3.0
Drowning	1	0.5

Discussion:

Main aim of this objective is for evaluation of rationality of prescription. There are multi-factors which are contributing to choose an antibiotic for any infective studies. Since pneumonia is most prevalent disease all over the world and even in our set up VIMS ballari, this study is just an effort to bring some the factors. In our study we have considered mainly empirical therapy for consideration as this is feasible and cross sectional study.

The main problem in PICU admission is most of the antibiotics prescribed before admission of patient to PICU due to many initial illness. The other reason is polypharmacy practiced by some of the prescribers in rural setups with old school of thought. In our study we have taken guidelines from the quality indicators for ICU especially from Indian Society of Critical Care Medicine (ISCCM) as a scale for comparing antibiotic prescription policy in as ours is an Indian study.¹⁶¹ All criteria's have been met by the pediatric physicians according to the guidelines of ISCCM.

Here mainly feasible antibiotic indicators are taken:

1. Clinical criteria for initiation of antibiotic therapy:
2. Initial empiric antibiotic of choice based on local policy.
3. Removed infected sources
4. Daily review of antibiotic choice and continuation follow up.
5. Regular expert input from PICU physician.
Outcome indicators:
6. Length of stay of patients: whereas the study done in our institute general PICU minimal length of stay is taken as 4 days and maximum is taken as 14 days.

In our setup VIMS Ballari PICU the diagnostic criteria followed were as above by all the physicians in treating RTI. Hepler et al, interviewed physicians and gave following points for decision to initiate empiric antimicrobial therapy 1, patient might become septic 2, an infection was causing an exacerbation of underlying disease, also patients clinical status to decline, 3, patients predisposed to severe infection.¹⁶²

In the current scenario ours being a developing country for practice, maintenance doctors prescribe antibiotic though there is no need in PICU due to limited amount of beds, lack of time, overcrowding of patients, empiric antibiotic prescription was considered. In the study done by Kunin et al, have captioned the problem as "drugs of fear" medical representatives also claim physicians to use recent antibiotics.¹⁶³

Conclusion:

These patients were involved with other associated conditions namely, Febrile convulsions, severe anaemia, respiratory distress. Prescription pattern in PICU showed 2 antibiotics were preferred by the paediatrician to treat RTI. Diagnostic criteria were all met by the physician for empirical therapy.

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